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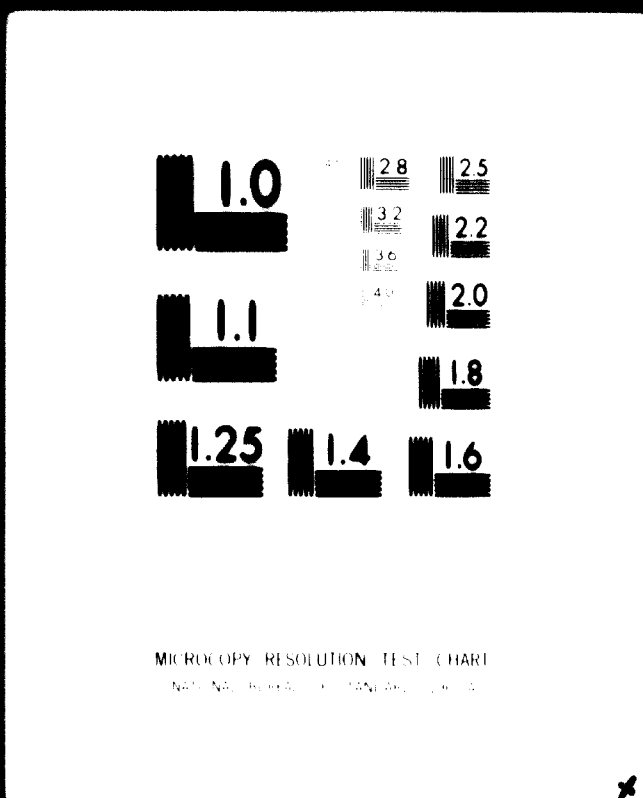
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\* \* \* \*

Jerusalem, June 1973.

UNIDO-United Nations Industrial Development Organization  
Vienna

Dear Sirs,

The two volumes submitted here contain the Text and Appendices of the Final Report of the Foodprocessing Industry Development Plan for the UNDP Project Area in the Bosanska-Krajina region in the Republic of Bosna & Hercegovina of Yugoslavia.

The report aims at a plan which seems realistic, practical and implementable under regional conditions. The plan, in its contents and size, could have a significant economic impact, within a few years, by contributing to a considerable rise of regional percaput income. This added income would, by nature of the plan, be distributed among the regional enterprises and family units in the primary, secondary and tertiary sectors, and it would be partly derived from the domestic Yugoslav market and partly from foreign currency sales.

The IBC team concluded, jointly with its Yugoslav counterparts in each field, that much can be achieved, in a relatively short time and with local human resources, by organizing the productivization of existing production factors in industry, agriculture and trade. Also, that new investments and projects should be built by and around the existing nuclei.

The team was impressed and stimulated by the demonstrated progress in similar agroindustrial activities in other regions of Yugoslavia. We were also impressed and convinced by the strong awareness of the regional bodies - of the B&H republic, the communes and the enterprises of the project area - that there was an urgent need to give special attention to raise the development level of the region to that of the more developed surrounding areas in Yugoslavia, and the overall readiness to take bold steps in that direction.

In our presentation we felt it was important to describe, analyze and propose for decision specific regional solutions but at the same time to point out their relative position within the total Yugoslav foodindustry development. This meant considering implications beyond the Project Area, in many aspects. The recent changes in the world food and feed supply situation, asentuated in the last weeks, give added weight to this approach.

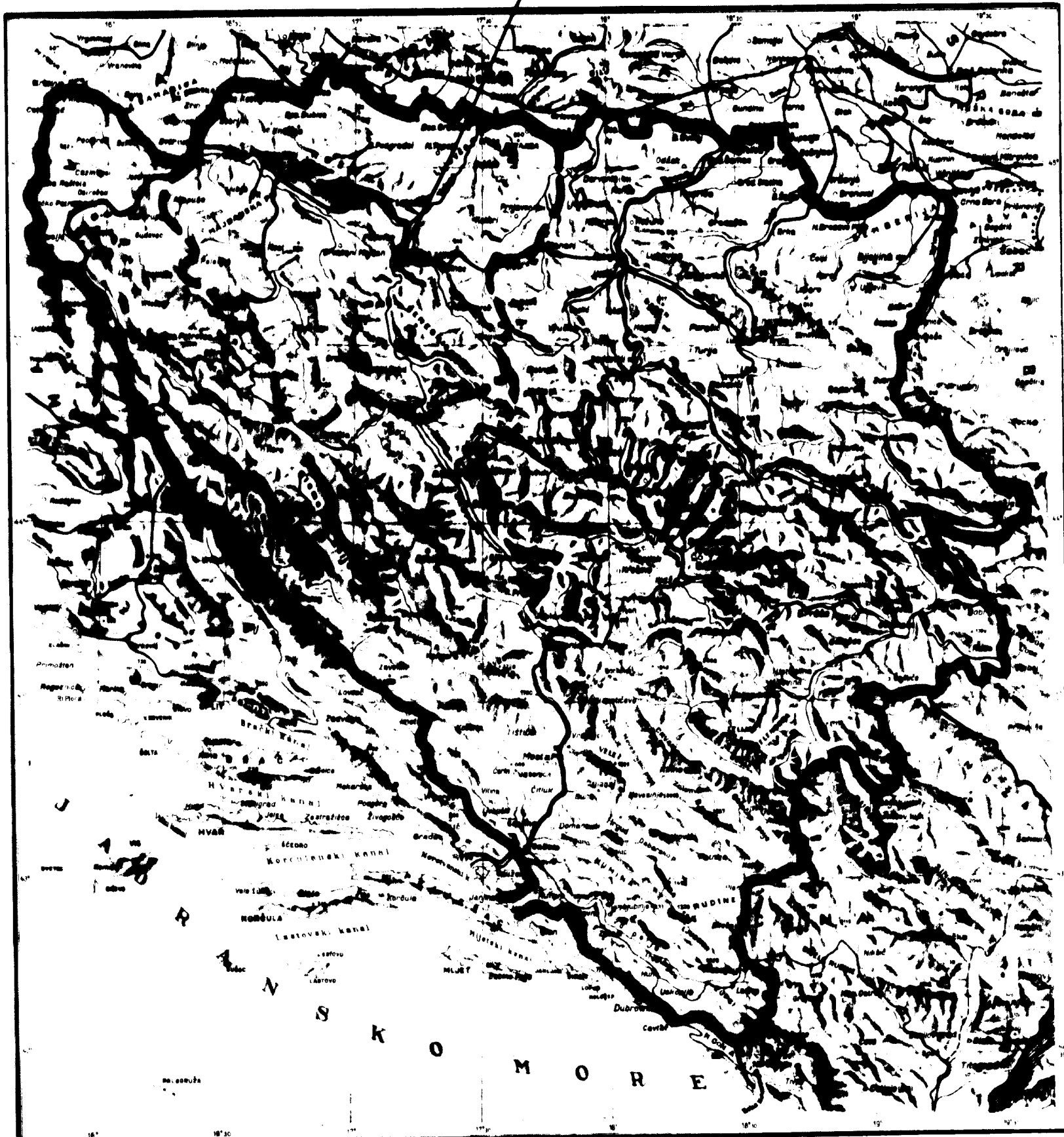
Regarding the way of presentation a few remarks are required. It is clear that there are several alternative techniques and structures of presentation possible in a report and that none can be perfect or full. It has to be kept in mind that in a report covering a broad economic sector for a whole region the planners have to strike a balance between modes of emphasis in presentation. The team members are aware that such a report should contain data and analyses looked for by the Yugoslav regional institutions and enterprises, by UNIDO and FAO, by financing bodies, and by others involved in the steps of decision and implementation. In trying to find a common denominator it was often necessary to sacrifice emphasis for one reader group for the benefit of another. However, it was attempted that these limitations should not influence the clarity of argumentation. Also, as far as possible the language of the report has been intentionally kept free from words and phrases which semantically, or via different interpretation of technical terms under different economic systems, might have led to misinterpretation - per se or in the Serbo-croat translation.

The team notes with satisfaction that a very close working and personal relationship was developed between it and the staff of enterprises, institutions and institutes, authorities and many individuals in the project area, the B&H republic and other regions of Yugoslavia. This full cooperation and interchange of ideas made it possible to reach the consensus on primary acceptance of the framework and major recommendations of the plan by the regional groups. This consensus can be considered vital and a first basis for the stagewise implementation of the plan.

Our gratitude is extended to our colleagues in all these Yugoslav bodies, to the FAO Project Manager for his guidance, cooperation and understanding, and to the UNIDO/Vienna and FAO/Rome staff for their continuous efforts to steer the project on course and to attach to it the priority it deserves. It has been a pleasure and honor for us to have been entrusted with our part of the joint effort to conceive and formulate this Development Plan.

# SR BOSNA I HERCEGOVINA

BK PROJECT AREA WITHIN B&H REPUBLIC



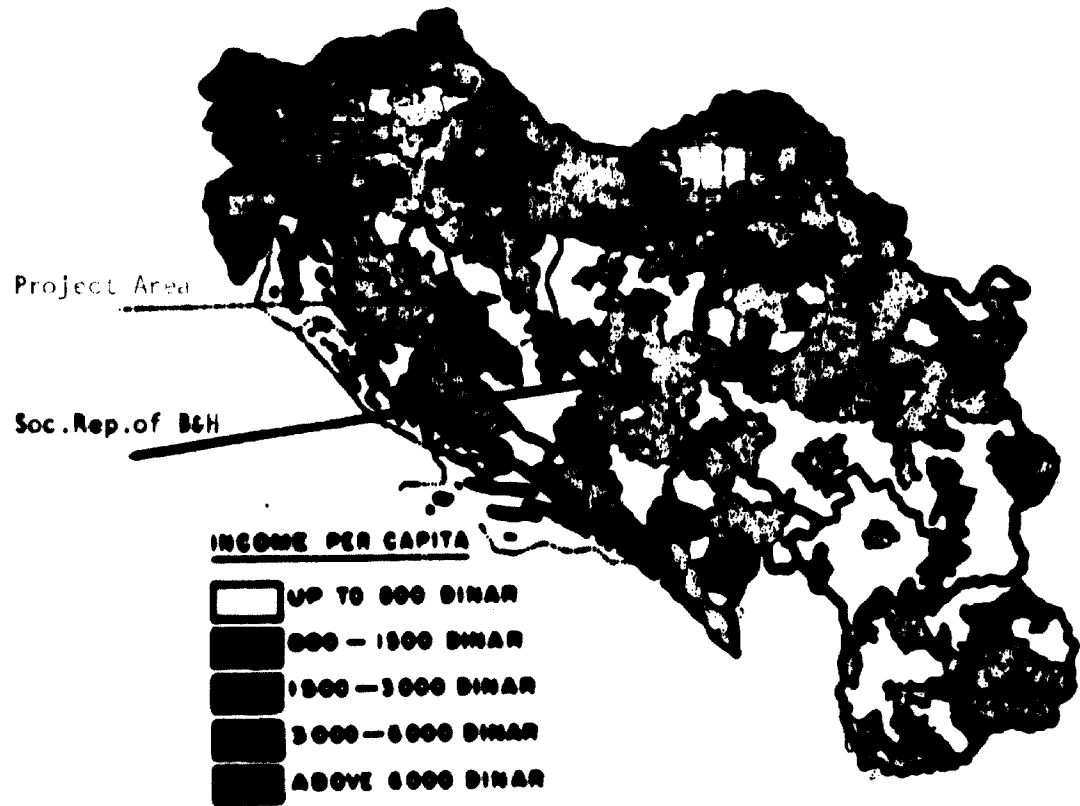
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PLAN IZ OBLASTI



# YUGOSLAVIA — INCOME PER CAPITA



I. SUMMARY

## S U M M A R Y

### A. OBJECTIVES OF PROJECT

The objectives of the UNIDO/FAO project were to examine the foodprocessing industry and its potential in the Bosanske-Krajina (BK) region of the Republic of Bosna-Mercegovina (B&H) in Yugoslavia and to propose a development plan for the region in the fields of vegetable, fruit, meat, milk and cereals processing.

### B. PERFORMANCE OF PROJECT

A team totalling eleven experts worked in the project region during three fieldwork periods in 1972:

(i) May 15 - June 13	Nine Experts
(ii) July 24 - August 5	Two Experts
(iii) August 30 - September 23	Four Experts

Parallelly and subsequently to this fieldwork in Yugoslavia, fieldwork was performed in several West-European countries (Germany, Austria, Sweden, France, UK, Holland, Switzerland) to gather market data and evaluate future marketing and knowhow/cooperation possibilities. Additionally, homeoffice work in Israel was carried out during the whole phase of the project.

The fieldwork in Yugoslavia was divided into several main groups of activities:

1. Repeated plant visits and discussions at all levels in the existing foodprocessing industry in the project region, in order to study the situation, the problems and the development programs of the individual enterprises.
2. Working sessions with the FAO Project Manager and the Counterpart Agency (Zavod za ekonomiku privreda - "ZEP").
3. Plant visits and discussions at various agroindustrial kombinats in other regions of Yugoslavia
4. Market research work in Yugoslavia -
  - a. Gathering of statistics in the project region, in Beograd, Zagreb and other centers.
  - b. Meetings with various trade, professional and other organizations in the food-processing fields to discuss industry problems and obtain data and to check data, views and proposals.
  - c. Working sessions with the ZIT market research institute in Zagreb which was contracted by ZEP to prepare various Yugoslav market data according to terms of reference drawn up by the team.
  - d. Visits by team members to retail outlets in the main town, smaller towns and the Adriatic tourist areas - this in addition to a systematic sample survey of retail outlets performed by ZIT as part of c. above.
5. Working sessions with senior representatives of the communal authorities in Banja Luka and the Republic of B&H authorities in Sarajevo.
6. Visits to foodprocessing institutes and laboratories in Beograd, Novi Sad, Cacak, Zagreb.
7. Inspection and sampling visits to several agricultural areas in the project region in order to study farming problems, the microclimate, and new agro-production possibilities.
8. Roundtable conferences with the managements of the foodprocessing enterprises of the region and the republic and communal representatives in order to learn about common problems and later on in order to propose first thoughts of the team about a development program and to obtain initial consensus of the participants of their acceptance in principle of the lines of thinking and the

series of projects proposed. The last of these conference, held in Banja Luka on September 13, was attended by representatives from UNIDO/Vienne and FAO/Rome as well. At this conference wide consensus was achieved on all the main points and conclusions discussed and these form the body of this report.

### C. SUMMARIZED FINDINGS

#### 1. The present situation in the foodprocessing industry in BK

- a. The industry is approaching a breakthrough point inasmuch as it is about to move from simple production and small-radius marketing to more sophisticated, largescale production.
- b. Profitability, utilization, and other key factors vary from a satisfactory situation in some plants - particularly those that are specialized and integrated with large enterprises outside the region - to unsatisfactory, particularly in the slaughterhouses.

Most of the recent expansion investments (Vitaminka, Dairy, Zitoprodukt) were well planned but need more product lines for better utilization of invested resources.

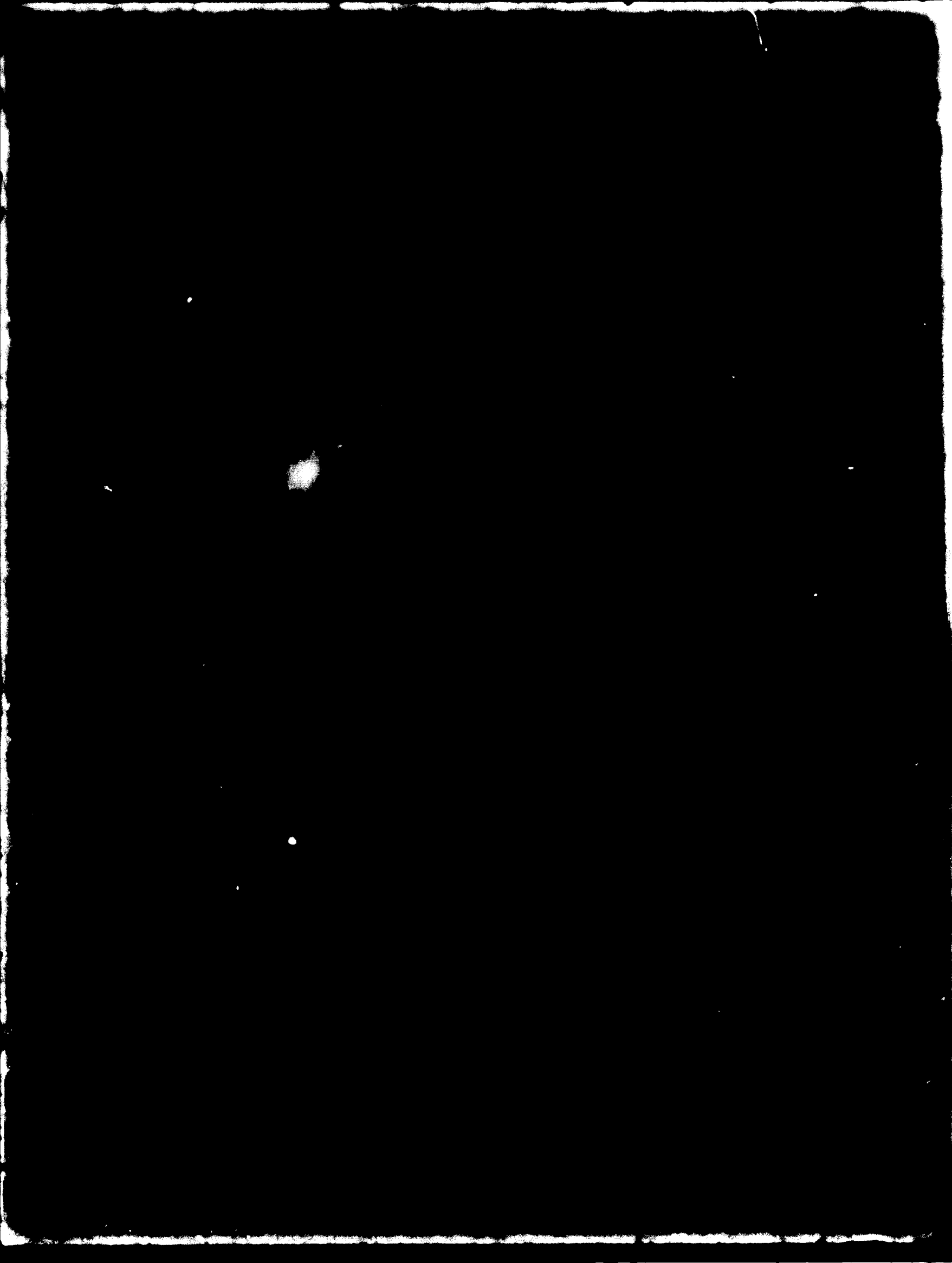
- c. Industry has difficulties to obtain their raw materials at the prices, quantities, times and qualities which it needs. Cattle, wheat, parts of vegetables, some milk are continuously "imported" from outside the region, mainly from the agricultural areas of Slavonia.
- d. Contract farming relationships are insufficiently developed and this is a major reason for the present lack of raw materials.
- e. Several development projects are in the planning or implementation stage, conceived and proposed individually by each enterprise. This has led to a positive impetus on the one hand and to emerging conflict situations between the enterprises on the other hand.
- f. There is presently no effective organizational framework for self-assistance by the enterprises to plan, fix priorities, present their case to the banks and authorities, and resolve their differences - most of which can in our view be resolved to the mutual satisfaction of the enterprises involved.
- g. Because of the relatively low income in the region the market for the industry has been restricted and, on the other hand, the industry could in its present state of development, not yet break through into the national market. The two plants that have marketing outlets outside the region are in a better position.
- h. There is a marked lack of a continuous "information base", i.e. the industry has not enough access to up-to-date information on markets, technology and other developments.

These weaknesses are pointed out here not as a criticism but in order to show where help and reorganization are needed in order to make it possible for the industry to embark on any major development program. Such a development program will have to be carried through by the enterprises themselves, within their plants or via new facilities which they will set up and it is therefore essential to include in any development program the organization and resources to overcome the stated difficulties in order to create the basis for an effective implementation of the development program.

#### 2. The Potential for Development

- a. It is the team's considered view, as expressed and explained in the final conference in Banja Luka, that the region is ecologically, geographically and in terms of manpower and market potentials well suited for much larger food-processing than today - also much larger than the formerly proposed industrial expansion projects of the individual enterprises
- b. There are several main preconditions to achieve such development:





1. Industrial activity will have to be concentrated in a few large specialized plants to become effective, profitable and self-generating - for the enterprises themselves and for the regional economy as a whole.

This development direction may for a time delay the dispersion of industry in several parts of the project region but after weighing all the pros and cons the team concludes that priority should be given to a policy of concentration.

2. Raw Material Supply will have to be organized to a much greater extent by the industry enterprises - including giving credit to the farmers, contracting with them, giving them extension services in the widest sense.
  3. Forward (market-oriented) Integrative measures within Yugoslavia and in export markets will have to be undertaken in order to break out into wider markets.
  4. An organizational framework has to be created by the enterprises in the form of a selfmanaged "Rooforganization" (R.O.). This will enable the carrying out of the development program in its stages by selfimposed priorities, streamlining, concentration of scarce technical staff resources as a service to all enterprises. Also, it will make it possible for the industry to present and work out its needs with the authorities, as to raw material sources and market outlets in a coordinated way.
- c. It has been proven in Yugoslavia and elsewhere that similar sets of preconditions, if implemented, do operate successfully. The team feels that after a number of working sessions in the region consensus was achieved with the enterprises and the authorities that development efforts will be made in the indicated directions.

### 3. Sectoral Summary.

#### a. Agricultural Aspects in the Project Area

1. Only those aspects were examined which have a direct bearing on the foodprocessing industry.
2. Data were developed on production and marketing aspects of various crops needed for the various development programs proposed in this project.
3. A specific arable area is being suggested as one possibility for direct Vitaminka growing of specific raw materials for its expansion program.
4. A procedure for land use optimization is suggested for further action on detailed planning of the agresources in selected parts of the project area.

#### b. Vegetables and Fruit Processing

1. The carrier for this sector should be Vitaminka and it should be given the possibility to extend sales to wider markets and to have access to raw materials.
2. The adoption by Vitaminka of the proposed development program could lead to productivization of Vitaminka and its taking a leading position in the Yugoslav canning industry.
3. Specialization in high-quality, high-price products should be chosen.
4. Babyfood, Sweetcorn (canned and quickfrozen), highgrade vegetables and fruit are processed for graded fresh sales, canning and/or quickfreezing. Potato and vegetable seeds projects are also proposed
5. The plum surplus problem is analyzed - one conclusion is that it needs wide action on republic level.

#### c. Meatprocessing Industry

1. The region has large livestock breeding meatprocessing potential which is presently completely underutilized.

2. Small regional slaughterhouses, partially using livestock from outside the region, are the only industry at present. Suggestions are made on some improvement in their overall working.

Unconnected with (2) above, it is proposed to embark on a longterm large integrated meat development project, consisting of feedstuff ingredient production (forage grains and protein values), feedmix production, livestock increase and improvement, modern meatprocessing (of this regional livestock) for the domestic market and for export.

This project is seen as the possible lever for a significant increase in the percaput income of the region. Considering its importance it is recommended to make large efforts to mobilise and organize the required resources for phased execution. The total investment - needed over several years - would be large but it would be selfliquidating in terms of payout and of hardcurrency

3. The Stojanovic Kombinat is proposed as the carrier of the Meat Development Project.

#### d. Feedstuffs Production

1. The problematics of the Yugoslav feedstuff economy was analyzed, particularly in terms of lack of indigenous highquality vegetable protein values.
2. Implications of the continuation of present animal feeding systems on the exportability of meat to competitive future European meat import markets are discussed.
3. A program is presented for an integrated soybeans growing and processing complex.
4. Measures are proposed to increase forege yields, as part of the feedstuffs supply
5. The feedstuffs projects were quantified and connected to the Meat Development Project

#### e. Milk & Deiry Products Production

1. Today about 10% only of the region's cowmilk output is processed by the Banja Luka dairy which is the only dairy in the region
2. It is proposed to give priority to increased collection of milk from the farmers, by various organizational, logistic and incentive measures which are detailed in the relevant chapters.
3. Increase of milk output in the region should be given second priority, after the first priority is solved
4. It is suggested to change the expansion program of the dairy by widening output and range of products. This would achieve a larger turnover and consequently productivisation of the investments made
5. Cheese production in other BK locations is recommended

#### f. Cereals Processing

1. Cereals Processing in the region today consists of several locally-oriented flour mills and bread bakeries, plus one sizeable biscuits/waffles plant which, via integration with a nationwide produce/distributor, has access to the whole domestic market
2. One of the bakeries, the Urbanja/BanjaLuka bakery of the regional Zitoprodukt production/trading enterprise, is very modern and spacious
3. It is proposed to expand the cereal processing industry by production of industrial cakes, specialty breads, oriental sweets, various snackfoods. This would be profitable as such and also help to productivise recent heavy investments in the bakery.
4. Zitoprodukt is suggested as the carrier of the cereals processing development

g. Fish and Riverfood Processing

Proposals are made for starting the breeding of various types of fish, including processing of trout by smoking, and of lobster farming.

D. SUMMARIZED COST OF DEVELOPMENT PROGRAM AND EXPECTED MAIN EFFECT ON THE BK ECONOMY

The program was conceived to optimize towards maximum quickest practicable regional income improvement via agroindustry, i.e. a systematic combination of foodprocessing and agrodevelopment.

The program evolved would be implemented in stages and is flexible. However, once a decision will have been made on any product line or "sub-system" it will be imperative to organize the resources for the complete, phased and interrelated implementation of that particular project. If that will not be done, the opposite of the desired effect will happen - instead of productivising past investments and streamlining the situation, the burden and complexity will be increased.

The main additional projects recommended in the various sectors and their expected impact are summarised here. The summary does not contain several peripheral non-definitiva projects - agricultural and agroindustrial - detailed or mentioned in the report.

ALL FIGURES IN MILLION \$ (17 ND = \$1) xx)

PROJECT GROUP	Total fixed new investment for maximum fullstage implementation	ALL FIGURES IN MILLION \$ (17 ND = \$1) xx)		Approx. Increase of Annual Regional Income (direct nett)
		Hard Currency	Added Sales Hard Currency	
Meat Development	85.8	25.5	109.4	79
(Complex - Kombinat incl. livestock + feedstuffs devlpt)				
Vegetable/Fruit Canning, etc.- Vitaminka	4.2	1.5	17.5	14 <sup>x)</sup>
Other Veg./Fruit Project - Vitaminka jointly with others	0.2	0.1	2.0	1.5 <sup>x)</sup>
Cereals Processing - Zitoprodukt	1.5	0.5	6.8	5.5 <sup>x)</sup>
<b>TOTAL</b>	<b>91.7</b>	<b>27.6</b>	<b>135.7</b>	<b>100.0</b>

x) includes sales to foreign tourists and, in meat complex, imports substitution.

xx) excluding dairy operations for which the main investments have been made.

It is seen that the major simple factor in agroindustry that could significantly increase the region's wealth would be LARGE SCALE MEATPRODUCTION.

The "nett added value" of \$100 million, of which a large part in direct or indirect hard currency, will be - if achieved - a real nett added income to the region. It would thus increase nett annual percaput income by about \$130, and this income will be dispersed across the population since a large part of it will be farmers' incomes (for livestock breeding and crops) generated through the organization, production and sales activities of the industrial plants (See final section of Meat Industry chapter for detailed explanation of nett added value concept)

All projects proposed are estimated to give reasonable profitability provided they are properly implemented, they deal with products which would have a good continuous market, and we believe they can, over time and with certain organizational preconditions, be implemented with/by the human resources mobilisable in Yugoslavia for the region

2. RECOMMENDATIONS

## 2. RECOMMENDATIONS

- A. A development program for BK agroindustrial development is presented which has possibilities of implementation if the following conditions will exist:
- a. Financing will be made available.
  - b. The program, or specified parts of it, will be approved and adopted by the regional authorities and enterprises and obtain their full support.
  - c. The organizational recommendations are carried out to a sufficient extent so as to create a proper implementation basis.

B. The major recommended policy lines could be summarized as follows:

a) Meat Production in Bosanska-Krajina

Financial, managerial and physical resources should be concentrated on a massive program to create a vertically integrated meat industry of the region.

This implies investments and reorganization of the infrastructure, including:

1. Change in feeding system of cattle and other meat animals.
2. Large organization of Contract Farming.
3. Large expansion of feedmix production.
4. Agricultural growing and industrial preparation of protein values for animal feed, mainly soya.
5. Improvement of forage lands.

This infrastructure could give a large continuous meatsupply of quality which will at any time in the foreseeable future be saleable in many export markets, most of which are near to Yugoslavia, and also domestically. In order to have this meatsupply upgraded in value and in variety for optimum and continuous income, it is recommended to set up in stages a modern large slaughterhouse-meatprocessing complex which would work at top export quality and would be independent of the meat production facilities for regional consumption. This complex should contain:

6. A slaughterhouse and meatprocessing plant with an annual throughput of 150-200,000 head of cattle and 200-250,000 pigs, plus some quantities of sheep.
7. A slaughterhouse and processing plant for 7 million broilers, as the first stage of expanded poultry production and processing in the region.
8. A by-products utilization (rendering) plant to treat the regional byproducts for both economic and sanitary reasons.

In order to start the planning and implementation of this project, a Meat Division should be set up in the Mladen Stojanovic Kombinat which will be directly charged with the detailed work.

The Meat Division should also have a special department dealing with the organization of feedstuff production - from the agricultural side, such as the introduction of soybeans, better forage crops, etc., till and including the supply of ready feedmix to the farmers and installations which will raise the animals.

b) Major Organizational Changes.

In order to carry out the development program two major organizational changes are recommended:

1. Creation of a BK Foodprocessing Rooforganization.

- (i) This body should be set up by the industry enterprises immediately, starting with a small nucleus. All the activities which will be accepted as belonging to this body should be exercised by it, on behalf of the industry, towards the enterprises, the authorities, the farmers, financing institutions and the outside regions.
- (ii) Investment Funds and decisions should be channelled through this body and specialized manpower and activities of an overall character should be concentrated in it.
- (iii) Financing of the activities should come from the budgets of the enterprises which will be members.
- (iv) The seat of the organization should be in Benja Luka.
- (v) A top management committee should be formed to be responsible for directing this body. It should consist of representatives of the member enterprises and of the communal authorities. It could be considered that the management committee nominate an Executive Director of the rooforganization from outside the enterprises, or outside the region, who has the experience and standing to carry out such a development program.

2. Restructuring of Relationships between the industry and the farmers, so as to create a strong Raw Materials Base.

- (i) The authorities could do much to help in furthering a legal framework which would encourage increased and more efficient production by the private farmers who constitute over 90% of the agroproduction potential. Creation of farmers' associations, credits for capital investments and inputs on secure but conditional terms, and a detailed policy that will make the farmer a productive participant in the development program, could be of great value. In some of the more developed regions of the Federation this has already been done successfully and the team believes, after discussions with communal and B&H republic representatives, that such are their intentions for BK so as to have the required raw material basis for the market-oriented industrial development aims.
- (ii) The industrial enterprises, individually in their daily management and coordinated in the proposed rooforganization, will have to make a large effort to attain the same effective type of contract relationship between them and the farmer-suppliers as is today practiced in many other regions of the Federation. Farming is today becoming a side occupation, instead of a main source of income, for many of the private farmers in BK and it is possible that only a strong, well organized incentive system can bring about that increase in raw material supply which will be required for the implementation of the proposed development program, or any significant parts thereof.

(iii) The banks and communal authorities should study the overall socioeconomic implications of this development program. Once it is approved in the proposed or modified forms, a large infusion of funds will be required into the agricultural sector, via the industrial enterprises (associated as a reorganization). The quantitative changes will be so high that a new qualitative approach will be indicated in regard to the granting of selective agricultural credit - via money and inputs - to the supplying farmers.

It is further recommended that the banks get involved with the development program "on the ground floor" and have their representatives become members of the committees which deal with the credit needs of both the enterprises and the farmers.

C.. Further general recommendations are:

a. Specialization.

The BK foodprocessing industry should plan to specialize in its plant units in production runs of related products and try to avoid unnecessary duplication and fragmentation, either among the regional enterprises or in competition with those Yugoslav products which are produced by a large number of enterprises in other regions.

b. Cultivation of special crops.

The development program contains several proposals for the cultivation of new types of crops. Most of these are intended to give a good market for new processed or (initially) semiprocessed vegetables or grains, as well as to increase the sales or profit per unit invested - both for the farmer and for the industry and the commercial sector - by having more sophisticated products available. It is recommended to support the necessary investments and organizational steps and give reasonable priority to such cultivations - whether they be done by the Kombinat, by private farmers or on new lands to be worked by the enterprises through new contract arrangements.

c. Utilization of spare capacities in the enterprises

In most of the enterprises of the region the team found the possibility to add additional products which could be produced with the existing equipment and space or with minor investments or space expansions. The proposals are shown in detail in the sectoral chapters of the report.

It is recommended to concentrate immediate attention to carry out these proposals. This will not detract resources from the large meat complex and on the other hand it can increase the profitability of the enterprises appreciably within a short time, and cause better productivisation of the present foodprocessing capacity in the project area.

d. Evaluation Criteria for New Projects

It is recommended that the planners in the development departments of the enterprises (who will be working as a group in the reorganization) should use market trends, international costs/prices, and "total self-cost concepts" (from field via factory to the market) to judge investment decisions. This seems to the team to be a very critical point. For instance, one of the major factors that influenced former calculations regarding soymeal feasibility was a distorted price situation as a result of imbalanced development in the vegetable oil industry, and connected matters. Similar considerations pertain to some cropland and forage land utilization, to dairy products prices, etc. The team pointed out these matters in several roundtable conferences and in individual meetings with plant managements and agreement was reached that in future development programs, a different, longterm method of evaluation will be used.



e. Strengthening of Information Base

It is highly important to strengthen the information base of the plant managements and departments - development, production, marketing - in a radical manner. The team found that complex and costly investment, production and marketing projects were being discussed, planned and proposed by the existing industry without the management's having sufficient access to up-to-date and full information in each field. The investment in an information base is only a fraction of the cost of mistaken or insufficient planning and implementation decisions. Details of the recommendation are proposed in the report sections, mainly in the section on the roof-organization's tasks.

f. Breakaway from Regional Internal Market

For understandable reasons the BK foodprocessing industry has till now been mainly marketing to the local, regional market - Banja Luka and surroundings, some parts of Bosnia outside the project region. Exceptions are Badel Bosanska of Banja Luka which has integration agreements with the Zagreb Marian Badel enterprise and produces certain articles for a wider market, the Mira Gikota biscuits plant of Prijedor which has a similar integration arrangement with the Zagreb Josip Kras chocolate enterprise, and a minor export turnover by Vitaminka of Banja Luka, via Voce-Export of Zagreb, vegetable preserves.

It is recommended that active steps be taken, via the roof-organization and the enterprises, to achieve similar market integration (and production division) arrangements with a number of established and expanding enterprises in other regions of Yugoslavia. This would greatly facilitate the implementation of the development programs and assure a better industrial base. The team has discussed such possibilities with a number of plant managements in Yugoslavia and there does seem to be concrete interest on their part to have some co-production and/or co-marketing integration arrangements in BK. The reasons are that they feel that BK, as a developing region of the Federation, has easier access to basic investment credit, that BK has a labor pool and a potential for expansion, whilst being geographically near the markets of Croatia, Srbija and the tourist regions of the Adriatic coast.

g. Marketing and Knowhow Agreements with Foreign Industry and Commerce

Although it will not be easy to have conclusive and quick realizations of such agreements, they are possible and are in practice arranged between many Western European and Southern European enterprises. It is recommended that the roof-organization deal with this subject which is one of the prime possibilities for building up a permanent export market for some of the goods to be produced.

h. Training and Manpower Development

The roof-organization should see as one of its immediate tasks the creation of a long-term training program for various echelons of the foodprocessing industry. This training could be done partly in Yugoslavia and partly abroad. In order to obtain effective results, training of 6-12 months or more is essential, to be performed on an "in-plant" basis in producing enterprises, sales organizations and planning institutes.

Simultaneously it would be useful to have teams from the enterprises go on 2-4 weeks' studytours to various specific organizations in several foreign countries, to acquaint themselves with up-to-date practices in their field. A number of such tours, connected with the proposed development programs, have been suggested in the relevant section of the report, and it is recommended that UNIDO finance them.

i. Tourist Area Market on the Adriatic

This market is becoming a potentially large seasonal factor. Due to the location of BK industry it is recommended that arrangements are made for storage and distribution of BK-origin food products in those areas.

## D. Specific Sectoral Recommendations

### I. Vegetables/Fruit Processing

- a. Vitaminka to be a self-financing enterprise, as material supply, including solution of temporary seasonal differences between Vitaminka and the Kombinat Contract Farming, is wide range of the purchasing agents plan. The use of NIT and other organizations to be sufficient results over time. None of the proposed technologies and plants should be dropped because of fear of nonavailability of vegetables and fruits. The required quantities and cost of the above mentioned in the report.
- b. Vitaminka to be the carrier of several projects of technical and expansion projects, to include the production of the 5 million tons of investment in the plant.

Vitaminka has a 912 tonnes per 79 m<sup>2</sup> ND in the light of which and 175 mill. ND in 1975. The high yield is a product which contains a quantitative increase of the standard products and locally. This would have meant a production increase from 9,500 tons to 24,000 tons.

It is recommended to have a different expansion of Vitaminka in addition to their program. This would include a series of new products which would in three stages add up to a total of 24,000 tons per year, to triple their intended peak target and increase the turnover from 175 mill. ND up to 475 mill. ND. To add another 300 mill. ND in new products, to relatively small additional investment of 150 mill. ND to cover these stages.

Such production would turn Vitaminka into a viable enterprise of national standing and at such time when Vitaminka could also afford the development exporting, and other semi-automated machinery which are required to keep large production going.

The main products recommended for stage-wise introduction are:

- Baby food (homogenized) - 100,000 tons/year
- High grade baby food - 100,000 tons/year
- Canned Sweet Corn - 100,000 tons/year
- High grade Canned Corn - 100,000 tons/year
- Pickled Baby Food - 100,000 tons/year
- Canned Champignons - 100,000 tons/year
- Canned Apple Cakes - 100,000 tons/year
- Canned Asparagus - 100,000 tons/year

- c. Quick-frozen Vegetables and fruits can be made into meat dishes as well should be produced at the Bismarck-Gladstok quick-freezing plant erected by the Kombinat. The plant is to be financed and operated by the Kombinat. It is recommended that the plant be built in the winter season, to allow seasonal cultivation of vegetables and fruits, to be able to start the day to launch the plant. The plant should be built in the winter season to start the day to launch the plant. The plant should be built in the winter season to start the day to launch the plant.
- d. A potato storage project should be started by the Kombinat, possibly in the Glanac area. Here 25,000 tons of potatoes should be stored for up to 7 months, to be able to start the day to launch the plant. This would give the plant a 100,000 tons per year.
- e. A vegetable seed project should be started by the Kombinat. The seed should be used to start the seeds and to profitable operations of the plant and of the farm.
- f. Cultivation of high quality potatoes should be started, since these have an excellent market and the seeds are available.

Cultivated potatoes - 100,000 tons/year

100,000 tons/year

100,000 tons/year

- g. Other vegetables should be planted on an increasing scale in order to upgrade the raw material supply base for industry, and also to get the farmers used to more sophisticated products demanded by today's and tomorrow's markets. These include broccoli, cauliflower, babycorn, chicoree, etc.
- h. On the plum surplus problems, the recommendations are:
  - i) The problem cannot be resolved regionally. It would require a coordinated solution by a Plum Utilization Board of B&H plus Srbija.
  - ii) Better grading and packing are a precondition for better sales.
  - iii) Controlled atmosphere storage would make possible after-season sales in the West-European market - assuming that only top quality graded fruit will be stored.
  - iv) A combined grafting and eradication program should be drawn up.
  - v) Anti-season sales to the southern hemisphere should be considered. This would require introducing a new variety which is transportable for longer periods at +1°C.
  - vi) Certain processed plums products (Powidl, plum pulp) have some markets but this would not materially affect the plum problem which is quantitative and dispersed.

## 8. Meat Industry Complex (See also Recommendations B.1. at beginning)

- a. Various improvement steps are recommended for the existing or presently constructed slaughterhouses in the region.
- b. Livestock Supply
  - i) Contract cattle raising and pig breeding in the region should be organized on a large scale in order to form the basis for a large exporting meat industry complex.
  - ii) The local "Busha" cattle can be upgraded by cross breeding and active steps should be undertaken in this direction.
  - iii) The Kombinat should organize a large "Meat Division" as an essential organizational measure to start a large scale meat industry in BK. The first task of the division would be to plan a 5-year scheme for bringing livestock supply up to the requirements of the development project.
- c. Meat Processing Plants

It is recommended to erect, stagewise, the facilities as given in the report and in recommendations B (a)6 - B (a)8

The implication of the meat industry complex for the BK economy is analyzed in the report and given in the summary.
- d. Export Marketing

Considering the very large amounts earmarked for export - both as chilled/frozen meat and as meat products - it is recommended to start thinking of setting up a special meat export group, with contacts abroad, so as to launch the multiyear scheme which is being proposed.
- e. Development efforts - scientific, organizational and commercial, should be made in order to bring the poultry raising and processing branch up to international standards. This can be done by bringing in experts from other areas of Yugoslavia.
- f. It is recommended to base decisions on development in this field on the method of overall economic analysis of the sector, shown at the end of the meat chapter.

**Volume I**

**02348**  
(1 of 2)

**Foodprocessing Industry Development Plan  
for Bosanska-Krajina Region  
YUGOSLAVIA**

**Final Report**

**Submitted to UNIDO**

**The United Nations Industrial Development Organization**

**UNDER CONTRACT 72/20-DU/YUG/71/514**

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### 3. Animal Feedstuff Production

- a. It is recommended to give top priority in the agricultural field to projects concerned with animal feedstuff production, particularly vegetable-protein-rich oilseeds such as soya, and other feedstuff components.  
Protein values grown in the region can, by turning them into meat, be one of the main income sources for agroindustry, and the alternative to growing them in the region or near it would be import against hard currency which the team considers unnecessary. The region can within a short period cover all the protein values needed by self-production.
- b. Feedmix facilities will have to be enlarged considerably over the period of the development scheme.
- c. The feedstuff situation should be analyzed by the planners and the financing institutions in terms of the overall cost/benefit to the economy, both in dinar terms and in hard currency earning/saving. This has not been done till today. Presently the decision makers base their selection of projects according to the internal price structure for inputs and outputs in the "micromarket".
- d. Meadow/Pasture improvement should be undertaken without delay. This is required for any progress and productivization if these fodder components can be achieved with small means.
- e. Feeding methods should be improved. Concentrated in-stable feeding should form the basis of new investment decisions, farmer-industry contracts and extension services. Feedstuff formulae should be based on prices of active components, NOT on prices of components-containing raw materials.
- f. The possibility of introducing sorghum as a large scale feedstuff plant should be considered.
- g. A soybean processing plant should be erected in the region, logistically to be located between the soybean planting areas and the feedmix requirement centers. A plant of 500 tons per day should be considered as a practical economic-sized unit.
- h. Decisions should be made regarding the land-utilization program indicated in the feedstuff section of this report.

### 4. Milk Supply and Processing

- a. It is recommended that the Banja Luka dairy be expanded to receive and handle 100,000 litres/day (instead of the presently planned 60,000)
- b. The system of receiving milk in the dairy should be altered.
- c. More products should be included in the production mix, such as:
  - i) Various Drinks (pasteurized milk normal and low fat content, cocoa and coffee flavored milk, vanilla flavored milk)
  - ii) Cultured Products (natural, stirred, fruit, yoghurts, creams)
  - iii) Soft cheeses
  - iv) Butter spreads
  - v) Processed cheese
  - vi) Semi-soft cheeses and hard cheese at cheesery(ies) - removed from the Banja Luka dairy
- d. The present milk collection system should be widened and improved.
- e. Sales and Promotion efforts for dairy products should be improved.
- f. The production of milk caramels should be studied by the dairy in conjunction with the Mira Cikota biscuits plant.

## 5. Cereals Processing

- a. Large sums have been invested in the new bakery of Zitoprodukt in Banja Luka and it is recommended to produce a number of new products in the spare space available in this bakery and in its other bakery in Prnjavor. This can lead to productivization of the investment and to the introduction of a new series of products in the area.  
The products are:

Industrial Cakes  
Specialty Breads  
Industrial Oriental Sweets  
Cornbased Snackfoods  
Puffed Wheat and Rice

- b. The integration for national marketing by Zitoprodukt with a national chain should be considered, similarly to Mira Cikota Prijedor's integration with Josip Kras of Zagreb. This could give Zitoprodukt, which is well set up and well managed, an immediate headstart to break into the wider market with products which should have very good sales.
- c. It is recommended to assist Mira Cikota in the financing and implementation of its expansion program. This is well conceived and the plant has shown that it knows its field fully in terms of product development and sales.
- d. The Banja Luka brewery may wish to modify its product mix with new beer brands. Should the brewery wish to go on with this project then it is recommended that they consult with other Yugoslav breweries before going abroad. It may pay more if several Yugoslav breweries make joint arrangements with a firm abroad, and the new brand would probably be more acceptable if it appeared all over the Yugoslav market.

## 6. Fish and Riverfood Processing

Due to the possibilities to use the Vrbas/Neratva river area, and other rivers, as fish catchments, it is recommended:

- a. To study the newly developed Japanese methods of cage fish breeding in river waters for application in the Vrbas and Sava rivers.
- b. To consider the introduction of trout breeding - plus erection of a trout smoking facility.
- c. To develop lobster breeding in several places which have already been found suitable.

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3. BACKGROUND ON THE YUGOSLAV FOOD PROCESSING  
INDUSTRY AND ON AGRICULTURAL ASPECTS IN  
THE PROJECT AREA

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3. BACKGROUND ON THE YUGOSLAV FOOD PROCESSING INDUSTRY AND ON AGRICULTURAL ASPECTS IN THE PROJECT AREA

3

In this chapter the overall situation is described for the foodprocessing sector of the Yugoslav economy, as well as the overall aspects of agriculture in the project area in regard to forming a supply base for the regional foodprocessing industry. The chapter does not include a description of the specific existing enterprises in the various sectors - these are described in detail in the relevant sectoral chapters of the report.

It should be mentioned here that a large number of internal and published documents exist in the project area and in other regions with ample statistical data of past performance. No need was seen to repeat most of this information except to analyze and highlight the problematics which has a future direct bearing on the issue at hand - an integrated development of a foodprocessing industry in BK, based essentially on the existing enterprises acting as nuclei and as carriers.

A. FINANCIAL STRUCTURE AND PERFORMANCE OF THE YUGOSLAV FOODPROCESSING INDUSTRY

This is given as overall background information.

The tables overpage give summarized information of the financial structure and performance of Yugoslavia's foodprocessing industry for 1969 and 1970, as analyzed by the Poljoprivredne Banka (Agrobank) from 96% comprehensiveness of data.

Physical volume had increased by 12% and there was an increase in all subsectors of the foodprocessing industry except in concentrated soups, starches, sugar, milk processing and confectionery production. Sales of the industry increased by 32% in money terms.

Price increases influenced the supply instability - with livestock prices increasing 24% (cattle 28% and pigs 17%), cereals 5% vegetables 34% and fruit 16%. In the same period the average retail price increase of the products of the foodprocessing industry was 11%, with meat products increasing by 24%. Instability caused by the rawmaterial price increases reflected on the production and therefore on the supply of domestic and foreign markets.

In the nine months treated in the report foodindustry exports were 820 mill. dinars - 32% above the same period the year before, with processed meat the single largest export item at \$24 million. Imports by the foodprocessing industry also increased - by 51% - to 768 million dinars. 51% of these imports were animal feedstuffs of which half was oilseedmeals, i. e. protein feedstuffs.

Basic capital increased by 12% and working capital by 19%. Increase of fixed capital in the meat processing industry was 7% only, although the meat processing industry constitutes 34% of the total foodprocessing industry and contributed in that year 37% of total processed food exports.

There was a large increase in total indebtedness by the industry due to the granting of investment credits. (Note - since such credits are the main source of capital in Yugoslavia's growing industry under the economic system, this statement has to be understood in the proper context). This indebtedness increased specially in the milkprocessing, sugarprocessing and meatprocessing plants - with an average indebtedness in the foodprocessing industry of 36%.

Operating losses of the industry decreased by half compared to the previous year. The losses in the meat processing industry decreased by 63% though they still constituted 52% of the foodprocessing industry losses. The fruit and vegetable industry losses were 17% of total industry losses.

On the other hand, 87% of the repayments on investment credits due from the industry in 1970 were paid. Since such capital repayments constitute an "accounting expense" within the Yugoslav system of overall industry accounts, and many credits are granted for rather short periods, the real "losses" of the industry are considerably smaller by Western accounting methodology.

Productivity is reported to have increased by 10%, measured as output per worker. Total average net personal income in the foodprocessing industry in 1970 was 1,025 din/month (compare 1,324 dinars in 1971 and 1,396 dinars in mid-72) - with incomes well above the average in the breweries, sugar refineries and vegetable oils refineries, and incomes well below the average in the slaughterhouses and the vegetable/fruit processing industries.



The following data refer to the Agrobank analysis for Jan/Sep 1969 and 1970.

Statistical data on the foodprocessing industry for 1971 and/or latest available periods from various sources are given in the relevant section of the appendix.

OPERATIONAL FUNDS IN MILL. DIN.

	<u>1969</u>	<u>1970</u>	<u>Index 1970/69</u>
Basic Capital	5.252	5.889	112
Average short-term Working Capital	3.807	4.530	119

SOURCES OF FIXED ASSETS IN MILL. DIN.

	<u>1969</u>	<u>1970</u>	<u>Index 1970/69</u>
Operational Fund	2.608	2.986	114
Bank Credits	1.746	2.106	121
Other Sources	77	62	80
Total	4.431	5.154	116

USAGE OF WORKING CAPITAL IN MILL. DIN.

	<u>1969</u>	<u>1970</u>	<u>Index 1970/69</u>
Money	585	776	133
Receivables	2.745	3.309	121
Material Stocks & Small Inventory	2.061	1.954	95
Work in Progress	472	543	115
Stocks of Finished Products	716	701	98
Stocks in Sales Inventories	188	206	109
Total	6.767	7.489	111

SOURCES OF WORKING CAPITAL IN MILL. DIN.

	<u>1969</u>	<u>1970</u>	<u>Index 1970/69</u>
Operational Fund	784	762	97
Credits for Long-Term Working Capital	476	642	135
Credits for Short-Term Working Capital	2.284	2.508	110
Suppliers	2.259	2.438	108
Total	5.803	6.350	109

FULFILMENT OF CREDIT REPAYMENT OBLIGATIONS - MILL. DIN.

	<u>1969</u>	<u>1970</u>	<u>Index 1970/69</u>
Repayment Obligations for Fixed Assets and long-term Working Capital	246	297	121
Paid	215	258	120
Unpaid	31	39	126

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1. The Global Situation.

Yugoslavia is mainly interested in export markets with convertible currencies.

Considering the country's present marketing network and trade connections, this means in effect orientation towards the EEC Common Market countries and to a certain extent the USA.

Of secondary trading interest are the Eastern European countries towards whom Yugoslavia is mainly a creditor nation in food trade. They pay good prices and take some goods not marketable in the West, but the range of trade is limited and the individual Yugoslav producer/exporter receives dinars without sufficient export incentives.

Of tertiary foreign trade overseas interest - within the presently trading conditions - are "clearing" countries, mainly in developing regions, which could over time become of interest if and when the Yugoslav foodprocessing enterprises will "discover and work" these markets to a larger extent than hitherto.

Great efforts are made by the Federal Yugoslav Government to increase its association agreements with the common market countries. In a recent memorandum to the European Commission in Brussels, the Government referred to the expiry of the present agreement in 1973 and suggests to include an evolutive clause for increased economic cooperation.

This would include finance and credit policies, foreign investment, industrial and technological cooperation, improved cooperation regarding Yugoslav workers in common market countries, etc. The memorandum is said to have specifically requested steps towards the stabilisation of pork and processed foodstuffs exports, in addition to the resolution of the beef export problem. Presently Yugoslavia has an agreement with the EEC covering the regulation of "babybeef" exports.

It is thus clear that any prognosis regarding the feasibility of exportability of processed foodstuffs will be very difficult. The following remarks might define some problem areas:

- a. Even assuming a liberal policy of the EEC in the future, the feasibility of exporting processed foodstuffs will be lower than that for fresh produce or intermediates - both pricewise and acceptance-wise. While the trade of fresh produce will be regulated by agreements, quotas and customs tariffs, processed products will have to contend with resistance/competition by the local food-processors, changing product fashions/specifications/labelling and similar situations.
- b. Meat, laborintensive fruit/vegetable products, climatically/season-favored products and specialties will be the products having some chance and therefore need priority attention. Even in that case, very close watching of changing market and fluctuating price level patterns will be required in order to sell, and sell profitably.
- c. Matters could be made easier by adhoc or longterm trading arrangements or partnerships with larger EEC country trading, manufacturing or distribution organizations. This can be built up on condition that the Yugoslav organization offering such links will be considered by the importing partner to be able to deliver sufficient quantity and quality as contracted, and that delivery logistics will be controlled by supplier and buyer. These latter points were stressed by all major West European trading organizations contacted in our export market survey. It is realized that this would need investments by the Yugoslav economy in improving the refrigeration chain, as well as attention to giving priorities to export shipments on the rail network.
- d. Major competition in similar products is to be expected in the Western markets from the East European countries, mainly Roumania and Bulgaria, who are steadily building up large capacities on the agricultural and foodprocessing potential and forcing the export sale of these products in large lots by highly centralized efforts, coordinated with their overall trading policies and execution between them and the Western countries.

Although some organized resistance to these developments is evident among the agricultural and foodprocessing sectors of the buyer nations - some of whom are themselves exporters (like Holland) - it is expected that the overriding interest

of the West and East nations to enable the export of capital goods and technology to the East will mean the continued opening of Western countries to such foodstuffs from the East.

- e. "Third World" countries could, with directed effort, be made into customers for Yugoslav food exports. Although many of them are trying to export foodstuffs themselves, these are often of tropical nature, or of different seasons, and they often lack the currency or buying power to import expensive foods from hard currency countries in quantity.

The team has drafted a questionnaire which was circulated by the Yugoslav Foreign Trade Institute in Beograd to Yugoslav Commercial Counsellors abroad, in order to ascertain first information in the this matter. Following on the replies could help towards such developments.

## 2. Specific Points relating to the Development of Exports from the Project Area

Beginnings have been made by the area's foodprocessing industry to export some of its products abroad - mainly via specialized trading organizations such as Voce Export and others. Like in other countries, the share of the foodprocessing industry in exports, by percentage of its output, is smaller than that of other industry, such as metal-lurgical, which has specialties to offer. Studies made locally have stressed this point but we would comment that in the future it might be best to make efforts to gradually increase exports of profitable products - first by using sales to the foreign tourist areas as "easier, nearer, more profitable and constituting a test for rectification of mistakes." As a second stage one could attack specific export markets with specific products, after a clear picture has been gained of "where, when what, how and how much." Any effort to export only in order to reach a "target" - whether this is a statistical one for the area compared to other local industries, or whether it is a percentage target out of total plant production in order to equilibrate earnings or foreign currency availability to the plant - will bring stresses that will boomerang.

## C. SUMMARY ON AGRICULTURAL ASPECTS IN THE PROJECT AREA

The project area in Bosanska-Krajina (BK) has agricultural areas of over 500,000 hectares, 94% of which are owned by private farmers and the rest by the social sector. There are 2 main ecological regions in the project area. From the Sava river southwards to Banja Luka region there are arable lowlands. The other region is hilly, partly wooded, good for grazing, with small but potentially significant interspersed arable plots.

In the lowlands most of the crops common to that part of Yugoslavia are grown, being dominant. High yields have been achieved in extensive crops, particularly in hybrid maize, wheat and rye. Yields of intensive crops (vegetables and fruit) are low but progress is being made in the social holdings (M. Stojanovic Kombinat) towards better yields. The Kombinat veg/fruit production is a fraction only of the area's veg/fruit output. Pastures and meadows abound in the hill region but are underutilized.

For data on major food products of agriculture in the project area see the various tables in the chapters. (The various forecasts there for 1975 are the old ones, not taking into account new specific food industry development additions).

In 1971, 48% of the total project area population (51% of its households and 60% of its economically active population) were farmers - a large part of them dispersed in low-access hilly areas - and many able bodies members of the farmer families work permanently abroad, or some (male and female) near their homes in non-farming occupations. 34% of households in the project area are classified as purely agricultural, 17% as mixed and 49% as non-agricultural. The only areas widely differing from this statistical average are the three urban communes of Banja Luka (16% agricultural households), Jajce (19%) and Prijedor (22%). It is in these three communes that industry has concentrated. On the other hand, some of the hill communes have up to 80% agricultural population.

The social agricultural sector, represented in the project area mainly by the agricultural divisions of the Stojanovic Agroindustrial Kombinat, is being managed under the "selfmanagement" system on an efficient scale by international standards. It has well managed crop areas and limited but good cattle and pig raising facilities. Wheat and maize yields are severalfold above those of the private smallholder farms. In milk yields the difference is even more pronounced. Sufficient agrotechnical knowhow is available and applied internally but reorganization is required to extend it externally.

The area has several advantageous features for agricultural expansion - such as good climate, underutilization of large resources which are near markets, a central geographical position, plentiful water, underutilized manpower which in our view could be productivised/trained/motivated by the advance economic sectors of the region (the Kombinat, industry, distribution enterprises, institutes, authorities) as producers of more, better and more efficiently produced food for wider marketing and for local industrial processing towards wider markets. These advantages can be turned into real economic assets - increased production under conditions of productivity - more by regional organizational measures than by the mere investment of capital, since the major problem and challenge is to overcome historical disadvantages in the structure, attitude and development level of important segments of the population.

Speeded-up on-farm development is possible between industry and selected farmers, or between industry and farmers' cooperatives. A beginning for such development has been made by the modernized concept of voluntary contract cooperants who receive from the Kombinat financing and production assistance via advances of inputs (seeds, fertilizers, young calves, feedstuff, tractorhours, etc.) and the Kombinat undertakes to buy their output at predetermined conditions. It is now necessary to extend this concept to a larger, more systematic and sophisticated procedure to obtain from these sources raw materials for food processing, suitable in price, quality/variety, quantity, timing and security for delivery.

In the first stages the cooperants marketed contracted wheat, maize, calves, milk fully or partly via the Kombinat but there is no contract arrangement today on vegetables and fruit.

Considering the profile and structure of the regional agriculture - its population, land environment, potential markets, Government regulations, etc. - it seems that the most efficient line of development of agriculture would be for selective contract association between local farmers - as individual cooperants or as a producers' cooperative and/or marketing groups (or a combination of both) - and large economic units which alone can have the stability and facilities to guarantee the farmer a higher income and a steady market. The mechanics of this area and will remain difficult because of the transient features in the Yugoslav economy between an administratively controlled and a market-oriented foodproducing/distributing sector. The temptation of the farmer to sell his produce - in an economy which often shows temporary shortages of supply of fresh foods in some areas - on the general marketplace at short-term peak prices, higher than those contracted, can be overcome only by a combination of factors. These are improved contracts, giving high security to the farmer, "extension" (guidance) service to the farmer, insistence on planting of processing-oriented crop varieties.

The team discussed this matter in detail, separately and jointly, with private farmers, the management and technical level of the Kombinat, economic, agrotechnical and veterinary institutes, communal and republic representatives and all concerned agreed that despite many inherent difficulties this would be the preferred solution.

On specific problems and recommendations for action (individual product lines are discussed further on in the report):

1. The main landholdings of the project area; i.e. the private sector holdings, are distributed all over the project area.
  - a. The more successful farmers are to be found in the lowlands and near the main roads since they have a priori production and distribution advantage. These farmers grow vegetables, in addition to grains, and in many cases have dual-purpose cattle. Such farmers are nearest to the stage where sophisticated cooperation arrangements could bring maximum and quickest return on additional investment (for inputs, working capital, agrobuidings, infrastructure).
  - b. The farmers further away from the main roads concentrate on grain and some meat cattle and highfat pigs. They are cut-off from the market in vegetables and milk for transportation reasons and therefore produce vegetables and milk for their own consumption only (family eating plus some milkfeeding of piglets and calves).
  - c. The farmers in the higher hills are the most underdeveloped. Subsistence farming is prevalent - consisting of some forestry and farm yard livestock activities.

2. Specific considerations and recommendations of overall agricultural development priorities and methods per se in various parts of the project area are beyond the scope of this report. However, as a raw material provider for local food processing the following priority development directions are indicated:

a. Strong development of meat-oriented cattle, pigs and poultry, in a balance of -

- a.1.1. The contract-farming method (via cooperants) or  
 a.1.2. The intensive "factory farming" method where concentrated production of meat-intensive animals such as broilers or fattened calves takes place.

The balance will depend on the progress achievable in better contracts with the cooperants, on the attitude of the financing institutions, and on the product. (Broiler production is most efficient in an optimal factory-farming central unit. Also, it is relatively new while a dispersed cattle nucleus does already exist all over the project area). Also, the cattle development can give an economic impetus to the hillfarmers of unprecedented proportions, by grazing-land improvement.

b. Rationalization of the Milk Supply.

The lowlands part of the project area are ideal for dairy cattle raising. The branch is somewhat developed close to main roads, as mentioned before. The farmer has no incentive for investment in organizing more widespread collection since he is too small a factor by himself (by number of cows and by milk output), and also the price system does not encourage it.

Presently the dairy cows in BK consist of a minority of Friesians (4,000 - 4,200 litres milk per lactation) in the Kombinat, Simmenthal cows (2,000 - 3,000 litres) and a majority of (grazing) "Busha" cattle kept for meat, whose milk is mainly used on the farm, for human and animal consumption, as well as for self-production of cheese.

Details are discussed in the Dairy Industry part of the report.

On the agricultural side it should be remarked that proper increased supply of lowcost milk to the dairy will depend on:

1. Pricing decisions by Government on actual subsidies.
2. Development of areas for improved fodder production, as well as development of modern feeding systems.
3. Investment in structures and mechanical milking facilities for groups of farmers.
4. Modernized collection facilities.
5. Systematic changing of calving seasons so as to assure sufficient supply of milk in winter, and
6. A specific higher price to the farmer in winter as incentive.

c. Vegetables and Fruit.

The intensification of BK agriculture by vegetable cultivation is of particular importance. The reasons are:

1. Both as fresh foods and as processed foods (assuming good quality of either) they will find a good and ready domestic market for a long time to come.
2. The soil in most parts of BK is suitable for all vegetables of this climatic region, and some soils are highly suitable for special vegetables such as asparagus and others.
3. The financial results per hectare are much larger than those achievable by even the highest-yield grains.
4. The crops are suitable for efficient production in reasonably small units - sizes that are in-between the present "garden farming" and grain fields. Crops for planting in adjacent private holdings could be organized within the cooperation schemes, to produce quantities of vegetables suitable for processing.

The basis for intensive development of vegetable cultivation would be (individual products are discussed in the sectoral part on vegetables and fruit):

- (i) Selected lands of private farmers should be equipped for irrigation, similarly to the relevant Kombinat lands.
- (ii) Suitable supply contracts should be signed in a coordinated preplanned manner by the buyers - Vitaminka, the Kombinat, retailing organizations - with selected farming groups.

The buyers should decide on the method, timing and orientation of contracts.

- (iii) Better credit facilities should be given to the farmers to assure them seeds, fertilizers, biocides. Credits should be linked into the above contract scheme.
- (iv) Extension services (guidance, instruction, liaison) should be provided by the above-mentioned buyers and the buyers should reorganize in such a way that their agro-technical personnel will see as part of their duties such extension services to the farmers.

Such permanent contact between producer and buyer's expert can resolve many practical problems, including eventual price adjustments, and is the best guarantee that the contracts will be a live instrument and not dead paper with escape clauses which the farmer today invariably invokes when convenient.

- (v) This means in fact that the buyer will take upon himself the complete organization of the rawmaterial supply - the financing, legal, input-supplying and coordinative/supervisory aspects. Thus the rawmaterial supplier (the individual farmer, or a group of farmers) becomes an external employee or external cooperant of the processing plant.

This system, in its modern variety, is applied today in agroindustrial operations, under different economic and political systems, and also has found successful acceptance in other areas of Yugoslavia. There is no reason that it cannot be spread and used to a growing extent in the project area.

#### d. Soybeans

The vegetable protein from soybeans, as soymeal, is becoming the most effectively used vegetable protein in the world for animal feed. So much has been published about it that there is no need in this summary to elaborate on the importance of soybeans. Details are given in the chapter on soybeans.

The Banje Luka Agricultural Institute has made several years' field trials with soybeans and came to positive conclusions (Mulalic - 1969 - Zbornik, Redove). Among some people in the region associated with agriculture or industrial soy utilization there was conclusion regarding the value and possibilities of soya.

It should be pointed out that the average annual soybeans processing capacity per plant in the USA has gone up from 43,000 tons to 180,000 tons.

In the soybeans and feedstuffs chapters the problematics of the vegetable protein supply is discussed and specific recommendations are made on the agricultural as well as the processing sides.

#### D. DEVELOPMENT OF BK AGROINDUSTRY WITHIN THE CONTEXT OF YUGOSLAV AGROINDUSTRY

It was considered important, for practical objective as well as for other reasons, to examine and present the possibilities of agroindustry in Bosanska Krajina in comparison with other, recently developed agroindustries in Yugoslavia, in several republics and locations, including in Bosnia-Herzegovina. Since these agroindustrial Kombinats or foodprocessing factories which linked up (integrated) with their own agricultural production facilities or contracted with others, were working under similar conditions of the Yugoslav economic system and were staffed by Yugoslav personnel on all echelons, their success and level of achievement would, in our view, be a more relevant yardstick for targets in BK than examples of plants or agricultural activities abroad.

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Visits were paid by our team to several agroindustrial Kombinats in B&H, in Srbija, Hrvatska and in Slovenia. Discussions were held with their managements on technical and administrative levels, fields and plants were visited, data were collected. Also, discussions were held in Beograd with the management of the largest national financing body of agroindustry, the Agrobank (Jugoslovenska Poljoprivredna Banka), the Association of Agroindustrial Kombinats and similar rooforganizations. Detailed annual reports of seven of the largest Yugoslav agroindustrial Kombinats submitted to the Agrobank - containing descriptive, production, output reporting, financial reporting and development programs, were received on loan and fully analyzed. The excellent detailed workmanship of these reports enabled an insight into the strengths and weaknesses of their operations and into their genuine efforts to develop a new mode of industry, suitable to their environment, often against difficult conditions of financing, markets, pricing regulations and technological requirements - all this in the transitory stages from an administrative economy to a market-oriented economy.

The activities of these Kombinats range from regular, largescale agriculture through single stage or multistage processing and marketing of agricultural products - meat, fish, sugar, milk, cereals, fruits and vegetables - to the developing and managing of retail shops, hotels, banks, chainstores, export agencies and other service organizations.

Although many of their activities take time to achieve full profitability they have laid a sound basis for their productive growth and are showing a way to others. It may be that with the emphasis on decentralization the new trend will show a modified form of agroindustrial Kombinats, with more specialized units, more processing stages and more vertical integration rather than horizontal broadening. This will not change the value of studying the stages of their development by other bodies in Yugoslavia who are interested to set up modern foodprocessing facilities linked with nearby agricultural resources.

In the BK region, the "Mladen Stojanovic" Agroindustrial Kombinat has achieved, over the ten years of its existence, considerable progress in agricultural and industrial operations and is in the middle of a diverse expansion program. Its management recognizes the difficulties of trying to industrialize in a relatively underdeveloped region of the country. Details of these matters are discussed in the relevant section of this report.

The following table has been constructed on the basis of learning what has been achieved, under Yugoslav conditions, by an "average good agrokombinat", noting the salient factors, and showing these in relations to the situation in the BK foodprocessing industry sector, i.e. showing whether and where this sector needs some or much improvement in order to achieve the same developmental level as these kombinats have reached today. It should be said in fairness that some of the BK foodprocessing is well advanced over the median taken; also, some of the agroindustrial kombinats in other regions had a headstart by building onto a nucleus of optimal ecological and historical conditions. However, on the whole the table may be found useful for decision-making groups in the industry and administration of BK and B&H as a tool for setting lines of future actions.

\* \* \* \*



TABLE SHOWING IMPROVEMENTS NEEDED BY THE FOODINDUSTRY TO DEVELOP TOWARDS  
INTENSIFIED ACTIVITY LEVELS OF "GOOD AVERAGE AGROINDUSTRIAL PLANTS"  
ELSEWHERE IN YUGOSLAVIA

ACTIVITY	Exists today in BK on same level	Needs some Improvement	Needs Considerable Improvements
Creating environment for vertically integrated agroindustry			x
Selling to regional market		x	
Selling to national market			x
Integration with national marketing channels			x
Exploiting Economy of Scale			x
Specialization			x
Management - Overall		x	
Modern Management Tools			x
Access to Loan Finance for Basic Capital	x		
Accumulation (Profitability)		x	
Contracting for Raw Material Supply			x
Technological Knowhow			x
Innovation with New Products			x
Relations with Republic Govt.	x		
Relations with regional authorities	x		
Direct contact with export markets			x
Contacts with Tourism area			x
Gaining production and service institutions as customers			x
Producing a wider <u>spectrum</u> of a product (cuts of meat, type of yoghurt or cheese, canned vegetables, etc.)			x
Linkup with selfservice markets etc.			x
Brandname concentration			x
Systematic buying or selforganizing of market research			x
High utilization of technical planning assets of own organization			x
Close links with vocational training in region			x
Interchange of information (market, raw materials, technology, prices, etc.)			x
Utilization of scientific institutions - for industrial progress and for better raw materials			x
Setting up own or joint departments for developing new products and new raw materials		x	
Utilization of nationwide export agencies			x
Stability of Enterprise and Personnel		x	
Influx of new trained manpower			x
Developing "Factory Farming"			x
In-plant training (Manpower Reproduction)			x
Concentrate on most profitable products			x

6. 

## 4.A. VEGETABLE / FRUIT PROCESSING INDUSTRY

### 1. INTRODUCTION

This chapter will deal with the various aspects of developing a viable vegetable and fruit processing industry in BR.

First, the background is given by describing the present vegetable and fruit processing plants in the project area.

Then, the market, marketing considerations and the position of the Yugoslav industry for each relevant product group are examined. For potentially exportable products international market data are given.

The raw material base is described and analyzed - for two reasons. First to show the availability and producibility of required raw materials feeding the processing industry. Secondly because the region is undergoing a transition; several vegetables and fruits can be developed profitably to be sold domestically and for export in fresh form but could later be partly considered for processing.

New product lines are being proposed in the vegetables and fruits sector and their technoeconomic feasibility is shown. (Some products, such as babyfood or ready-to-eat frozen items may have a meat component, in addition to vegetables and fruit).

Organizationally, some questions directly relating to production and distribution are discussed in this chapter. Matters belonging to the proposed reorganization are mainly taken up in the separate chapter dealing with it.

All the evidence collected during the field work in Yugoslavia shows that with small additional investments, plus an organizational effort, there are possibilities to increase vegetable and fruit processing in the region, to reach a wider market than hitherto, to achieve profitability in processing, and to have an assured supply of raw materials for industrial processing at prices reasonable to the industry and to the farmer. This does not hold for all products, particularly not for those for which a large number of vegetable/fruit processors outside the region all over Yugoslavia are competing.

Specialized products of high quality only should be considered for which there is a market and for which the BR processing industry can secure its own raw materials.

\* \* \* \*

## 2. PRESENT VEGETABLE/FRUIT PROCESSING IN BK.

There are at present two plants in the project area, both located at Benja Luka and both having recently undertaken expansions at their existing sites. A third facility (for quickfreezing) is under construction.

One plant is VITAMINKA, the other one is BABEL-BOSANKA and the new third facility belongs to the KOMBINAT.

VITAMINKA. This well-established plant is producing "staple" preserves - mainly canned and bottled products of peas, beans, tomatoes, cherries, blueberries and deciduous fruits. The products are simple canned vegetables, mixes such as Djuvec and Ajvar, standard quality jams, pickles, soft drinks. Although Vitaminka has export sales connections with the Zagreb "Voceexport" trading enterprise which has organized certain raw material sources in B&H for its associate firm, Vitaminka presently seems to stand alone to face several problems which will be described below.

A detailed examination was made in May, July and September by several team members of all phases of Vitaminka's activities, with the full and valuable cooperation of the Vitaminka management.

Vitaminka's key problems - which have lately been accentuated by the implication of Vitaminka's recent expansion - are:

- a) The product mix, marketing set-up, amount of sales and all other management objectives were till recently concentrated on the local regional market, with relatively little activity on the all-Yugoslav domestic market or in exports.

This may have sufficed before but after the recent expansion there is an immediate need - and opportunity - to capitalize on the new resources which the company has through its modern plant in which five million dollars have recently been invested in buildings, equipment and cold storage, mainly financed by the commune and the banks.

The team saw as one of its main tasks in this branch to suggest new products and procedures which could help towards the resolution of this problem, since it came to the conclusion that the quick productivisation of Vitaminka via fully utilizing its capacity for increased operations in the vegetable/fruit preserves field would be one of the main ways to stimulate this food processing branch in the area; this would also avoid undesirable fragmentation.

Specific new product lines were worked out and suggested by the team, and in the concluding field discussions between FAO/UNIDO/IDC and Yugoslav Counterpart representatives with the regional plant managements these suggestions were accepted by the Vitaminka management. Market and feasibility evaluations on them are given later in this chapter.

- b) Vitaminka realizes that it suffers from a lack of self-organized, integrated agricultural products supply, in terms of availability, prices and controlled predetermined quality.

If this problem is not resolved satisfactorily in a systematic manner, by initiative of Vitaminka and the support of the communal and governmental authorities, then the public money spent on the expansion of Vitaminka will be practically idle and sooner or later the enterprise will either become a satellite to another enterprise or increase its losses.

Several deliberations and discussions were held on this key-problem and a set of recommendations has been worked out, connected with the additional product lines referred to above, and with other ideas. This was also accepted as a guideline by the Vitaminka management.

- c. A Conflict-of-interest situation has developed recently between Vitaminka and two other regional food processing enterprises.

1. Between Vitaminka and the growing food processing division of the Stojenovic Kombinat in nearby Bosanska-Gradiska, in connection with the production of quick frozen vegetables, mainly peas, which the Kombinat will produce there from its own raw materials in a new freezing/cold storage installation which is presently under construction.
2. Between Vitaminka and the Badel-Bosanska soft drinks and alcoholic beverages bottling firm in Banja Luka. This firm - with which the team also had detailed discussions - is fully integrated with the old established, nationally active "Badel" beverages concern, buys fruit bases for its soft drinks from Vitaminka and presents strong competition to Vitaminka in the profitable soft drinks market.

These matters are part of a wider complex of problems of the regional food processing industry which were discussed in several forums during the field work and will be referred to more specifically elsewhere in this report. In the context of this chapter we would remark that the various plant managements are increasingly aware of the negative implications of this situation and during the round-table conferences held between the plant managements, the FAO Project Manager, the Yugoslav counterpart and communal representatives and the IDC team, indications came up for a readiness for solving this problem.

**BADEL-BOSANKA.** This plant is working very profitably, for several reasons:

- a. It specialises in quantity production of a small number of high-profit, quick-moving consumer products.
- b. It is mainly a "confectioning", i.e. bottling operation, with low investment, little stocking needs, no complex raw material supply problem.
- c. It is fully integrated with the national "Badel" organization, having received the special task of producing a line of beverages which is nationally marketed and distributed via the Badel network.

Its main problem was, until recently, insufficient production space. They are solving the problem via a sizeable extension adjacent to their present building which is inside the Banja Luka residential area. Since this expansion is nearly completed, there would be no point now to recommend better relocation.

Consideration of Badel's position by the team showed two possible areas of further strengthening this useful economic enterprise - adding further soft drinks production and finding some mutually contributive contact point with Vitaminka.

Badel is essentially a softdrinks bottling plant, established in 1948 and twice expanded since then. In 1968 it merged with "Marion Badel" of Zagreb.

Badel-Bosanka supplies fruit juices (i.e. non-gaseous soft drinks) to the whole Badel national chain. Orange syrup is supplied by Badel-Zagreb, berry syrup by Vitaminka (who may use domestic or imported supplies). Badel also makes seven varieties of gaseous drinks - for the region only - fruit based and mineral water. Bottling capacity is 30 million units/yr. Until now all bottles were returnable.

Badel-Bosanka acts as BK sales agent for Badel's alcoholic drinks (mainly Slivovitz) - receiving some already bottled, some in bulk for bottling in their plant.

1971 revenue was 55 million MD of which 70% from Badel-Bosanka's production and 30% from sales agency for Badel Zagreb. The enterprise is financially independent, i.e. the revenue and accumulation belong to itself.

Total investment in the plant is 40 million MD. The plant is highly profitable - in 1970 nett accumulation, after salaries, was 25,000 MD per worker, in 1971 - 40,000, and for 1973, after the expansion, 60,000 is expected. These figures are considered extremely high in Yugoslav light industry.

Badel was one of two plants in the region seen by the team which is working three shifts, six days weekly. This full utilization of capital, equipment and space has proven itself in the accumulation figures which are among the best seen or heard by the team during all its field work.

Until now Badel-Bosanka were not dealing directly with any rawmaterial supply problem. Now they are thinking of cultivating blueberries (cultivated bilberries - Borovnice) on 200-250 hectares which belong to the enterprise in the Skendar Vekuf area of the region which is above 1,000 m altitude.

PIK MLADEN STOJANOVIC - THE KOMBINAT - Until now, the Kombinat concentrated on agricultural production, slaughterhouse, feedmix production and services.

Recently development plans were drawn up for various expansions into foodprocessing and one of them is under implementation. This concerns a quickfreezing facility - a freezing tunnel and associated equipment in connection with the Bosanske-Gradiska meat coldstore of the new slaughterhouse.

The immediate purpose of this quick-freezing installation is the production of frozen peas and other vegetables, using the Kombinat's own raw materials. The Kombinat also plans to produce frozen ready-to-eat dishes in this installation.

Details regarding the quickfrozen vegetables and fruit field, on markets and production, as well as recommendations on fuller utilization of the facility, and of working cooperation with Vitaminke - the only experienced producer of processed vegetables and fruit in BK - are given in the relevant sections of this chapter.

\* \* \* \*

3. THE MARKET AND THE INDUSTRY

The market and the industry will be described for those products where a good chance is seen for domestic or export sales and where the raw materials would be economically available or producible.

In essence, the market for processed vegetables and fruit of BK origin has to be seen primarily in terms of streamlined, aggressive, modern distribution. Demand exists domestically (local residents and tourists) and abroad. But domestic competition in Yugoslavia is stiff and bound to increase with the multitude of development programs in all the republics of the Federation, some of them by powerful Kombinats with excellent distribution facilities and proximity to markets. Competition in foreign markets is also strong - both from local producers in these markets who are urging protectionist measures, and from other Southeast European exporters (Bulgaria, Romania, Greece, Turkey) who are steadily increasing their offer, supply and general market appearance/penetration in Western Europe.

In such a competitive market the way to a reasonable and continuous share of the market has to be via specialized distribution channels. Quickly processed information, transport, the "cold chain", storage near retail outlets, all these matters need attention. It seems that such attention can be given if and when the producing bodies in BK will create the necessary coordinative framework for such specialized activities. This has been discussed and clarified in Banja Luka with all the organizations concerned and an overall willingness exists to adopt the recommended coordinative effort, which will be described in the chapter on the BK industry reorganization.

a. Processed Vegetables and Fruit - General

The growth in kgs/yr per ceput consumption of processed vegetables and fruit in Yugoslavia is as follows:

	<u>Processed</u>			
	Vegetables	Index	Fruit	Index
1954	0.46	100	1.05	100
1966	1.59	345	2.65	250
1971	5.22	1135	4.12	395

The rate of consumption growth of processed vegetables and fruit is much higher than that of fresh vegetables and fruit, the latter having remained almost static. These rates are to be expected in an economy where the consumption of the more expensive foods has only recently been stimulated and where processing on a modern industrial scale is a recent development.

Total production of processed vegetables and fruit in the Federation in 1971 is estimated (neglecting small imports) at:

Processed Vegetable consumption (from above)	107,000 t	
Processed Vegetable exports (from other data) consisting of 60% of canned pepper products, balance canned cucumbers, etc.	<u>10,000 t</u>	
Total processed veg. production		117,000 t
Processed Fruit consumption (from above)	85,000 t	
Processed (incl. frozen) fruit exports (other data - see table)	<u>42,000 t</u>	
Total proc. fruit prod.		<u>127,000 t</u>
Total proc. veg + fruit production		<u>244,000 t</u>
		*****

The exports included 12,500 tons frozen fruit items and 500 tons frozen vegetable items (cherries, strawberries, raspberries)

PROCESSED FRUIT AND VEGETABLES PRODUCTS PRODUCTION AND SALES DATAYUGOSLAVIA

	Unit	1960			1969		
		Quantities Produced	Quantity	Sales Value in MD ('000)	Quantities Produced	Quantity	Sales Value in MD ('000)
Raw Fruit Juices	tons	109	3	40	6,132	2,633	16,351
Plum Jam	"	165	189	218	408	411	1,470
Marmelade	"	14,868	14,892	26,035	16,740	17,632	71,072
Jams & Preserves	"	3,623	3,629	8,913	5,159	5,093	23,615
Compotes	"	1,861	3,293	5,916	8,602	5,768	24,411
Fruit Syrups	"	2,257	2,194	5,822	13,821	13,249	64,187
Natural Fruit Juices	"	2,725	1,940	7,723	25,510	23,953	91,994
Sweetened Fruit Juic.	"	3,315	3,079	5,888	9,709	9,209	41,950
Other Fruit Products with Sugar	"	1,778	1,621	1,870	4,492	4,948	20,901
Dried Plums	"	108	86	156	1,512	952	3,442
Other Dried Fruits	"	71	68	68	462	465	5,224
Frozen Fruits	"	...	...	...	2,961	2,497	10,871
Tomato Concentrate	"	6,686	6,071	17,908	5,815	7,403	40,160
Tomato Juice	"	7	2	2	137	123	437
Other Kinds of Preserved Tomato	"	397	505	1,347	1,726	1,740	9,192
Juices of Other Kinds of Veg./Pasteurized	"	5	5	20	592	292	2,044
Canned Peas	"	2,451	2,126	4,405	13,184	10,201	35,801
Canned French Beans	"	2,171	1,516	2,697	4,731	7,962	23,234
Other Canned Vogs.	"	5,724	4,693	7,314	31,418	33,583	173,498
Cans with Prepared Dishes (with more than 50% of Vegetables)	"	2,426	2,057	10,850	196	245	1,500
Not-Canned and Semi-Prepared Dishes (with more than 50% of Veg.)	"	...	...	...	447	513	8,346
Soup Concentrates	"	2,184	2,172	21,058	4,070	4,079	89,548
Frozen Vegetables	"	-	-	-	545	515	1,884
Pickled Vegetables	"	1,378	1,182	413	8,923	7,414	25,778
Dried Vegetables	"	880	753	1,830	1,372	1,234	14,893
Similar Spices	"	435	416	550	1,373	1,293	7,096
Other Processed Vegetables Products	"	4,268	2,917	5,605	4,732	4,282	29,167

SOURCE: ZIT



PRODUCTION OF DRIED FRUIT, WINE, OLIVE OIL, PLUM BRANDY, FRUIT JUICES & WINE

	D r i e d F r u i t							J u i c e s			Wine in 100 Hecto- litres
	Plums	Figs	Other Fruits	Plum	Other	Olive Oil in Hectolitres	Plum Brandy	Fruit Jucos	Wine in 100 Hecto- litres		
0 1960-1969	22,439	3,755	2,646	10,430	3,461	43,829	1,315,122	16,504	53,754		
1970	26,222	3,086	1,885	10,799	4,885	14,832	1,488,225	48,188	53,941		
Social Sector	5,959	3	-	30	1,979	170	49,186	31,016	13,862		
Private Sector	20,263	3,083	1,885	10,769	2,906	13,662	1,481,119	9,888	40,679		

SOURCE: ZIT

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This production is 30% above the production of 1969 which is detailed in the table overpage. Supplementary figures are given in the table following that table which give data on home-processing of dried plums and figs, jams, olive oil and plum brandy (Slivovica), as well as fruit juices and wines produced partly by home-processing and partly by the social sector (industry).

The vegetable and fruit processing industry shows growth and needs more growth since the per caput quantities produced and consumed are small compared to Western countries and the exports still very small compared to those of other suppliers to hardcurrency markets (Bulgaria, Hungary, Romania). Apart from quantitative growth the industry needs modernization and specialization and steps are undertaken by several enterprise managements in these directions.

Canned vegetables are mostly peas, stringbeans, cucumbers, cabbage, peppers and tomatoes. The canning industry association is aware that the vegetables product range has to be expanded to such products as canned spinach, carrots, asparagus, champignons, sweet corn, potatoes, different forms of tomatoes, eggplant, pumpkins, etc.

The industry consists of 45 vegetable and fruit processing plants, of which 10 are modern plants, with their own raw material supply organized. The largest plants which have penetrated all over the country are Podravka (near Zagreb) which is strong in soup concentrates and in canned vegetables, as well as various specialized products (Podravka processed in 1971 4,500 tons alone of canned peas, including organizing their mechanical harvesting), Fructel (Slovenia) - with a production of 35,000 tons in 1971, of which 20,000 tons fruit juices (in bottles and Doypecks) -- Fructel is now constructing cold-storage facilities in Bosnia in order to better penetrate the B&H and southern markets. Grocka, Prima, Sabac are other large producers. Vitaminka of BK could become one of the country's leading producers if and when it completes its expansion program selectively, organizes its raw material supply and introduces some of the more modern products suggested in this report.

On the next page are listed what we believe to be the major expansion programs presently under way or considered in the Yugoslav vegetable and fruit processing industry. (Prepared by ZIT in response to request by team).

YUGOSLAVIA

Estimate of Processed Fruit and Fruit Juices Exports 1971

	'000 tons/yr.		'000 tons/yr
Strawberry Juice	5	Other frozen fruit	1
Blackberry "	1	Blackberry pulp	0.2
Sour cherry "	4	Cherry pulp	0.7
Other fullstrength juices	1.5	Apricot pulp	0.5
Cherry concentrates	0.5	Strawberry pulp	1.5
Apple juice concentrates	1	Raspberry pulp	0.7
Frozen Strawberries	3	Sour cherry pulp	7
Frozen Raspberries	1.5	Plum pulp	0.5
Frozen Blackberries	1	Fruit compote	1
Frozen Cherries	5	Other preserved fruit	6

<u>ENTERPRISE</u>	<u>LOCATION OF ENTERPRISE</u>	<u>LOCATION OF EXPANSION</u>	<u>TYPE OF EXPANSION</u>	<u>REMARKS</u>
Agroruma	Vojvodina	Same	Fruit Cold Storage	
Bosko Palkovijevic	Srbija	"	Fruit Cold Storage	6,000 tons
Budimka	Salvonia	"	Reconstruction & Expansion	200 mill. ND
Godomin	Srbija	"	Fruit Cold Storage	Italian Equipment
Loznica	Srbija	"	Plum drying/packing	
Navip	Srbija	"	Fruit Juices	Doubling to 40 mill. bottles
Bosanka-Doboj	B & H	"	Fruit & Vegetable production expansion	From 6,000 to 20,000 tpa Raw Material from regional private farmers
Pelagonia	Makedonia	"	Expansion and cold storage	
Kulpin	Vojvodina	"	Canned Veg./Fruit	Doubling from 10,000 to 20,000
Fructal	Slovenia	Bosnia (Celic/Brcko)	Cold storage + fruit juices	6,000 t frozen pulp + 7,000 t fruit storage
Osijek PIK	Croatia	Same	Fruit Juices and other expansions	62 mill. ND coope- ration contract farming in Brcko. 80 mill. ND.
Djervin PIK	Srbija	"	Fruit Juices	Swiss Investment 6 mill. ND. Entire output, cherries + berries, destined to Switzerland. Own plantations.
Borinci	NE Croatia	"	Apple Juice	With Swiss knowhow
Vocar	Srbija	"	Marketing Center	For Fruit Juices + brandy bottling
Hidroprodukt	Srbija	"	Potato, cabbage, mushrooms, pears, berry, apples pro- cessing; (Potato chips plant exists and will be expanded). (Dto for thermal veg. canning)	Integrated with Vocar 31 mill. ND to be in- vested. 1975-1,200 t potato products. 850 t berries, etc
Dvostar	Makedonia	"	Cold Storage	5,100 t
Godomin PIK	Srbija	"	Fruit Juice/Tomato Juice, Fruit and Grapes Cold Store	10,000 t fruit, veg. processing, 40 mill. ND
Vitaminka	B & H	"	2,500 t Jams, Fruit Juices (6, bott) 10,000 t canned vegs. 1,100 t sweetened fruit syrops, compotes, pulps	Original Vit. Expansion Plan - to 24,000 t
Stojanovic PIK	B&H		Quickfreezing of vegetables and ready-to-eat dishes	5,000 tpy per shift

## Consumer Preferences in Processed Fruits/Vegetables in Yugoslavia

The condensed results of recent housewives/buyer surveys carried out by ZIF at the request of the team, as well as direct survey work by the team, are as follows:

### (i) Processed Vegetables -

1. The year-round supply of fresh vegetables and fruit is improving, particularly in the larger towns. The situation is as yet far from satisfactory, in frequency, quality and variety of supply.
2. The population sees preserved products first and foremost as supplies when fresh vegetables/fruit are not in season, and only secondarily as convenience foods. This is, however, changing, the more rapidly the more urban the buying area is.
3. 28% of housewives do some preserving at home.
4. 84% of housewives questioned had used some processed products during the preceding month, mainly sauerkraut, peppers, cucumbers, peas, tomatoes, beans. This corresponds to 4.45 million (extrapolated) households.
5. A number of brand names are known (Podravka, Grocka, Fructal, Kulpin, partly Vitaminka) but even the biggest producer, Podravka, had only about 8% of the total market.
6. Preserved vegetables use is highest in Vojvodina (99%). B&H is 10% below 84% average.
7. 53% favored 1 kg. packages, 26% 500 grms, 10% larger than 1 kg. 83% favored glass packaging (which is recent in Yugoslavia).
8. 21% did use quickfrozen vegetables. Main reason for small use, according to respondents, was limited availability. 14% out of the 21% bought quickfrozen peas. Most buyers live in towns.
9. Most preferred canned vegetable is sauerkraut, in low income areas. In high-income areas it is the least preferred.
10. Home-processing is dying out, particularly in larger towns and higher income brackets.
11. Consumers listed wishes for new preserved products (among those they thought they knew about) as spinach, pumpkins, eggplant, potato salad.
12. Consumption frequencies over the recent month (sampling about 3,000 housewives) of processed vegetables was as follows (in %):

	<u>Cucumbers</u>	<u>Peppers</u>	<u>Peas</u>	<u>Tomatoes</u>	<u>Sauerkraut</u>
Once	7	4	23	5	6
Twice	16	12	32	7	13
3 times	15	11	18	10	15
4 times	13	11	15	12	17
5 times	12	12	6	9	9
6-10 times	25	24	5	29	28
11 and more times	<u>12</u>	<u>17</u>	<u>1</u>	<u>28</u>	<u>12</u>
	100	100	100	100	100

### (ii) Processed Fruits -

#### a. Fruit Juices

1. 50% of adults (above 18) had fruit juice regularly within the preceding week, 30% within the preceding month, 20% not at all.
2. Among the lowest income groups 39% are non-consumers, in the next income bracket 19%, in the higher income brackets 10%. In the 18-24 age group 15%, 35-44 36%, 65+ group 61%. (This pattern is apparent to anyone visiting restaurants, snackbars and kiosks all over Yugoslavia).

3. Orange juice leads as product with 32%, lemon juice 15% (particularly in the South), blueberry juice (Borovnice) 11%. Then apricot, raspberry, peaches. Higher-income groups drink mainly orange, blueberry and apricot-peach juices.
  4. Only firm that penetrated national market wholly is Fructel, overall share 14% - ranging from 3% to 50% of sales depending on region. Most consumers do not care particularly about brand names.
  5. Higher-income urban consumers rated the presently marketed fruit juices as "bad"
- b. Preserved Fruit.
1. Most housewives prefer fresh fruit but are interested to buy preserved fruit if fresh fruit is out of season, if preserved fruit is of interesting composition and quality.
  2. Podravka leads manufacturer's list of preserved fruit sales
  3. Frozen fruit was almost unknown - this picture changed radically in 1972 in the major towns
  4. The average housewife is even less knowledgeable about new preserved fruit products of potential interest than regarding preserved vegetables.

\* \* \*

In addition to the housewives survey, a retail outlets survey on a wider range of food consumption was designed by the team and carried out by ZIT in 55 outlets in 15 urban centers all over Yugoslavia. The results are incorporated in the appendix of this report. Despite the indicative nature of the survey it is possible to make certain qualitative conclusions, particularly as these are strongly reinforced by parallel sampling discussions and tests conducted by the team in supermarkets and other retail outlets in Banja Luka, Zagreb, Mostar, Beograd, Osijek, Bosanske-Gradiske, Opatije, Rijeka, Sarajevo.

The main conclusions from this survey and the corroborating work are:

- (i) The market is undersupplied with processed foods, in terms of product range, quantities, timing.
- (ii) The consumer is quality conscious and processed foods have a relatively high price elasticity. Good products are bought at any price within reason.
- (iii) Retail outlets have insufficient refrigeration facilities - a major deterrent to the increased consumption of many high quality, nutritious foods (This appears to the team a particularly important point since even with increased production by the factories there is mostly no organized body to see to increased retail refrigeration space)
- (iv) There is still a lack of knowledge by the retailers and the consumers about the wide range of possible real convenience products which are not yet on the market.
- (v) New products are bought immediately and - if quality remains - continuously.
- (vi) The retail trading margin is reasonable, perhaps a little on the high side for supermarkets/self-service stores, but still in the range where it cannot be said that the trading margin is unnecessarily pricing the products out of the market.

(As regards total price the team was surprised to see what high expenditures on good food items the average housewife was ready to make, considering the average level of incomes in these areas )

## b. Quickfrozen Vegetables and Fruit.

A separate discussion is given here on frozen foods since specific recommendations are required for the quickfreezing plant of the Kombinat in Bosanska-Gradiska and this is a new foodprocessing activity in Yugoslavia; also since the world pattern of production and marketing is particularly expanding.

### 1. Definitions.

Quickfrozen foods are those which have been cooled rapidly down to about  $-18^{\circ}\text{C}$  and maintained at not higher than this temperature range from the moment of processing, through the storage and distribution network until sold to the consumer (or until temporarily defrosted by reprocessors). Special processes are used

"Frozen" or "Deepfrozen" foods are frozen slowly by conventional refrigeration processes to various temperatures. "Chilled" products, mainly meat, refer to temperatures about  $0^{\circ}\text{C}$ , sometimes also to vegetables and fruit in transit cooling to a few degrees  $+$ .

In countries starting quickfreezing industries the statistics and other documentation and discussions often use quickfrozen and frozen/deepfrozen interchangeably, and this is partly so in Yugoslavia as well, particularly due to its present starting pattern of having more frozen (quickfrozen + frozen) fruit than vegetables, and no frozen meatpacks yet, which is a somewhat different development than was experienced in other countries.

The discussion here deals mainly with "quickfrozen" foods.

### 2. Processes.

Several processes have been developed and are used by the producers in many countries. Tunnel blast freezing is the most standard one (and this is being adopted by the Kombinat in their Bosanska-Gradiska plant under construction). The others - each having their specific advantages and disadvantages - are contact freezing, flow freezing, liquid nitrogen freezing, coldflash freezing; also immersion freezing (used mainly for fish and poultry).

Production costs vary according to process, product, size, etc., but it is interesting to note that the actual direct processing cost is about 3% only, and the total processing self-cost, including capital charges, and packaging, about 11% only, of retail prices. Raw material costs the producer about 17% so that 72% of the retail price consists of the "coldchain", transportation, distribution costs. These facts are relevant to any judgment of the marketing aspect in decisions about quickfrozen food development.

### 1. The World Pattern.

Frozen foods developed first in the USA and today annual consumption there has reached about 6.3 million tons (without poultry) or about 35 kgs./caput/yr. Consumption in Western Europe, Oceania and Japan developed strongly since 1960, with the UK, Scandinavia and West Germany being the first and the other countries following suit.

Selected production patterns were started ten years ago by some Eastern European countries, primarily Poland - later Yugoslavia, Bulgaria and Hungary.

**ESTIMATED FROZEN FOOD RETAIL SALES IN EUROPE - 1972**

(Mainly quickfrozen, including prepared meals, but excluding frozen poultry).

<u>Country</u>	<u>\$ Million</u>	<u>Kg/Consum/Year</u>	<u>Country</u>	<u>\$ Mill.</u>	<u>Kg/Consum/Year</u>
UK	400	7	Switzerland	30	5
W. Germany	250	4.7	Finland	30	6
France	150	3	Norway	25	6
Sweden	120	14.5 (some exports included)	Austria	25	4
Netherlands	75	5	Belgium	25	2.5
Italy	60	2	Bulgaria	20 <sup>+</sup>	0.5 <sup>+</sup> large part exported
Poland	45 <sup>+</sup>	1 <sup>+</sup> large part exported	Yugoslavia (Domestic)	3	0.18
Denmark	35	7	(Exports)	4	--

Compare: U.S.A. 6,000 35

Although the consumption patterns vary from country to country, it can be assumed, for purposes of understanding the general market pattern, that in West Europe consumption of quickfrozen foods is divided as follows:

<u>By Product</u>		<u>By End User</u>	
Vegetables	45%	Households-retail	65%
Fruit	3%	Catering	25%
Fish & Seafood	15%	Institutional (mainly prepared dishes)	10%
Meatcuts & products	19%		
Others (desserts, baked goods, dairy products)	18%		

The largest items in the vegetable line are peas, green beans, brussels sprouts, potato products, spinach, broccoli, carrots, lima beans. Recent additions are sweet corn, asparagus, baby carrots, onions, baby corn, corn-on-the-cob, mixed vegetables, celery, cauliflower, peppers and other varieties, as well as a larger range of potato products. The former dominance of peas is decreasing since the producers try to add lines to offset the cheap low-profit pea-line.



ESTIMATED EUROPEAN PRODUCTION/IMPORT/EXPORT OF FROZEN VEGETABLES - 1972('000 t)

<u>Country</u>	<u>Production</u>	<u>Imports</u>	<u>Exports</u>	<u>Country</u>	<u>Production</u>	<u>Imports</u>	<u>Exports</u>
United Kingdom	240	22	3	Italy	15	0	5
West Germany	150	30	7	Sweden	n.a.	20	15
Netherlands	70	6	18	Denmark	15	n.a.	n.a.
France	30	5	5	Finland	5	n.a.	n.a.
Hungary	20	-	10	Austria	10	1	-
Bulgaria	15	-	10	Yugoslavia	3	- <sup>a)</sup>	0.5
Poland	15	-	6				

<sup>a)</sup> negligible quantities from East European countries

The UK used to import 40,000-50,000 t. annually of quick frozen vegetables for about 5 years, but this has now been reduced to about 22,000 tons, most of which come from Canada, Sweden, Australia, South Africa and the Netherlands - consisting of sweet corn, spinach, asparagus, brussels. Consumption in the UK of quickfrozen vegetables has attained a fairly high level and local production has been increased. Consumption in the UK of quickfrozen fruit is very small - less than 2,500 annual tons - but this pattern may change.

West Germany is also a large importer of frozen vegetables and fruit - 60,000 tons, of which about half is frozen fruit (partly pulp, etc for reprocessing) - while the Netherlands is a large consumer and also exporter of quickfrozen vegetables; production is rising and, like in Germany, institutional meals are becoming an important market

Sweden, and to a lesser extent the other Scandinavian countries, are large consumers and Sweden also produces partly for export - but imports as well. The high living standard, working women, dependence upon vegetables imports, and own technology (derived from traditional fish freezing) contributed to the development of quickfrozen foods consumption in Scandinavia and particularly in Sweden. Part of these considerations also apply to Switzerland.

France, Italy, Belgium and Spain have the lowest percaput quickfrozen foods consumption in West Europe since they have an abundance of constant fresh vegetable and fruit supply, higher percentages of rural populations, and, perhaps more important, strongly ingrained food consumption and meal preparation habits. However, this is changing too - the percaput consumptions in France and Italy have doubled over the last 3 years, mainly due to large increases in retail sales (at the beginning, the institutional markets were bigger there than the retail sales).

Canada, South Africa, Australia, New Zealand and Japan are rapidly developing their quickfrozen food industries and Japanese consumption in particular shows a very high growth rate. Japan started exporting about 6,000 tons of frozen strawberries to the USA and New Zealand last year and is expected to start exporting these in larger quantities to West Europe soon.

Poland has a large and highly developed quickfrozen foods industry, concentrating on exportable foods such as frozen strawberries (largest European grower and exporter and second-largest grower in the world, after the USA, though about to be overtaken by Japan).

Bulgaria is developing its quickfrozen industry and cold transportation chain, with intentions to become, within a few years, a very large supplier of quickfrozen vegetables and fruit to the West European markets, including bulk supplies for the growing catering and institutional 'wholesale' markets.

As demand develops all over it can be assumed that the Mediterranean countries will also set up such industries, particularly in vegetables easily grown there. Experience also shows that with proper utilization of refrigerated shipping space, and buffering between product on season and timing of consumption season, quickfrozen products can be economically moved over large land and sea distances; shortly air cargo transport will also be used to an increasing degree.

The quickfrozen processing industry all over the world, including Western and Eastern Europe, is owned/controlled by a small number of processors and in many countries, including the large markets of the UK, Germany and Sweden, 3 to 4 processors share about 80% of the market. Among these are such giants as Unilever, Findus-Nestle, Tesco, Iglo.

All the countries with high retail consumption of frozen foods have a developed cold-chain - from processor via storage and distribution, to the kitchens of the consumer. The creation of such a coldchain has been considered such a national priority that in most countries Government and Industry/Trade commissions or Boards were set up to coordinate the planning and execution of the largescale development of such coldchains.

Regarding forecast of consumption growth - it is considered by the Industry and by the food trade that most of the factors point towards a very high growth rate everywhere, even with competition from potentially better organized or cheap-source vegetables and fruit. Urbanized living and buying habits, the experience with the high standard quality of the frozen products will lead to continuous growth, as is witnessed by the USA pattern some years ago. Today, even in the United Kingdom, German and Dutch markets - representing the highest West European consumptions percaput except Scandinavia - frozen food purchases are on the average not more than 3% of the total food bill of the population, and this is in those three countries where there is negligible home consumption of food by farmers, i.e. these 3% are about equivalent to 3% of the food purchases of the population via retail and catering outlets. Thus there is a high probability for growth, perhaps even dramatic growth, in some of the sectors, for many years to come.

2. The Situation in Yugoslavia

Yugoslavia has been producing industrially significant quantities of quickfrozen fruit and vegetables for 5 years only - production before that could be described as pilot quantities.

Frozen meat and fish were not produced/marketed till lately but some projects are under way (see mention later of ready-to-eat dishes) - the Sijeme meat processing plant was marketing some meat products, then discontinued, and is now starting this line again).

Four plants are presently the main producers of quickfrozen fruit and vegetables - Vocar/Beograd, Hladnjaca/Zagreb, PIK Progres/Prizren, Srbijanka/Vajjevo.

The Stojanovic Kombinat will add capacity soon. Hladnjaca is about to expand, and Podravka as well as Centroprom/Beograd have plans to invest in this field.

Data on exact production and sales are conflicting, since various sources do not distinguish between production of quickfrozen products and that of marketing products kept in cold storage. However, all data for identified "quickfrozen products" show a considerable growth over the last 5 years and also that even at highest production/consumption data assumptions the percaput consumption is still very low. To this it ought to be added that frozen meat production, either as meat cuts or as ready-to-eat dishes, is just starting on an industrial scale, partly in new enterprises (such as PIK Beograd) and partly in reorganized facilities (such as Sijeme Zagreb).

Thus the whole branch is technologically and marketwise in its infancy.

Many items have been produced and marketed in the vegetable and fruit lines. Until now only one of the processors in Yugoslavia has his own controlled raw material supply and therefore, most of the raw material for the quickfreezing industry is bought by the processors on the open market, with all the attendant instability.

In quickfrozen vegetables the main items were and are peas, beans, some mixed vegetables and peppers, some spinach. Eggplant, carrots, cauliflower, celery, and djuvec have some production.

In frozen fruit the main items are strawberries, sour and sweet cherry products, peaches, and berries.

Distribution is partly through the BAIKY network (which has relatively good refrigeration cabinets and transport) and partly through the producers' own sales network.

Packaging - most of the domestically sold retail products are sold in polybags of 250, 300 and 500 grams. Some spinach and fruit in syrup are sold in imported espresso-type plasticised cartons of 450 grams. Wholesale bulk products are sold in 5 kgs polybags as well as in large sacks of 10 and 25 kgs.

The total domestic sales in 1972 of quickfrozen vegetables and fruit (including some domestically sold frozen fruit pulp for juices) are estimated at an order of magnitude of less than 3 million dollars retail value - about 5,000 tons. Sales of frozen meat (as distinct from chilled meat and processed semi-preserved meat products stored in refrigerators in retail outlets) are as yet negligible. This should be compared to a developed market for frozen foods like Britain, with annual sales of over 500 million dollars (all frozen foods), or Germany and the USA where the percaput consumption is even higher.

The producers who have conducted their own market surveys are realizing that there is demand for frozen vegetables and fruit (and for frozen meat as well) by the urban population who are getting used quickly to buying prepared products. However, they realize that the missing link in the chain is the restricted refrigeration facilities in the overall domestic retail network.

Therefore lately a pattern has developed where the producers are primarily looking for institutional, rather than retail, outlets as prime continuous buyers for their increasing output, and parallelly quantities of frozen intermediate products are being exported, mainly frozen fruit products for reprocessing abroad. At the same time the trade association "Jugofrigo" took upon itself export distribution as well as the organization of overcoming bottlenecks in the internal market, and the situation is improving as regards refrigeration facilities in some selected retail areas.

The development of the frozen foods market will therefore be strongly dependent on the supply organization side rather than on production (where several enterprises are investing in facilities, including the Stojanovic Kombinat in BK), or then on demand (since market testing evidence shows that housewives are interested in buying more frozen foods at today's retail prices). This evidence was collected by ZIT in sample surveys, by the marketing departments of several agroindustrial Kombinats, and the team found equal responses by supermarket managers in various towns.

\* \* \*

Surveys conducted in 1970/71 showed that 10% of Yugoslav urban housewives bought quickfrozen vegetables and fruit regularly. The situation was similar in West Europe some years ago when quickfrozen foods were introduced.

Since several large enterprises in Yugoslavia are entering this market, and there does not seem to be coordination between their pace and size of increasing output, it is difficult to forecast what the market would be for quickfrozen vegetables and fruit produced in the presently erected quickfreezing plant of the Kombinat. Some indications can, however, be given on the following points:

1. The domestic market is growing and should grow considerably, particularly since good raw materials are available and known, and part of them are already marketed as frozen products (see list later).
2. The export market is growing - in fact frozen fruit products show a higher growth rate than many conventional Yugoslav exports in the foodprocessing field.

- 3. Marketing chain bottlenecks are being overcome and as more of these are resolved - which is possible with local Yugoslav resources - sales should rise sharply.
- 4. Since despite this growing market, national overcapacity of production may develop within 3-4 years, it would be advisable for the Kombinat to undertake continuous steps to build up an export market for part of its quickfrozen vegetables and fruit products immediately. (This in distinction to other intended product lines of the BK food-processing industry where in the first stage mainly domestic marketing efforts are recommended.

Testing and evaluating the export markets may show that different products for export should be planned for the future to those that will be started now.

c. Quickfrozen Ready-To-Eat Dishes and Packs

Considering the plans of the Kombinat to quickfreeze and distribute 20,000 daily portions of ready-to-eat meat + vegetable dishes in the Bosanska-Gradiska freezing plant soon after its start-up, our comments regarding the overall market pattern are:

- 1) Up to now there is only one active producer in Yugoslavia of quickfrozen meat, meat and vegetables and vegetable portions - PIK Sljeme/Zagreb with whom the team discussed this subject. Information by Sljeme was supplemented with study of their detailed operations and financial report at the Agrobank.

Sljeme, a major integrated meat processor with large means and experience, as well as permanent export connections with the USA, started producing these packs in 1968 and planned to supply 100,000 portions/day. Sales did not succeed then and it was only much later that the enterprise found out the reasons - similarly to the belated recognized situation some years ago in Western Europe.

- a) The public and the institutions were not prepared yet to take up such large quantities.
- b) Institutional sales, gradually introduced, were possible but only with the catering end-part of the distribution chain being done by the processor/supplier; i.e. Sljeme would have to deliver, instal defrosting/ warming equipment so that the institutions could demonstratively calculate their savings by "closing down" their kitchens and transfer most of the staff elsewhere, before signing a longterm contract.

Additionally there were some problems with the completeness of the freezing equipment line which caused too long processing time in the tunnel and thereby increased costs. Sljeme has therefore reorganized its production and marketing system and is now processing at the rate of 50,000 portions daily. A list of Sljeme's assortment of about 55 varieties of quickfrozen ready-to-eat dishes is given in the appendix. They are not all produced continuously but they show the type of products that are gaining consumer acceptance, mainly of personnel eating in canteens of enterprises and institutions, but also of shopping housewives.

- 2) There is reason to expect that eventually the demand for such dishes by the social sector institutions and enterprises - production and service units - will be very large, as a standard contract and distribution system is evolved and managements as well as workers see the advantages and the food gets to be accepted.

Although the workday in Yugoslavia finishes much earlier than in Western Europe (2.00 or latest 3.00) and a light meal, rather than coffee only, is taken at the morning break, the serving of a hot lunch is gradually becoming an accepted added social fringe benefit and it is this market which could be penetrated as a basis, with retail sales following.

Another large market opening up would be restaurants for whom there is considerable incentive, within the economic system, to turn part of their operation into being a "sit-down-hotmeal-shop".

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3) It should be noted that in Western Germany - presently the fastest growing market in Europe for quickfrozen institutional meals together with the United Kingdom - the total annual sales of such institutional meals are presently only about 100 million DM, including some income from the distribution/catering part of the chain. Ten (10) firms in Germany are in this branch of which one (Apetito - today controlled by Versefood/Canada) has 30% of the market. On the other hand, the annual growth of the ready-to-eat meals market in Western Europe is about 30%.

In Yugoslavia, PIK Zagrad, one of the largest and most successful agroindustrial Kombinate, is setting up the second large facility (after Sijama) with a planned capacity of 300,000 dishes/day.

Other PIK's are about to follow suit, including one in Sarajevo.

#### d. Baby Food Production and Marketing in Yugoslavia

Babyfood has only recently entered the Yugoslav market, mainly from local production, partly repackaging, partly imports.

Discussions with pediatricians, pharmacists, retail outlet managers, - all of whom spoke of rising need and demand - motivated the team to give special attention to this type of product, particularly due to its importance in nutrition, and as several team-members could contribute specific background knowledge in this field.

One distinguishing feature of the potential Yugoslav market for babyfood is the pattern whereby many mothers in the poorer agricultural districts, in recognition of dietary deficits of their babies, turn to the pediatrician to ask for special nourishment as mothermilk substitutes and as supplements to milk. This has been borne out in questioning in several areas, and pediatricians are looking for a proper range of ready-to-eat babyfood for prescription as a continuous baby-feeding source. Similar considerations hold for infant feeding of higher age groups.

Babyfood is presently marketed through pharmacies, supermarkets and hospitals. Questions put in various towns to the commercial outlets (pharmacies and supermarkets) showed there was considerable and rising demand for the local brands (or locally packaged brands), and full demand for the imported and yet less known brands. Also that housewives were demanding a wider range of ready-to-eat babyfoods which are not yet available from local manufacture.

There are presently two major producers of babyfood in the country, with minor new ones having recently entered.

##### 1. PLIVA/Zagreb.

This is a large producer of pharmaceutical and chemical products. It produced about 700 tons of babyfood in 1972, as one of many product lines. All its babyfood products come in instant-powder form, in cardboard or metal boxes, in ranges from 35 gms. - 450 gms. These are powder of milk, vegetables, vegetables and meat, fruit. Carrots, potatoes, spinach, tomatoes, peas, chicken, beef, apples are used for the non-milk powders.

##### 2. PODRAVKA/Koprivnica near Zagreb.

Podravka is the largest vegetable canning plant in Yugoslavia. It also produces babyfood, under licence from the German firm "Dr. Ritter". Semolina, vegetables, chocolate and fruit product is made, in the form of flakes, all packed in 250 gms. cardboard boxes. In 1972 production was about 220 tons.

##### 3. Other producers are DROGA/Portoroz (Istria), (Ljubljana), ZDRAVLJE/Leskovac, KRKA/NovoMesto - with semolina and chocolate products. They entered the market this year and production is still insignificant.

Imports of Babyfood in 1971 were reported at 248 tons (182 tons in 1970) divided into:

West Germany	140
Britain	90
Holland	12
Switzerland	6

Memofarmacija/Ljubljana is the importer and repackager of HUMANA babyfood produced by Promonta/Humana in Merford, Germany, or by others for Humana. They distribute the powdered babyfood in 350 gms. cardboard boxes, in a range of about 11 products - semolina/milk/fruit/vegetable mixes.

PIK Belje is the importer and distributor of the British "Trufood" range of glass-jar packed preserved homogenized (mashed) ready-to-eat babyfood, containing products or mixes of vegetables/meat/fruit. This product is new on the market and sold through supermarkets and pharmacies, in 35 grms. and 50 grms. glass jars.

Exports of Babyfood were started - in 1971, 100 tons were exported to Czechoslovakia and in 1970 and 1971 trial shipments were sold to the Sudan and to Somalia.

Thus, present net consumption (in 1972) was about 1,000 tons, including imports. The number of annual births in Yugoslavia is about 340,000 - and expected to stay at that number or even fall somewhat.

As an indication of market possibilities the present consumption of 1,000 tons should be compared with the Polish production/consumption of 17,000 tons, reached within 4-5 years after ready-to-eat Babyfood was introduced into the market.

\* \*

#### Comments on Marketing Possibilities of Babyfood.

- a. The market is in its infancy, both as regards size (consumption per caput, or per baby born, or per urban-area baby/infant) and as regards product consumption pattern.
- b. An increasing number of urban and rural mothers are aware of the need and possibilities of today to give their babies, from a very early age, high-energy balanced babyfoods with carbohydrate/milk/meat/vegetable and fruit content.
- c. Mothers ask the pediatricians in the clinics this question and pediatricians tend to prescribe what is on the market; they would welcome an extension of the market, and particularly homogenized ready-to-eat babyfood marketed in sterile packages (i.e. glass jars or cans).
- d. There would be a possibility to obtain the cooperation of the Federal Association of Nutritionists in Beograd. This Association could provide for free television promotion of the idea and advantages of using more babyfood.
- e. Although mothers would be ready to pay high prices, particularly on babyfood prescribed by the doctor, their budget would put a limit to purchases over the month and therefore the price has to be kept low. This means large-scale production with modern equipment, and retail sales in jars of not less than 150 grams, since packaging material (jars and twist-off lids), although available in good quality in Yugoslavia, is expensive.
- f. A Yugoslav domestic market of 5000 - 10,000 tons is foreseen for the next few years for homogenized babyfood.

In order to enter this market, it will be recommended that production in BK be started of 1,500 annual tons, as a product line addition to an existing vegetable/fruit production plant (Vitaminska).



e. Soft Drinks Production and Marketing in Yugoslavia

Softdrinks are categorized in Yugoslavia according to:

- (i) Juicas:
  - e. Raw Fruit Juicas
  - b. Natural Fruit Juicas
  - c. Sweetened Fruit Juicas
  - d. Tomato Juica
  - a. Other
- (ii) Artificial Softdrinks - i.e. carbonated beverages

Statistical Data up to 69/70 on softdrinks production in SFRJ are given overpage and broken down for the republics in the appendix.

It is seen that output is growing very fast, 25% for total soft drinks, 25% for carbonated beverages, nearly 50% for natural fruit juices, small (6%) for tomato juice.

Sales of natural fruitjuice in 1971 are reported as 35,000 tons, compared to 25,000 in 1969

The Yugoslav softdrinks industry is presently characterized not only by an extremely high growth rate - and the pattern of consumption can be observed easily in kiosks, restaurants, hotels and retail stores - but by the fact that it uses almost solely natural bases, i.e. almost no extracts or artificial flavors or color additions; this because of the available raw materials and the habits of the population. It is of course difficult to say whether this pattern will persist as demand grows for a variety of cheap drinks

The statistical records show the output of industry only - there is considerable additional private sector production, processed and marketed erratically as a "wildcat" operation, which upsets some parts of the market and is also outside the sanitary control system. However, the fact that the private operators succeed in selling their products is an additional sign for the large demand.

The present consumption (extrapolated from the above) of about 130 million annual litres of softdrinks (two thirds juices and one third carbonated) should be compared with the consumption of about 570 million litres of beer (which has had a consistent growth rate of 13% annually).

As has already been pointed out before in another section of this chapter, there is a strong tendency to prefer orange juice and orangeades, with berry, cherry, peach, apricot juices coming next. A survey carried out by ZIT in 1970 showed that apple-juice was in small demand but housewives would want to buy good apple juice if available. Negative replies were, however, received on the potential demand for grape and plum juices (which are not yet manufactured in Yugoslavia, despite the rawmaterial availability).

The team had discussions with Jugokonzerve, institutes in foodprocessing technology, enterprises and individuals in Yugoslavia on the position of softdrinks production and development and our comments are as follows in regard to this sector in its bearing on the situation in BK:

1. Domestic Market

There is doubtlessly a large field open for quantitative increase of production as well as increasing varieties.

Raw materials are available and/or organizable all over Yugoslavia and also in BK.

The BK industry could achieve a strong position in this field because of the existing capacity and experience of Bedel-Bosanke and Vitaminka.

DATA ON FRUIT JUICE AND SOFT DRINK OUTPUT IN YUGOSLAVIA

	Natural Fruit Juices in 1000s	Sweetened Fruit Juices in 1000s	Tomato Juice in 1000s	Other Vegetable Juices in 1000s	Total Juices in 1000s	Artificial Soft Drinks in hl	Total Soft Drinks in hl
1965	4.421	6.620	106		15.622	291.455	447.675
1966	1.686	8.290	168	82	13.706	331.232	468.282
1967	1.632	9.312	109	2	17.377	404.139	577.909
1968	2.388	5.371	126	225	28.136	491.604	772.964
1969	6.132	9.709	137	592	42.680	669.180	1,088.980
1970	...	...	...	...	...	866.811	...

Average Yearly Rate of Growth	8.6	48.7	6.6	-	28.1	24.1	24.9
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Average Retail Price 1971 5.00/1tr.

Badel-Bosanka has the distribution network and Vitaminka has high level technology and basic production experience. Together they could organize additional rawmaterials supply, including the "selection and breeding" of high-aroma, optimally suitable fruit.

## 2. Export Market

There are exports of frozen and other fruit bases, particularly to Germany. With the widening of the domestic market new bases and products will be available for export if the rawmaterial supply will not be used up domestically. The USA, the Soviet Union and other countries are also becoming growing markets for fruit bases.

Thus the key to exporting these products for the BK region would be to organize largescale supply of specialized types and grades of fruit (perhaps also of some vegetables) by:

- selective contracts with farmer cooperant groups for buying-up of graded fruit which is available today (including cherries and apples).
- cultivation of berries (see section on berries) and guiding improved cultivation of other existing fruit varieties, by contract-farming.

## 3. New Softdrinks Products

### - Berry Juices

These are much in demand in Yugoslavia and abroad and a wider variety of berry juices, in addition to bilberry, strawberry and raspberry juices, should be developed. In this, as well as in genetic variety selection of berries, the softdrink department of the Cacak Institute as well as the FAO adviser, Mr. Roach, could be of great help.

### - Fruit Cocktails

These have been started on a very small scale and could be considerably expanded - for the domestic, tourist, catering and export markets. Technical assistance could be obtained without difficulty. Kernelfruit and softdrink mixes, including some plum inclusion, could be used.

### - Apple Juice

This is a high-quality drink if properly produced. As shown in the table of existing expansion programs in Yugoslavia in the vegetable/fruit processing industry, one plant is about to be erected in Northeast Croatia, with Swiss knowhow.

Considering the large local production of applejuice in most Westauropean countries, this product would not be suitable for export marketing but a very good chance exists for domestic marketing, particularly as applejuice is generally drunk in larger quantities than the more viscous juices presently marketed.

Yugoslavia has increased its apple production and, as everywhere else, the production of applejuice is largely a logistic question of collection of apples cheaply enough near the producing area; also that of preferably having the right variety of "cider" apple - although regular apples are usable. There is considerable apple production in and near the project area (10,000 tons in the project area and 50,000 tons in near radius) with part of the crop unseable as fresh fruit.

It ought to be mentioned here that the team discussed the possibility of pectin production near a suitable apple area, as within a few years the only Yugoslav pectin plant (Pozaga/Uzicka-Srbija), producing 60 tpy 250° - strength pectin in an old plant with 80 tpy capacity limit will not be able to supply all the domestic needs, and even today some pectin is imported by the fruitprocessing plants. In line with development of applejuice it is suggested to watch the pectin market, since, within a short time, the need for a larger integrated applejuice-pectin-by product animal feed plant may arise.

Considering the general market expectations for applejuice, it is recommended that Vitaminka and Badel study together the possibilities of organizing processing-grade applas, as well as steps towards cultivation changes for cider applas, since there is sufficient market expectation for 2-3 plants in Yugoslavia to produce applejuice. However, applejuice production by Vitaminka or Badel would require considerable investment in equipment and only if they will have studied the possibility of assumed marketing should such a project be considered for implementation.

\* \*

f. The Market Position in Dried Dehydrated Vegetables and Freezedried Fruit

Western Europe is the world's major import market for dehydrated vegetables which are mainly used in soup concentrates.

Europe's total import needs for 1975 are forecast as about 30,000 annual tons, of this 12,000 tons in the major single article - dehydrated onions. Total European consumption will be about 50,000 tons.

One of the dried vegetables which Yugoslavia supplies (mostly to Italy where it supplies most of the imports of this article) is dehydrated mushrooms which will continue to enjoy a good market since its supplies are limited by natura.

Eight vegetable processing enterprises in Yugoslavia have - in addition to their other production - vegetable dehydration lines, supplying the soup concentrate producers and exporting some products. The main vegetables dehydrated by these plants are onions, garlic, tomatoes, carrots, peppers and leek.

Practically all vegetables dehydrated in the world today are hot-air-dried as freeze-drying (lyophilization) is in most cases too expensive for vegetables. Only the Dutch dried soup industry uses commercial amounts of freezedried vegetables and the only freezedried culinary vegetables are some peas processed in Ireland.

The Western European countries have dehydrating industries and obtain their raw materials from very closely controlled specialized contract farming in their areas. Some countries with a combination of ecological conditions and cheap labor have established plants under commercial arrangements with the European users (Egypt, China, Turkey, Sudan, Ceylon, etc.).

For reasons of structural relocation and development of this industry in the direction of the above mentioned countries, and considering that in this concentrated product BK would have no transport advantage in its proximity to the export markets, and that eight producers are already supplying these products, it is not recommended to go into such production.

For the time being similar considerations hold for projects connected with the freeze-drying of fruit in BK. Although for some highpriced fruits, freeze-drying is economically more competitive than that for vegetables, overcapacity exists in some countries and the market is very erratic. The team is convinced that safer and more profitable processing outlets would exist for any quantities producible in the region, under contracts of the region's processing industry.

These remarks are made because of recent commercial proposals of rather unsubstantiated nature having been made by interests from abroad to the commune of Sanski Most in the project area for contract-growing fruit and freeze-drying it. The team was asked to examine the proposals and did so in July and September and the results were notified to ZEP and Sanski Most, with specific reasons for not recommending investments in this project.

On the other hand it is recommended to follow the developments of the new market for "puffed" vegetables (dehydrated by a process similar to puffing wheat for snacks) since these have been found to reconstitute better than hot-air-dried vegetables and can be produced in small quantities, and raw material costs are a smaller part of the price.

\* \*

## 9. Specific Fruits and Vegetables Marketing and Production

In order to focus on the general environment in the European markets for such products, a condensed review is given first on some points of relevance to the development thinking for possible BK projects.

### Review

#### 1. General European Market Trends

Western Europe is the world's largest import area of fresh and processed fruit and vegetables.

The EEC fruit harvest (annual average 67-71, 71, 72) of the main deciduous fruits is shown below, in million tons.

	Apples	Pears	Cherries	Plums	Apricots	Peaches
1967-71	6,5	2,7	0,63	0,84	0,19	1,71
1971	6,3	2,8	0,68	0,81	0,21	1,89
1972	5,4	2,4	0,51	0,62	0,17	1,88

Nett imports of fresh fruit and fresh (incl. dehydrated) vegetables into the EEC are shown in the next table.

	1963/65	1966/68	1969	1970
	Mill. US-\$			
Fresh Fruit	566,6	641,6	668,8	676,0
Fresh and Dehydrated Vegetables	84,9	126,9	167,2	223,3
<b>Total</b>	<b>651,5</b>	<b>768,5</b>	<b>836,0</b>	<b>899,3</b>

Increase of West European trade in fresh and processed fruit and vegetables between the periods 63/65 and 69/70 is shown below.

	Import		Export	
	Volume %	Value %	Volume %	Value %
Fresh Fruit	15	19	18	26
Processed Fruit	38	44	66	84
Fresh and Dehydrated Vegetables	25	36	13	34
Proc. Vegetables	31	78	73	83

Italy/France/Spain effect 75% of West Europe's fresh fruit exports. The Netherlands and Italy effect 67% of West Europe's fresh and dehydrated vegetable exports.

Eastern European countries (except the Soviet Union) did not increase their vegetable imports during those periods but considerably increased their fruit imports, particularly in citrus and some tropical fruit. The Soviet Union has increased its annual fruit imports from 400,000 tons in the period up to 1965 to 800,000 tons in 1972 (300 citrus, 300 apples, 80 grapes, 105 dried fruit, 16 bananas, 5 pineapples), and its imports of canned fruit are now about 150,000 tons (mainly from Bulgaria). The Soviet Union also imports several hundreds of thousands of tons annually of processed vegetables, mainly from Bulgaria.

The total volume of East European exports to the West in vegetables and fruits has decreased since the early sixties - fruit exports being today about 23 mill. dollars as before. Vegetable exports rose by close to 50%. West Germany buys 60% of the fruit export and 45% of the vegetable export of these countries.

Imports of fruit and vegetables by West Germany in 1971 are shown below.

	<u>Tons</u>	<u>( '000)</u>
Fresh vegetables	1,420,000	1,240,000
Fresh fruit		
Central European fruit	1,560,000	1,285,000
Southern fruit (mainly Citrus and Bananas)	1,650,000	1,300,000

As these imports were bigger in 1972 it can be seen that fresh fruit and vegetable imports by West Germany have been achieved a record level of 4 billion DM. A large part of this is intra-EEC trade. Vegetables 270 million DM, valued at 220 million DM only are from outside the EEC and fruit nearly 1 billion DM came from outside the EEC - (mainly in the Southern Fruit category).

UK fruit imports are considerable but less than those of West Germany. They total less than 1.5 million annual tons, mostly Southern fruit and apples/pears.

West German and UK fresh fruit import plants. Certain German production data are given in tables overpage.

France imports very small quantities of fruit and vegetables.

The rest of the West European fresh fruit imports are shown below.

1971 Fresh Fruit Imports by Main West European Countries  
(excluding Germany, UK, France)

	Tons	\$ mill.	of which Central European Varieties
Netherlands	530	100	20
Switzerland	350	100	25
Sweden	320	90	32
Benelux	430	90	30
Italy	400	70	5
Austria	300	55	18
Norway	150	40	n.e.
Denmark	150	32	"
Denmark	140	33	"
Ireland	80	20	"
Portugal	25	5	"
Spain	15	4	"
Greece	22	4	"
Iceland	5	2	"

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Benelux	430	90	30
Italy	400	70	5
Austria	300	55	18
Norway	150	40	n.a.
Finland	150	32	"
Denmark	140	33	"
Ireland	80	20	"
Portugal	25	5	"
Spain	15	4	"
Greece	22	4	"
Iceland	5	2	"
Turkey	1	0.15	"

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	<u>West Germany</u>			<u>United Kingdom</u>	
	<u>Fresh Fruit Imports 71/72</u>	<u>Production</u>		<u>Fresh Fruit Imports 71/72</u>	<u>'000 t</u>
		<u>'000 t</u>	<u>1972</u>		
Apples	600	1,209	1,979	Apples	250
Apricots	20	3	26	Apricots	3
Bananas	520			Bananas	340
Blueberries/Cranberries	7			Bilberries	1
Cherries - Sweet	30	105	190	Blackberries	1
Cherries - Sour	30	83	171	Cherries - Sweet	2
Gooseberries	10			Blackcurrants	20
Grapefruit	85			Grapefruit	90
Grapes	290			Grapes	75
Lemons	130			Lemons	30
Mandarins	160			Mandarins	40
Oranges	800			Oranges	420
Peaches	290	20	43	Peaches	37
Pears	210	340	414	Pears	55
Pineapples	7			Pineapples	8
Plums	20	325	480	Plums	8
Raspberries	3			Strawberries	2
Strawberries	50	24	24		
Coconuts	2				
Avocados	0.5				
Buvas	0.2				

Fresh veg. imports of important quantities

Tomatoes 297

Cucumbers 164

SOURCES:

(Nolland 204)

(Romania 37)

(Bulgaria 10)

(Nolland 138)

(Romania 5)

(Bulgaria 11)

Total fresh veg. imports of UK - 1,420,000 t  
(40% from Italy, 20% from non-EEC countries).

Data on the Production/Import/Export of Canned Fruit of a number of European countries are given in the next table, with imports of Western Germany and the UK broken down by categories. These data do not include frozen fruit. Also, it appears from the data sources that in some cases only canned fruit in the strict term is included, in other fruit preserves such as jams as well. Neglecting these inconsistencies, the data do indicate fairly accurately the consumption and trade picture.

A few additional data on canned fruit are interesting to note in connection with the table. South Africa has increased its exports of canned fruit, including juices, to 236,000 annual tons. The Greek exports (not available in tons) were 20 million dollars in canned fruit plus 10 million dollars in fruit juices. Italy's exports of canned

fruit are mainly pears, peaches, some cherries, and mixed fruit. Bulgaria exports more than 100,000 tons canned fruit, plus 30,000 tons fruitjuice, out of a total production of 1.5 million tons fresh fruit. The UK imports of canned fruit shown in the table (350,000 tons) were valued 130 milli. dollars and in addition the UK imports nearly 30 million dollars fruitjuices, plus frozen fruits. UK consumption and imports of canned fruit are fairly static, while the other European countries show annual increases. United States exports to Europe of canned fruit (mainly peaches and pineapples) are decreasing annually but Australian and Far Eastern exports to Europe are increasing.

European Production/Imports/Exports - Canned Fruit (Incl. Bottled) in '000 tons

<u>Country</u>	<u>Product.</u>	<u>Import</u>	<u>Export</u>	<u>Country</u>	<u>Product.</u>	<u>Import</u>	<u>Export</u>
Austria	n.a.	15	n.a.	Italy	140	9	70
Belgium	20	35	10	Netherlands	30	60	27
Bulgaria	200	-	180	Norway	4	13	-
Denmark	8	16	-	Poland	32	-	20
Finland	4	8	-	Portugal	1	n.a.	-
Franca	55	65	5	Romania	110	-	n.a.
East Germany	n.a.	40	-	Spain	200	-	75
West Germany*	120	330	-	Sweden	5	30	-
Greece	20	-	n.a.	Switzerland	45	30	2
Hungary	140	-	85	United Kingdom*	100 +)	350 +)	5
Ireland	-	11	-	Yugoslavia		reduces annually	
USSR	800	150	-				

\* Import breakdown of the two important importing countries:

<u>West Germany</u>		<u>United Kingdom</u>	
Apricots	25	Apples	20
Berries	20	Apricots	20
Cherries	15	Berries	7
Citrus	22	Cherries	5
Peaches	85	Fruit Salad	40
Pears	30	Grapefruit	30
Pineapples	65	Oranges	26
Plums	5	Peaches	90
Oranges	22	Pears	60
Other	40	Pineapples	55
		Other	10

## 2. Market Structure

The huge production and trading amounts are producing many strains and stresses which are reflected in the protectionist measures against imports by the EEC, in internal price supports in the EEC (including cash payments - up to now \$ 300 million - to farmers who eradicate trees or destroy parts of unsaleable harvests). These matters are wellknown and their discussion is beyond the scope of this report. In 1972 an FAO study was made on trends in the fresh fruit and vegetables sector in Europe which concluded that due to rising costs and restructurizations in Western Europe a noticeable part of the vegetable and fruit needs for this area will within a decade be supplied from Southeastern European and farther Mediterranean countries who have the climate and labor conditions to produce, with modern technology of production

and transportation, many of Europe's needs cheaper and better. At the same time there will be a reshaping of the demand structure in West Europe towards new types and qualities of some vegetables and fruits and those West European producers who will wish to stay in the market will modernize and change over to meet this type of demand.

Thus the customs tariffs-reference price-quota system of the EEC, constantly changing to meet topical pressures, will in fact determine trade between third countries and West Europe. No West European country has yet undertaken massive measures to reduce cultivation of non-profitable production regions, despite the EEC financial incentives (incl. Britain), and similar incentives in Switzerland. In France and Italy, the two powerful agricultural producers, labor is leaving agriculture and, also, agricultural wages are rising 16% annually in France and 11% in Italy, due to inflation and competition for labor by industry.

Parallel to these developments a new trend has developed, based on old known techniques, of counteracting some of these imbalances by concentrating fresh vegetable production for large urban conglomerations in glasshouses near these consumption centers. Such decisions enabled Holland to become the main supplier of Western German imports of vegetables (about 650,000 tons tomatoes, cucumbers, lettuce, cauliflower, carrots, plus large amounts of potatoes exported from Holland to Germany). The trend can be seen by the recent large additions of glasshouse areas in several countries, including Bulgaria, Romania and Hungary. The small glasshouse areas in the USA and the Soviet Union are given as comparisons, since in either of these two countries, for different reasons, glasshouse production is not practiced.

Table of Important Glasshouse Areas (1972)

Holland	5374 ha	France	1600 ha
West Germany	835 ha	Ireland	200 ha
UK	1180 ha	Bulgaria	800 ha
Jersey and Guernsey	430 ha	Romania	650 ha
Belgium	800 ha	Hungary	120 ha
Scandinavia	750 ha	Soviet Union	200 ha
		USA	600 ha

In Yugoslavia, two Dutch firms have recently concluded an agreement with the Zaljezara Sisak and Agroindustrija/Novisad to construct glasshouses for Yugoslavia and for several East European countries.

Thus it is seen that many factors are at work which will determine the movement of vegetable and fruit produce and products into and between the West European markets. As far as priorities for export-oriented BK fresh, processed-intermediate and processed-final use products are concerned, the following could be noted:

- i) In a future market such as that expected by all prognoses - with competition expected outside and inside the EEC - the best chances will be for products having high quality, high unit price and specialty appeal.
- ii) For such sophisticated products various preconditions have to be met and arrangements made for them - such as "breeding" good raw materials, good technology, good distribution (as direct as possible) and good packaging, refrigeration chain incl. controlled atmosphere storage, etc.
- iii) A large effort has to be made to base the main sales of the plants in BK in vegetable and fruit processing, as well as the sale of fresh produce, on the domestic market so that this covers the operational and capital charges, and exports can be done by "second or third shift work" - this will have positive results in all directions.

- iv) For many export products association and coordination with other Yugoslav exporters of similar products must be sought, for joint marketing, specialization of production and a common information basis on which short-term and longterm decisions can be made.
- v) Standards have to be developed, together with other Yugoslav producers, and particularly with exporters, for specified quality, package etc. This will enable to create a uniform price quotable immediately to buyers, and will also enable to unitize lots, i.e. to sell at short notice larger quantities of one product than any one supplier has available. The present inability of the vegetable and fruit (fresh and processed) exporters to set such standards are a major reason for the relatively small exports in this branch.
- vi) A special effort should be made for phasing and focusing production of fresh fruit, graded, standardized, prepacked, towards distribution in the tourist areas during the tourist season. This would mean both indirect exports without the financial risks and difficulties of export abroad, and at the same time would propogandize the availability of high-grade standardized products in Yugoslavia, and thus create a desired consumer image for the same products when they could appear abroad in the origin countries of the tourists.

\*                    \*

The tables overpage give summarized statistical data about Yugoslavia's fresh vegetable and fruit production/import/export in 1971 and the more detailed later tables include breakdown of data for 1970 for the republics. Tables of prices will be found in the appendix. Data on the production and export of processed vegetables and fruit were given in the former section of this part of the report, which dealt with the processing industry.

\*                    \*

In the following section specific products will be dealt with.

\*                    \*

**YUGOSLAVIA****ESTIMATE OF 1971 FRESH FRUIT PRODUCTION & FOREIGN TRADE ('000 tons)**

	Prod.	Imp.	Exp.	
Apples	306 *	-	1	* 400,000 tons in 1972
Apricots	17	0.5	1	
Bananas	-	45	-	
Bilberries	n.s.	-	0.1	
Blackberries	n.s.	-	0.1	
Cherries (sweet & sour)	107	-	2	
Grapes	1,100	-	10	
Grapefruit	-	1	-	
Lemons	-	25	-	
Oranges	-	60	-	
Pineapples	-	1	-	
Peaches	62	-	2	
Pears	112	-	2	
Plums	800	-	20	
Raspberries	13	-	2.5	
Strawberries	25	-	-	
Red Currants	2	-	-	
Dried Plums	20	-	20	

Note: In summer Yugoslavia imported some thousands tons fruit of the type it produces, to stabilize the internal market.

**ESTIMATE OF MAIN FRESH VEGETABLE PRODUCTION & FOREIGN TRADE 1971 ('000 tons)**

	Produced mainly in Sector	Production	Imports	Exports	
Potatoes	P	2,857	0.00	45	
Tomatoes	P	305	2	-	
Green Peppers	P	270	-	0	
Cabbage	P	130	-	0.4	
Onions	P	251	-	2	(+ dehydrated)
Beans	P	171	-	4	
Peanut	P, S	20	-	-	

**PRODUCTION OF VEGETABLES**  
(Thou. Tons)

	Potatoes	Seed Potatoes	Peas	Tomatoes	Green Peppers	Beans	Carrots	Onions	Garlic	Cabbage & Kale	Late Cabbage
<b>SFRJ</b>											
# 1960-1969	2042.7	46.9	12.5	303.4	194.3	36.0	42.6	187.9	43.0	453.7	98.1
1970	2922.0	41.6	16.7	313.0	260.1	41.8	49.6	266.3	55.9	493.0	125.9
Social Sector	66.7	0.2	7.3	16.7	19.7	0.3	1.9	14.5	0.9	14.0	5.8
Private Sector	2055.3	41.4	9.4	296.3	240.4	41.5	47.7	261.8	55.0	479.0	120.1
<b>BOSNA I HERCEGOVINA</b>											
# 1960-1969	337.4	3.2	0.8	19.6	16.6	10.9	2.6	19.1	6.6	70.9	6.9
1970	370.2	3.3	2.4	18.9	16.4	10.9	3.4	22.2	7.4	68.4	8.6
Social Sector	1.9	-	1.5	-	0.5	-	-	0.4	0.1	1.0	0.2
Private Sector	368.3	3.3	0.9	18.9	15.9	10.9	3.4	21.8	7.3	67.4	8.4
<b>CRNA GORA</b>											
# 1960-1969	40.9	0.1	-	5.1	3.4	0.4	0.1	1.9	0.5	8.0	0.4
1970	46.0	-	-	6.8	7.3	0.5	0.1	1.8	0.5	9.8	0.1
Social Sector	0.8	-	-	0.2	-	-	-	-	-	0.4	-
Private Sector	44.2	-	-	6.6	7.2	0.5	0.1	1.8	0.5	9.4	0.1
<b>HRVATSKA</b>											
# 1960-1969	927.0	3.5	1.5	46.7	14.8	5.2	13.6	34.9	7.9	111.0	26.0
1970	867.6	2.6	1.3	47.0	15.5	5.0	15.5	38.1	8.5	113.0	32.6
Social Sector	5.9	-	0.4	5.8	1.0	0.1	1.6	0.8	-	6.2	3.4
Private Sector	861.7	2.6	0.9	41.2	14.5	4.9	13.9	37.3	0.5	104.8	29.2
<b>MAKEDONIJA</b>											
# 1960-1969	62.4	2.2	0.4	64.1	49.0	3.0	0.2	23.6	3.2	18.1	6.5
1970	81.9	1.1	0.4	90.6	80.4	3.9	-	43.6	3.9	28.9	9.3
Social Sector	1.6	0.1	-	5.6	3.5	-	-	2.3	0.1	1.1	0.6
Private Sector	80.3	1.0	0.4	85.0	76.9	3.9	-	41.3	3.8	27.8	8.7
<b>SLOVENIJA</b>											
# 1960-1969	712.6	2.2	0.2	12.8	1.9	1.5	3.8	10.7	1.9	66.4	12.8
1970	619.6	2.4	0.2	8.2	1.1	1.4	4.0	11.1	2.1	68.0	11.5
Social Sector	10.6	-	-	0.1	-	-	-	-	-	0.4	0.1
Private Sector	608.8	2.4	0.2	8.1	1.1	1.4	4.0	11.1	2.1	67.6	11.4
<b>SRBIJA</b>											
# 1960-1969	762.2	35.5	9.4	154.9	108.5	14.9	21.9	97.5	22.6	189.1	45.3
1970	937.6	32.0	12.4	141.4	139.2	19.9	26.5	149.3	33.2	214.6	63.5
Social Sector	45.5	-	5.4	5.0	14.7	0.2	0.3	10.8	0.7	2.9	1.3
Private Sector	892.0	32.0	7.0	136.4	124.5	19.7	26.2	138.5	32.5	211.7	62.2
# 1960-1969	447.2	31.4	4.6	85.4	71.2	9.8	7.7	52.1	16.0	133.3	28.5
1970	637.9	28.6	6.1	93.3	85.0	13.9	9.9	65.0	22.5	147.8	45.6
Social Sector	22.3	-	1.1	1.7	1.6	0.1	0.1	1.0	0.2	1.0	0.5
Private Sector	615.6	28.6	5.0	91.6	83.4	13.8	9.6	64.0	22.3	146.8	45.1
<b>Vojvodina</b>											
# 1960-1969	270.7	3.1	4.3	60.0	27.8	4.8	13.9	37.8	5.1	42.0	15.1
1970	348.2	2.2	4.3	35.6	40.6	5.7	16.4	71.6	7.7	47.1	16.3
Social Sector	23.1	-	2.4	1.6	12.9	0.1	0.1	9.6	0.5	1.7	0.0
Private Sector	317.1	2.2	1.9	34.8	27.7	5.6	16.3	62.0	7.2	48.4	15.5
<b>Kosovo</b>											
# 1960-1969	44.2	1.0	0.5	8.4	9.4	2.1	0.1	7.5	1.7	13.7	1.7
1970	59.3	1.0	1.9	12.4	13.5	0.2	0.1	12.5	3.0	19.6	1.5
Social Sector	0.2	-	1.8	1.6	0.1	-	-	0.2	-	0.1	-
Private Sector	59.1	1.0	0.1	10.8	13.4	0.2	0.1	12.3	3.0	19.5	1.5

- = less than 100 tons

**FRUIT GROWING AND PRODUCTION OF CENTRAL EUROPEAN FRUITS**  
(Thou. Tons)

	Apples	Pears	Plum	Sour Cherry	Apricot	Peach	Quince	Cherry	Walnut	Almond	Malons & Macarmol.	Straw- berries	Rasp- berries
<b>SFRJ</b>													
Ø 1960-1969	266.6	85.7	798.6	30.2	26.7	49.6	11.3	62.8	31.6	4.3	447.0	13.6	11.3
1970	277.0	111.9	806.0	30.6	22.6	66.6	11.4	63.8	33.9	3.6	460.4	24.4	11.6
Social Sector	79.3	23.0	22.6	3.6	2.4	23.6	6.1	0.4	-	-	20.6	0.9	0.3
Private Sector	197.7	60.9	673.0	26.6	24.1	43.0	5.2	63.4	33.9	3.6	379.6	23.5	11.0
<b>BOSNA I HERCEGOVINA</b>													
Ø 1960-1969	23.4	13.9	130.9	1.2	0.4	1.7	6.6	11.8	5.5	0.1	20.5	0.2	-
1970	10.6	15.3	173.1	1.0	0.6	3.7	0.8	13.0	5.8	0.1	15.7	0.7	-
Social Sector	2.7	1.2	0.0	0.2	0.1	2.5	-	-	-	-	0.7	-	-
Private Sector	15.9	14.1	164.3	1.4	0.4	1.2	6.8	13.0	5.8	0.1	15.0	0.7	-
<b>CRNA GORA</b>													
Ø 1960-1969	2.1	1.3	10.3	0.2	-	0.3	0.3	0.7	0.6	-	6.4	-	-
1970	2.3	1.5	7.4	0.2	-	0.7	0.3	0.5	0.4	-	7.7	-	-
Social Sector	0.2	-	0.1	0	-	0.5	-	-	-	0	0.1	-	-
Private Sector	2.1	1.5	7.3	0.2	-	0.2	0.3	0.6	0.4	-	7.6	-	-
<b>HRVATSKA</b>													
Ø 1960-1969	36.3	11.3	70.9	9.7	1.0	6.5	1.1	0.9	4.2	3.5	10.6	0.4	0.1
1970	52.6	12.0	77.4	13.2	1.9	7.3	1.0	0.1	4.6	3.1	11.0	1.1	0.1
Social Sector	25.5	1.5	0.0	1.1	-	1.7	-	-	-	-	-	-	-
Private Sector	27.1	10.5	76.6	12.1	1.9	5.6	1.0	0.1	4.6	3.1	11.6	1.1	0.1
<b>MAKEDONIJA</b>													
Ø 1960-1969	32.7	0.2	23.3	0.3	4.2	3.4	1.0	2.9	3.6	0.5	110.5	0.0	0.2
1970	49.7	12.0	30.1	0.7	4.7	5.3	1.1	3.5	3.5	0.4	137.3	1.3	-
Social Sector	11.2	1.9	0.7	0.2	0.7	3.4	-	6.1	-	-	16.6	-	-
Private Sector	30.5	10.9	29.4	0.5	4.0	1.9	1.1	3.4	3.5	0.4	116.7	1.3	-
<b>SLOVENIJA</b>													
Ø 1960-1969	63.1	12.5	6.1	0.2	0.4	5.4	-	5.9	1.7	-	0.1	0.3	0.1
1970	46.0	11.0	0.1	0.1	0.5	5.9	-	3.6	1.6	-	-	0.6	-
Social Sector	11.0	3.1	0.1	-	-	2.2	-	-	-	-	-	-	-
Private Sector	34.2	7.9	6.0	0.1	0.5	6.7	-	3.6	1.6	-	-	0.6	-
<b>SRBIJA</b>													
Ø 1960-1969	97.7	36.4	613.0	10.3	10.7	23.2	0.1	23.7	16.0	0.1	242.7	11.9	11.1
1970	107.6	59.0	601.5	22.7	14.7	33.5	0.1	24.0	17.0	0.1	227.6	20.5	11.3
Social Sector	27.7	15.1	11.4	2.1	1.5	13.0	-	0.2	-	0	1.0	0.0	0.2
Private Sector	79.8	43.9	600.1	20.0	13.2	20.4	0.1	24.0	17.7	0.1	226.6	19.7	11.1
Ø 1960-1969	66.7	27.9	448.5	0.4	0.6	16.3	6.0	10.6	12.1	-	102.7	10.6	11.0
1970	65.0	41.6	500.9	13.6	0.0	22.4	6.0	20.3	13.9	-	100.0	19.3	11.2
Social Sector	0.7	5.4	9.6	1.6	0.3	5.9	-	-	-	0	0.0	0.7	0.2
Private Sector	57.1	36.6	561.3	12.0	0.5	16.5	6.0	20.3	13.9	-	99.2	16.7	11.0
<b>Vojvodina</b>													
Ø 1960-1969	20.6	0.4	27.3	0.6	0.4	6.4	1.6	3.9	2.2	-	122.0	0.9	0.1
1970	20.7	12.7	22.5	0.7	5.6	10.0	1.6	3.2	2.4	0.1	101.2	1.0	0.1
Social Sector	16.3	0.9	0.7	0.3	1.1	6.9	-	-	-	-	0.1	-	-
Private Sector	12.4	3.0	21.6	0.4	4.4	3.6	1.6	3.2	2.4	0.1	101.1	1.0	0.1
<b>Kosovo</b>													
Ø 1960-1969	10.3	4.0	10.0	0.3	0.3	0.5	0.5	1.2	1.6	-	17.1	0.1	-
1970	12.9	5.2	10.1	0.3	0.3	0.4	0.4	1.2	1.4	-	25.4	0.1	-
Social Sector	2.6	0.0	1.1	-	-	0.1	-	-	-	0	0.1	-	-
Private Sector	10.3	4.4	17.0	0.3	0.3	0.3	0.4	1.2	1.4	-	26.3	0.1	-

- = less than 100 tons

#### h. Plums - Market, Production and Development Aspects

The terms of reference of the project as well as questions by various people in Banja Luka caused the team to give particular attention to the plum utilization problem.

This problem was examined in Yugoslavia, in the export market survey areas and at the teams's home offices. For practical reasons all the aspects are given in one chapter, i.e. market matters as well as developmental recommendations.

Our observations and conclusions are summarized here:

1. The plum utilization problem cannot be resolved in any way on the level of the project area. Whatever the detailed or overall actions needed, these require coordination from above between the authorities of the two producing republics involved - Srbija and B&H - who together are Europe's largest plum producers.
2. The major part of European plum production is in the East European countries. Until now they have not organized sizeable exports to West Europe.
3. There is very little international trade in fresh plums - of the variety grown in Yugoslavia - the countries where plums are a traditional fruit are producing and consuming their own. (There are also plant-physiological reasons for the small trade, connected with the transportability of the plum).
4. There is trade in prunes (dried plums). The two major suppliers are Yugoslavia (mainly to the Soviet Union - about 20,000 annual tons) and the USA (California - which last year produced 105,000 t. fresh plums plus 165,000 t. prunes of which 30,000 were exported, of which 25,000 to Europe, mostly to the UK and Italy). The semi-dried controlled-standard-quality California prune is unmatched by other prunes and it would take the imitation of the whole chain of California growing, controlling and processing methodology to compete with it.
5. Whichever trade could possibly be developed in fresh plums - whether via modified ripening seasons, or storage, or modified/new variety, or exporting to countries in the southern hemisphere (and these are in our view open possibilities) - the precondition would be the collection and grading of fruit to generate quantities of equal-size, equal-grade plums. This seems to be the central problem today, in Srbija and B&H; a large effort and a lot of regulatory measures, not only economic incentives, would be needed with the private farmers in order to bring even a minor part of plum cultivation under proper quality control.
6. We understand that among other studies on the subject in Yugoslavia there has recently been a study initiated by Hrana-Produkt, the Zagreb trade association, on the more intensive use of plums through industrial processing. This study was done with the cooperation of the American FMC (Food Machinery Corporation). This study also concluded that it would take very large efforts, large investments and a long period of time, to achieve visible economic results. It recommended continued drying for home consumption and export and finding ways to export fresh plums.
7. The plum problem, if left as it is now, will in our view become worse. The main reason is that most of the plums are used to make plum-brandy (Slivovic) and since the farmers are steadily going over to drinking beer, and the population grows slowly and also becomes more urbanized, the consumption of plum-brandy will decrease, thus freeing even larger quantities of plums for domestic eating or processing or export.
8. It is clear that the Yugoslav economy cannot afford a large fund of payments to farmers to eradicate plum trees.
9. The team has considered these matters. Whilst it is neither in our ability nor in the scope of this project to propose any overall solution for the surpluses - in BK or other plum-intensive regions - remaining after Slivovic production and home consumption, a number of partial solutions could be considered in the following fields:



FRESH PLUMS - EUROPEAN PRODUCTION AND INTRATRADE (1971/72 AVERAGES) in '000 tons

<u>Country</u>	<u>Product.</u>	<u>Import</u>	<u>Export</u>	<u>Country</u>	<u>Product.</u>	<u>Import</u>	<u>Export</u>
Albania	8	-	-	Italy	140	1	18
Austria	90	3	-	Luxemburg	4	-	-
Belgium	13	5	-	Netherlands	12	4	-
Bulgaria	300	-	10	Norway	20	-	-
Cyprus	1	-	-	Poland	135	-	n.e.
Czechoslovakia	120	-	-	Portugal	50	-	-
Denmark	3	1	-	Romania	500	-	n.e.
Finland	-	1	-	Spain	70	-	-
France	200	6	3	Sweden	28	2	-
East Germany	90	-	-	Switzerland	44	3	-
West Germany	350*	20	3	Turkey	115	-	-
Greece	25	-	-	United Kingdom	47	8	-
Hungary	200	-	12	Yugoslavia	820	-	20

\* 1970 - 500,000 t

PLUMS  
BREAKDOWN OF DATA ON PRODUCTION/TRADE

Output by Republics (in thou. tons)

Year	SFRJ	BiH	Crna Gora	Hrvatska	Makedonija	Slovenija	Srbija Total	Srbija Proper	Vojvodina	Kosovo
1967	705	113	5	34	24	5	524	486	25	13
1968	721	126	19	98	26	14	438	403	19	16
1969	1292	226	6	113	29	4	909	842	44	23
1970	896	174	7	78	30	6	601	561	22	18
1971	817	126	17	77	24	5	568	527	26	15

Year	Output						Consumption		Prices		
	Measg. Unit	Priv. Sect.	Soc. Sect.	Total	Impts.	Exports	Total	Kg. Per Capita	Buying up	Selling	Yearly Retail Prices
1967	000 tons	693	12	705	-	18,83	686	340	0,46	0,64	1,50
1968	"	711	10	721	-	2,43	718	360	0,51	0,64	1,36
1969	"	1259	33	1292	-	19,82	1272	630	0,42	0,63	1,61
1970	"	874	22	896	-	64,68	831	410	0,38	0,65	1,88
1971	"			817	-	6,82	810	400	0,84	1,40	2,50

Source: ZIT/OFFICIAL DATA

DRIED PLUMS (PRUNES) - PRODUCTION/IMPORTS/EXPORTS  
OF EUROPEAN COUNTRIES

COUNTRY	YEAR	PRODUCTION		IMPORTS		EXPORTS		COUNTRY	YEAR	PRODUCTION		IMPORTS		EXPORTS	
		'000 metric tons	'000 metric tons	'000 metric tons	'000 metric tons	'000 metric tons	'000 metric tons			'000 metric tons	'000 metric tons	'000 metric tons	'000 metric tons	'000 metric tons	
AUSTRIA	1967			0.9				THE NETHERLANDS	1967			1.8			
	1968			0.8					1968			2.0			
	1969			0.8					1969			1.7			
	1970			0.8					1970			1.8			
BELGIUM	1967			1.7				NORWAY	1967			2.1			
	1968			1.5					1968			2.1			
	1969			1.7		0.003			1969			2.2			
	1970			1.2					1970			1.9			
DENMARK	1967			3.1				SWEDEN	1967			2.8			
	1968			2.9					1968			2.6			
	1969			3.2					1969			2.4			
	1970			2.9					1970			2.6			
FINLAND	1967			2.1				SWITZERLAND	1967			0.4			
	1968			2.3					1968			0.5			
	1969			2.3					1969			0.5			
	1970			2.3					1970			0.5			
FRANCE	1967		12.5	5.8		0.7		UNITED KINGDOM	1967			10.5			
	1968		14.5	3.4		0.7			1968			10.0			
	1969		16.4	4.3		1.2			1969			8.3			
	1970		16.2	4.9		1.2			1970			9.2			
WEST GERMANY	1967			5.6		0.3		YUGOSLAVIA	1967		22.9				7.3
	1968			6.5		0.3			1968		12.8				14.5
	1969			5.8		0.1			1969		31.8				4.7
	1970			6.2		0.2			1970		15.2				
ITALY	1967			6.4		1.5									
	1968			7.7		1.4									
	1969			6.9		2.0									
	1970			9.0		1.5									

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e. Fresh Plums Sales

1. Domestic Sales in Yugoslavia

These could bring much better income to the farmers if grading and packing stations, with full regulatory accept/reject powers, would take over the fruit for marketing.

This would produce higher prices but on the other hand some "equalization fund" would have to be created so that the farmer whose fruit are partly or wholly rejected will obtain at least some token minimum for his produce.

2. Export Sales - Europe

2.1. After Season Sales

The majority of the small quantities of export plums which come to the Munich fruit market today is fetching a depressed price, even if of selected grade, because during the same weeks of season fruit from various East European suppliers, and domestic German fruit, are flooding the market. Thus a contributory solution would be to undertake measures, in selected areas, where large quantities are concentrated in the hands of farmer groups who can be organized for action in their own long term interest.

These measures would be:

2.1.1. Immediate Measures

Recently controlled-atmosphere storage of plums has been commercially developed. This storage process would make it possible to market plums weeks or months after the harvest. Considering autumn and especially winter prices of fresh plums in Western Europe, and their limited availability, the harvested plums could stand a fair cost of controlled atmosphere storage. It has to be assumed that sooner or later competitors will also introduce this measure but it would still extend the season and enable sales. Whatever is not despatchable abroad could still be sold on the domestic market.

2.1.2. Longterm Measures

Grafting of selected trees in order to produce earlier/late ripening varieties or replanting new varieties such as have been developed in several places including the Cacak Institute and applied at PIK Beograd.

This program would be connected with simultaneous eradication of the worst since help with grafting could, up to a limit, be conditionally combined with eradication. Whether this is possible and feasible - including an evaluation whether the same farmer groups have bad and saveable trees together, would depend on surveys.

### 3. Export Sales - Overseas

One reason why plums do not move in large quantities in overseas trade is that the presently known varieties, if chilled for transport, had to be brought up to +7°C latest after 10 days. This prevented the development of overseas shipping trade in plums and also kept South African winter plums sales to Europe small as transport in special trays and fast ships was limiting possibilities.

Very recently, and after many years of experimenting, a new plum variety was developed in South Africa which is transportable for longer periods at +1°C. This opens up a large winter market for South African plums from the next years onwards.

The South African Fruit Boards are generally interested to cooperate in developing international markets for their fruit with Northern Hemisphere producers, as they have shown in citrus and other fruits.

The potentially greatly increased winter sales of South African plums within a few years - to Europe and probably North America and Japan - should stimulate year-round demand for plums.

If Yugoslav institutes could introduce the same plum variety, Yugoslavia could consider developing its own anti-season market, i.e. export to the Southern Hemisphere.

Whilst the Southern Hemisphere markets that can afford high anti-season prices are fewer than those of Western Europe, they do develop and South Africa, Australia, New Zealand, parts of South East Asia and Latin America do constitute markets.

Admittedly this is a longterm matter but it does seem to have concrete merits and possibilities of permanency. Recent years have shown that South Africa is very successful to exploit economically the anti-season advantages which it has. South Africa could turn into the world's largest ocean trader of fresh plums and it would therefore be natural that Yugoslavia, as the largest present producer, and being in anti-season to South Africa, should find development possibilities in these directions.

### b. Processed Plums

#### 1. Prunes (Dried Plums)

There are today about 400 small drying installations for plums dispersed in the B&H and Srbija plum producing areas. This makes it impossible to arrive at a select standard type of prune. A solution to this problem - which is mainly organizational - would certainly increase the exportability of prunes. This matter could be discussed for BK between the Banja Luka Chamber of Commerce and the Republic authorities, so as to try evolving standard prune production in 1-2 pilot areas. This would not demand large investments and could test the possibilities.

#### 2. Canned Plums

The export market for such is presently non-existent, although for good fruit a small market in Scandinavia could be developed.

#### 3. "Povidl" (concentrated plum jam)

This has a certain market and is presently exported from Yugoslavia. It is liked in Europe, particularly by children who use it as a spread. In this connection it is proposed that if Vitaminka starts strained babyfood production as is proposed in this plan, it might explore the possibility of bulk supply of a babyfood variety of Povidl, or other plum concentrate, to various European babyfood producers.

Regular plum jam is on the Vitaminka production program and if Vitaminka will add to their product line the high-quality confitures proposed in this plan, they should be able to market much larger quantities of plums in that processed form than today.

4. Plum Pulp

This could have markets, even overseas, which could be developed - not in large quantities but still commercial amounts. Economically, it should be seen as a by-product from the grading of fresh plums and if such grading will be developed, then plums at minimum prices, at reject cost, could be available for making plum pulp. This should be explored by Vitaminka who would have the best outlets for this product, which is already exported from Yugoslavia.

5. Plum Juice and Prune Juice

Plum juice is tasteless and not recommended as a product for either domestic or export sales.

Prune juice, if of high quality, does have a market which started in the USA and is very small in Europe because few prunes are available at processing prices.

If Vitaminka could obtain access to non-selectable prunes, dried to the degree required for prune juice production, this may open up profitable sales for it, first on the domestic market.

\* \*

All the suggestions regarding processed plums are possibilities to increase the sales of Vitaminka. They will not have an influence on the main plum problem which is one of tens of thousands of tons in BK alone, not to speak of the surrounding plum growing areas.

In order to make a meaningful contribution to the partial solution of the plum surpluses as such, it appears to us that a selective reorganization over the whole producing area in the two republics would be required. This could best be done by a Plum Sector Development Board.

If the authorities in Sarajevo would wish to set-up such a Board, then an overall agro-business-type development program could be worked out by competent Yugoslav institutes, for successive partial solutions, some of which have been indicated here.

\* \*

## i. Berries - Market Position and Background

Berries could be considered in several marketable forms:

- a) As fresh fruit
- b) As an intermediate product - (pulp or concentrate)
- c) As quickfrozen berries (see sections on quickfrozen products)
- d) As juices

Berries enjoy an increasing world market in all these forms and demand exceeds supply everywhere. Yugoslav enterprises have entered the field in all forms and expansion seems possible and desirable. Supply cannot catch up with demand because in several producer countries, berry production is being changed towards cultivation - either open field or glasshouse, respectively plastic - and cultivation itself is becoming mechanized, particularly in harvesting which constitutes, if done manually, about 75% of all the work in berry cultivation.

West Germany imported in 1971 about 46,000 tons of strawberries (see Table) in addition to its self-production of nearly 25,000 tons. Britain, Sweden, Finland and Holland are large producers of various cultivated berries. Poland is becoming a very large producer of strawberries and other berries, and exports nearly 20,000 tons frozen strawberries to West Europe and the USA. As was mentioned in the chapter on quickfrozen foods, Japan is about to enter the European market with frozen strawberries.

It is evident from all information that with the success of cultivated berries and more constant supply to the retail markets and to the processing industry in Europe, the demand is about to increase even more, both for varieties of berries and for forms of consumption (fresh, frozen, juices).

A special report on berries was prepared by Mr. F.A. Roach, FAO Consultant, who was on a special mission in the project area in August 1972. Several points of these recommendations are summarized in the section of this report on vegetables/fruit/grains production as raw material for the BK Foodprocessing industry.

BK ecological conditions, like several other regions in Yugoslavia, are very favorable to large scale cultivation of berries. Considerable work has been done at the Cacak Fruit Institute about berry cultivation which has also summarized its findings on possible yields, varieties, etc. in good documentation which is available. Cacak also have available berry saplings, of strawberries, blueberries, raspberries, loganberries - part of them specially imported for industrial cultivation. Yugoslav enterprises that availed themselves of this opportunity have been successfully cultivating and selling berries - in fact the recent first appearance of Yugoslav frozen strawberries in commercial quantities on the West European market was due to such cooperation, after formerly used varieties had failed in yields and processability.

STATISTICS

ESTIMATE OF EUROPEAN PRODUCTION/EXPORTS/IMPORTS 71/72 - 1000 TONS

	<u>Production</u>	<u>Exports</u>	<u>Imports</u>	
Belgium	25	1	12	
Bulgaria	20	.	3	
Czechoslovakia	15	.	.	
Denmark	10	.	8	
Finland	3	.	.	
France	65	2	1	
East Germany	20	22	.	
West Germany	20	45	.	
Greece	8	.	.	
Hungary	20	.	.	
Italy	60	.	45	
Netherlands	20	.	6	
Norway	11	.	.	
Poland	120	.	25 <sup>a</sup>	<sup>a</sup> of which 15,000-20,000 frozen exports
Portugal	2	.	.	
Spain	9	.	.	
United Kingdom	60	.	.	
Yugoslavia	20	.	.	<sup>b</sup> 3,000 frozen exported
Switzerland	2	8	.	

General Statistics

Export Statistics

	<u>P</u>	<u>I</u>	<u>E</u>		<u>P</u>	<u>I</u>	<u>E</u>
Britain	15	.	.				
W. Germany	.	15	.				
				U. Germany	.	11	.
						(+6 resp/cross.)	

U. GERMANY EXPORTS OF FROZEN SHEEPMEAT 1971

From:		
Italy	20,000 t	
Belgium	7,000	
Netherlands	4,000	
France	700	
Romania	2,000	
Hungary	700	
Israel	500	
USA	410	
Poland	110	
Yugoslavia	110	
Others	<u>100</u>	
Total	46,070 t	*****



### J. Cultivated Mushrooms (Champignons)

The main producers in W. Europe are France, Great Britain, Holland, W. Germany and Italy.

The mushrooms processing industry has grown, in the period 1965/70, more rapidly than the production - 110% versus 80%. Most but not all countries participated in this increase and of course not all at the same rate. While the increase in the Benelux countries was about fivefold, the increase in Italy was 220%, Great Britain 110% and France only 70%. W. Germany did not increase its mushroom processing, mainly because their industrial production could not compete with prices offered by industry of the other countries. Therefore all the increase in production was channelled to the fresh market. W. Germany is the most important importer of processed mushrooms, i.e. 85% of all W. Europe. W. Germany and Belgium and Luxemburg import each 40% of the fresh mushrooms imported into W. Europe.

The average price paid in W. Germany in 1970 for processed mushrooms was DM 3,78 franco.

W. Germany is also the main per capita consumer of processed and total consumption of mushrooms, i.e. 650 and 1,020 gr. respectively (1970). Denmark and Great Britain are the main per capita consumers of fresh mushrooms, i.e. 770 and 760 gr. per annum (1970).

The enclosed tables show data on production and consumption trends in the countries of interest to Yugoslavia. In addition it ought to be mentioned that Denmark, Poland and Hungary are increasing their production considerably.

Champignons are produced in France till today in grottos and caves, although modernized (in trays). In Holland and the UK glasshouse growing has been developed. Contacts and knowhow agreements with enterprises in one of these countries will be required for starting production in BK and the detailed feasibility can only be established on the choice of the process. It should, however, be feasible to produce champignons in BK under similar conditions as in those countries, considering recently developed technology.

Champignon canning is included in the Vitaminska development program and feasibility data are given.

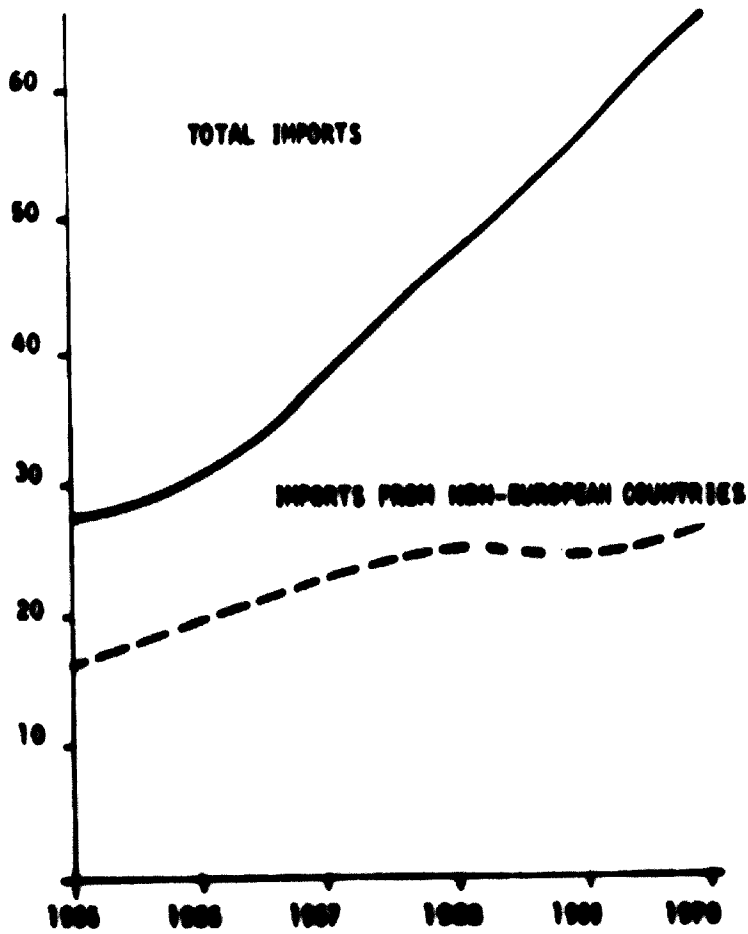
It is recommended that in the first instance a decision will be made regarding such cultivation and that Vitaminska should be allocated initial development funds to work out a detailed program for organizing the cultivation of champignons, with technical assistance, from abroad.

\*

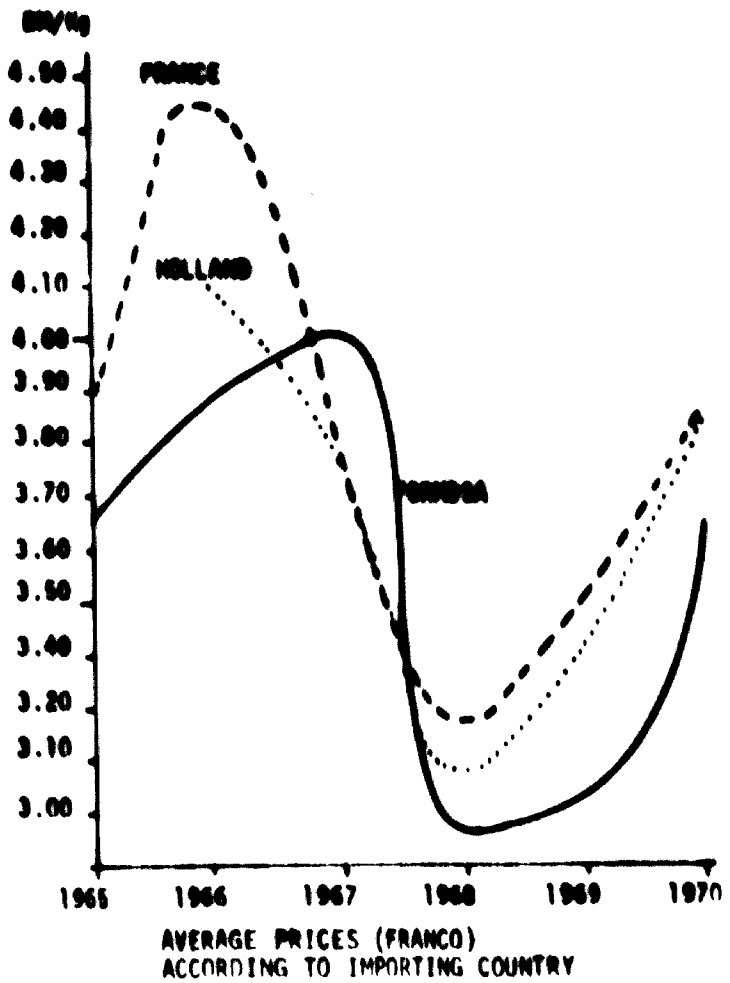
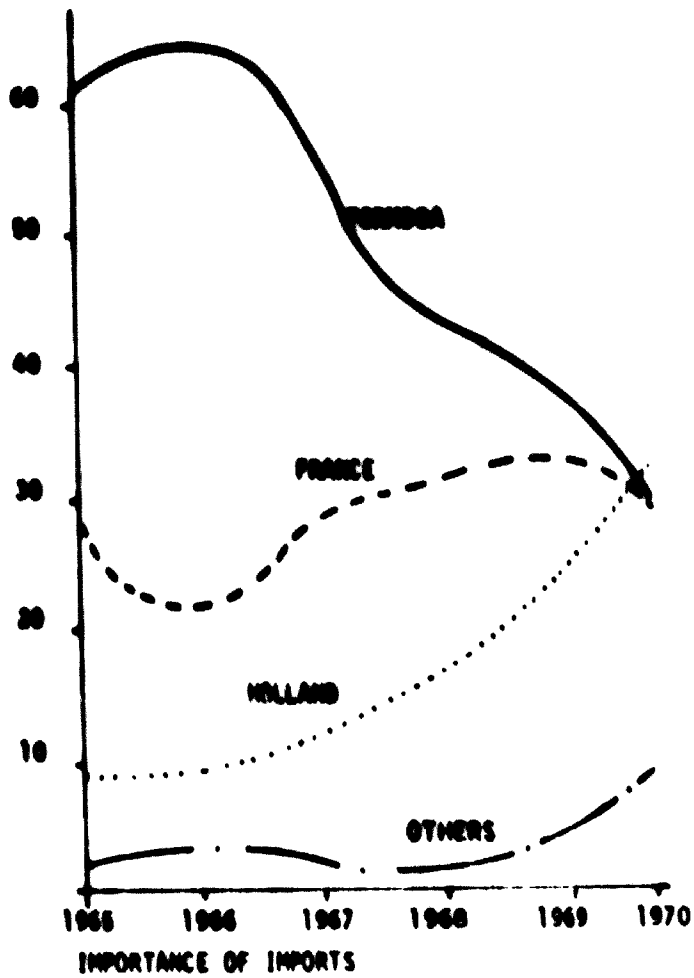
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Thou. Tons

CANNED CHAMPIGNONS - IMPORT TO EUROPE



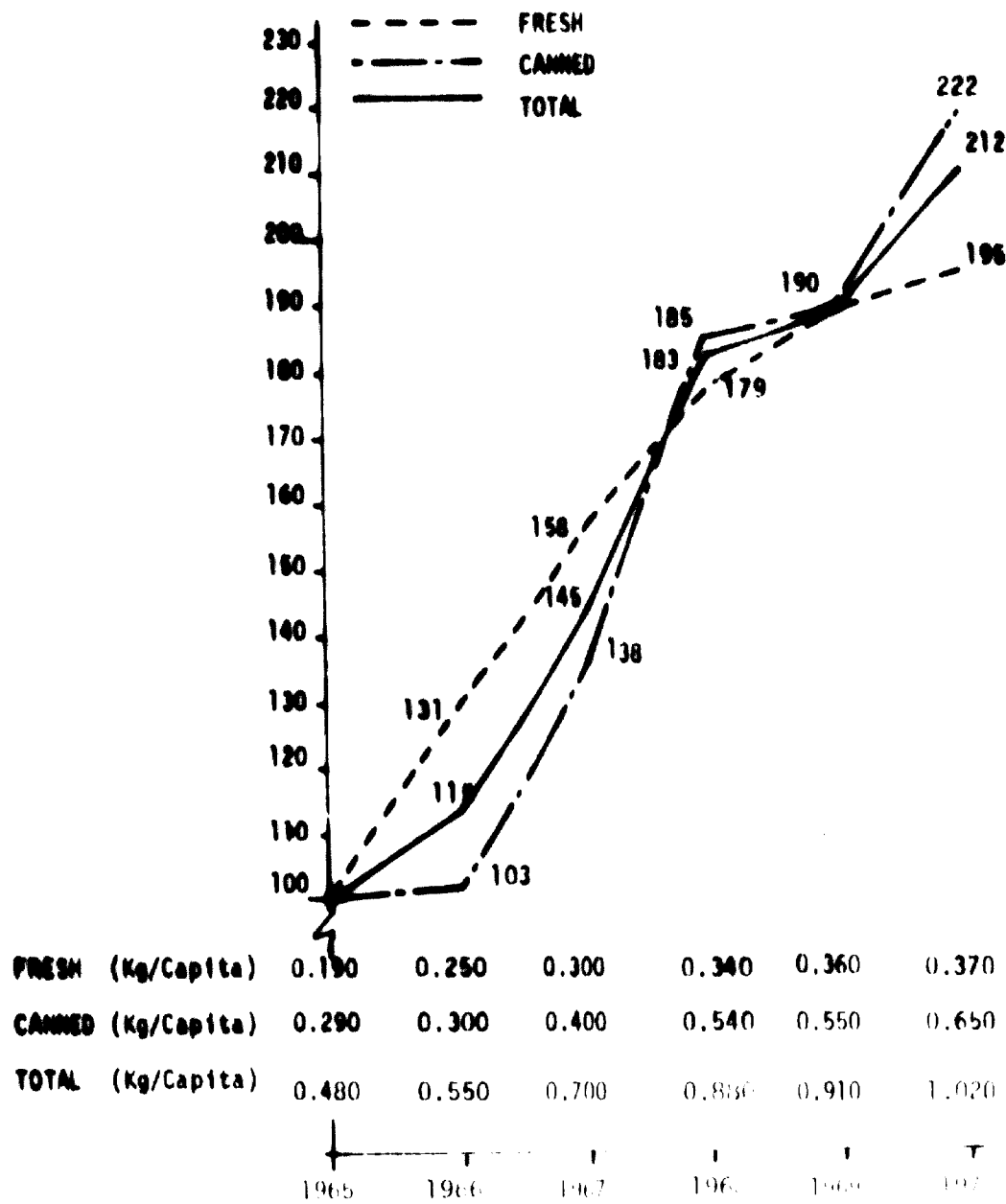
CANNED CHAMPIGNONS - U. S. MARKET



IMPORTS OF CANNED CHAMPIGNONS TO W. GERMANY ACCORDING TO ORIGINATING COUNTRIES (tons)

	1966	1967	1968	1969	1970	1970 Jan-Jul	1971 Jan-Jul	DM/KG
France	5,330	8,960	13,770	14,960	16,720	9,040	11,640	3,86
Belgium & Luxembourg	-	-	80	240	1,380	460	1,560	3,53
Holland	2,470	4,080	7,270	11,520	17,380	9,550	11,550	3,84
Italy	10	10	-	-	380	110	430	3,74
Denmark	70	40	50	90	40	35	-	3,10
Spain	-	-	-	-	50	-	340	3,70
U. S. A.	120	10	30	10	90	80	-	4,39
South Korea	110	380	200	390	1,420	1,060	1,220	3,95
Japan	260	240	120	1,030	1,790	1,730	80	3,42
Formosa	16,480	17,600	22,140	16,920	16,860	11,860	13,010	3,67
Others	50	40	10	20	60	15	350	-
<b>TOTAL</b>	<b>23,840</b>	<b>31,360</b>	<b>43,670</b>	<b>46,170</b>	<b>55,170</b>	<b>33,940</b>	<b>40,080</b>	<b>3,78</b>

INCREASE OF PER CAPITA CONSUMPTION OF CHAMPIGNONS IN W. GERMANY (1965 = 100%)



PRODUCTION & CANNING OF CHAMPIGNONS IN W. EUROPE - 1965

	1965		1966		1967		1968		1969		1970		1971
	Product	Cann-	Prod.	Cann.	Prod.	Cann.	Prod.	Cann.	Prod.	Cann.	Prod.	Cann.	Prod.
France	49600	27700	52100	31000	60000	38800	58000	38800	62000	39000	60000	47000	80000
Holland	12000	3200	15400	3900	17500	7000	20700	9800	24100	12000	29500	19300	35000
Belgium & Luxembourg	2000	350	2900	900	2800	800	2700	350	3500	550	4000	2000	N.A.
W. Germany	9000	200	13000	300	15000	350	17000	200	18400	300	20000	300	22000
Italy	6000	1100	9000	1600	11000	1900	14000	7500	18000	3200	20000	3500	N.A.
Great Britain	30000	6000	33000	6000	40000	8000	45000	9000	50000	11500	55000	12500	N.A.
Denmark	4000	1300	5000	1450	5300	1750	5500	1350	5500	1200	6000	1200	N.A.
Switzerland	2300	200	2400	200	2500	200	2500	250	2800	200	2800	350	N.A.
Austria	3000	600	3000	700	3000	700	3000	700	3000	700	3000	700	N.A.
Spain	2800	1300	2900	1300	3700	1800	4800	1600	4900	1700	5400	1800	N.A.
Sweden	2800	1150	2500	1200	2500	1200	2800	1300	2700	1400	2800	1500	N.A.
<b>Total</b>	<b>123700</b>	<b>43100</b>	<b>140400</b>	<b>40000</b>	<b>160000</b>	<b>62200</b>	<b>170000</b>	<b>61900</b>	<b>194700</b>	<b>73000</b>	<b>216000</b>	<b>90150</b>	<b>(137 G)</b>

IMPORTS OF CHAMPIGNONS TO W. EUROPE - 1965

	1965		1966		1967		1968		1969		1970	
	Canned	Fresh	Canned	Fresh	Canned	Fresh	Canned	Fresh	Canned	Fresh	Canned	Fresh
France	170	120	170	450	110	670	100	1110	100	740	310	40
Holland	70	-	120	20	240	40	170	200	210	100	1600	100
Belgium & Luxembourg	830	3220	1240	4150	1270	4310	1440	4070	1770	3500	1770	3470
W. Germany	23070	2500	23040	2520	31300	3110	43670	3820	45170	3060	55170	3170
Italy	70	N.A.	130	N.A.	240	N.A.	160	N.A.	430	N.A.	240	N.A.
Switzerland	1900	30	2500	10	2610	40	2620	80	2700	90	3300	120
Sweden	950	110	1600	190	2150	260	2050	130	2500	220	2500	350
Austria	N.A.	190	N.A.	140	N.A.	200	N.A.	170	N.A.	300	N.A.	200
G. Britain	N.A.	1300	N.A.	1800	N.A.	1400	N.A.	1300	N.A.	1050	N.A.	1150
Finland	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
<b>Total</b>	<b>27250</b>	<b>7650</b>	<b>29770</b>	<b>8900</b>	<b>38090</b>	<b>10030</b>	<b>50310</b>	<b>10880</b>	<b>53140</b>	<b>9960</b>	<b>65160</b>	<b>8500</b>

k. Asparagus - Market and Production.

On the Yugoslav market, asparagus is practically unknown. The main importer of fresh asparagus in Europe is West Germany, while the main European producers are France, Italy and Spain (85% of European production) and the main exporters are these countries and Holland. It is important to note that the per capita consumption of asparagus in West Germany nearly did not change in the decade 1960/70 and fluctuated upwards and downwards between 380 and 470 grammes annually (1970 = 440 gr.). Since the beginning of 1972 the E.E.C. has 4 standard specifications for fresh asparagus - extra, I, II, and III.

West Germany's own production is downwards in hectareage (1965 - 5110, 1970 - 4400) and upwards in yields (1965 - 2500 kg/ha, 1970 - 3200 kg/ha). Combination of both trends result in a more or less static local production (1965 - 12,900 tons; 1970 - 14,100 tons). Considering the statics of per capita consumption the increase of imports is considerable (1967 - 8300 tons; 1970 - 12,900 tons). The main import sources are France and Holland (95%). Main imports are from April to June. Fresh asparagus is forecast by West European importers as "shortage merchandise" for a long period.

Wholesale prices range from DM 5,00 to 8,00/kg. The earlier the supply the higher the price, but there is also a great difference of the average price each importing country receives. Thus in 1970 the average price for French asparagus franco was DM 4.20, for Dutch DM 3,90 while Hungary received only an average of DM 2,50/kg. Still, the high standards demand of the German population pays a higher price for the locally grown asparagus. The demand in West Germany is for full white asparagus, while the violettish French varieties are less acceptable and the green tipped American type products are nearly unknown. The demand for length and width is also exigent (length of 22 cm and diameter of 16 mm). Form of packaging is also standardized, and very specific for conventional shops unbundled in crates of 6 or 12 kg and for self-service shops in bundles of 1 kg. - ten per crate. Color or size or diameter or cleanness out of standard tolerances immediately create a sales problem.

A large demand exists for canned asparagus. It is interesting that canned asparagus is sold widely also during the high season of supply of fresh asparagus. The main imports of canned asparagus come from Formosa and China.

As stated elsewhere in this report it is recommended to start asparagus plantations, both as a source of good agricultural income and in order to create a new raw material for the processing industry. However, in the first stages this will be for the Yugoslav market only.

ESTIMATED EUROPEAN PRODUCTION OF ASPARAGUS - 1972

<u>Country</u>	<u>Production</u>	<u>Exports</u>
France	60,000 t	11,000
Italy	43,000 t	12,000
Spain	32,000 t	n.a.
Holland	10,000 t	5,000
Germany	3,500 t	--

Note: Iran and Kenya have started early-season air supplies to West Europe.

i. Sweet Maize (Sweet Corn)

Exact market data for sweet corn are lacking but it is known that this variety enjoys a widening market in the canned and quickfrozen forms in most developed countries. It is therefore considered to propose the processing of sweet corn in the farms in BK. Tonnages are shown in the relevant chapters.

Growing matter of sweet corn have been discussed in the agricultural production section of the report. Some sweet corn is being planted in Yugoslavia in the Doboj region of B&H and is destined for canning for export. Since sweet corn is being proposed in this project for canning by Vitaminka it would be useful if Vitaminka could contact the Doboj producers for pooling of information and possible action since they and Vitaminka would be the first two sweet corn canners in the country.

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m. Apples - Markets/Production

Apples, like plums, constitute since recently a threat of a surplus product in Yugoslavia. This despite the fact that much has yet to be done to bring part of the apple crop to the quality in variety and distribution which could fetch higher prices on the domestic market.

The subject of applejuice production has been discussed in the "Soft Drinks Industry" subchapter.

Regarding the possibility of marketing fresh table apples to West Europe, as was brought up in some discussions, our comments are as follows:

- West Europe has increased its table-apples production by 250% since 1960.
- Estimates of this production (supplemented by data on pears) as well as that of the USA/Canada/Mexico are given below for 1972.
- 1971 harvests were even higher, since 1972 was a bad year.

Apples & Pears Production 1972 ('000) Tons

	<u>Apples</u>	<u>Pears</u>		<u>Apples</u>	<u>Pears</u>
Italy	1800 <sup>1)</sup>	1400 <sup>1)</sup>	Benelux	248	58
France	1734 <sup>2)</sup>	510 <sup>3)</sup>	Greece	200	114
W. Germany	1263 <sup>4) 5)</sup>	336	Austria	160	39
Spain	525 <sup>1)</sup>	380 <sup>1)</sup>	Switzerland	120	30
Netherlands	520 <sup>1)</sup>	150 <sup>1)</sup>	Denmark	75	9
Yugoslavia	400	115	Norway	51	12
Bulgaria	380	n.a.	Sweden	48	6
United Kingdom	250	60			
USA	2838	512			
Canada	388	44			
Mexico	161	35			

- 1) High percentages exported
- 2) of which 480,000 exported
- 3) of which 60,000 exported
- 4) of this 480 to industry
- 5) +535 imports.

Percaput consumption in West Europe is between 20-30 kg/yr. It is on the rise in Yugoslavia and East European countries and in some West European producer countries, but static in those countries in the West which have reached very high percaput consumption (Germany, United Kingdom, Switzerland).

Over the last two years several trade-structural effects have been felt between the EEC countries in their apple trade and at certain times and locations there are signs of overproduction and oversupply. This is partly regulated by storage, but not successfully, since the huge quantities moving in internal and external markets within the EEC create problems by their mere size.

At the same time West European industry suffers from insufficient supplies of processing apples, because secondary apple trees are left to die due to lack of profitability of keeping them alive, after the new varieties and large scale production of the 1960's had their effect on prices and distribution logistics. Germany, France, Holland, Switzerland and the United Kingdom have large processing facilities for apples (juice, jelly, puree, compote, cider). Small area production apples can no longer be considered economic supplies there, and it has been found out lately that only plantations of 20 ha. with 1500 - 2000 trees/ha. can produce processing apples cheaply enough, considering the rising processing costs.

It is expected that West European production of apples will stabilize at the present amounts and that supplies of processed apple products will diminish over time. At the same time strict measures against non-EEC imports of apple products will be taken to protect home production.

It is therefore not recommended to devote much attention in BK at present to the export of apples or apple products but to focus efforts to the supply of the domestic and tourist markets with products such as those recommended, simultaneously undertaking agrotechnical measures to gradual improvement of the trees in BK for better quality and yields.

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#### n. Peaches - Markets/Production

For BK agroindustry the problem of peaches for processing does not exist presently, since out of total Yugoslav production of nearly 60,000 tons in 1971, only 4,000 tons come from B & H. 60% of the harvest comes from Srbije.

On the other hand there are not enough peaches available in Yugoslavia for the present demand of fresh fruit and more high-quality peaches, properly graded and packed, would certainly be saleable all over Yugoslavia at good prices, and even more so in the tourist areas, since the peach has over the last decade become a favorite popular fruit in Western Europe.

Since it is unlikely that Yugoslavia will be allocated foreign currency for quantity imports of peaches, all the increase of demand will have to be covered from domestic production.

It would be up to the Kombinat - who has the resources to organize production - to decide whether peach production, using new varieties, would be indicated. Such production would be earmarked for the domestic market - including tourists.

The situation in West Europe has changed considerably since ten years ago when peaches were still in short supply -

1. Italy and France more than doubled their (even formerly large) peach production within less than 10 years, and also improved their varieties.
2. Greece and Turkey, seeing the tremendous market growth in the EEC countries, planted peach trees and Greece has come into the market over the last 1-2 years. Greek production in '72 was 220,000 tons, Turkish production (negligible till now) was 120,000 tons in '72 - and will be destined for export from 1973.
3. Due to overproduction in the two EEC countries there is strong pressure in the EEC against allowing Greek and Turkish peaches into the EEC, above minimum quotas which will be periodically fixed.



4. In 1971, the EEC peach balance was approximately as follows:

Italian production	1,320,000 tons	
French production	630,000 "	
German production	<u>43,000 "</u>	(decreased to 20,000 in 1972)
Main EEC production approx.	2,000,000 tons	
Imports into EEC (90% from Greece, 10% from Bulgaria)	70,000 "	
Exports from EEC	<u>90,000 "</u>	
Available for consumption	1,980,000 tons	
Removed from market as price support measures (italian producers receive from EEC 50 Lire per kg. destroyed peaches)	<u>105,000 "</u>	
Net consumption in EEC	<u>1,875,000 tons</u>	*****

From the above it can be seen that:

- 1) The chances of profitable export of fresh peaches from BK are very small.
- 2) Present Yugoslav percaput consumption is one third of that in West Europe.
- 3) The foreign tourists, much used to a full supply of good peaches in the home countries, would most probably be good customers for high grade peaches which they presently cannot buy in Yugoslavia.

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#### Chicoree (Endives) - Market and Development Aspects

This refers to the vegetables called chicoree in Belgium and "endives" in France, (though the endive in English is a somewhat different vegetable).

World Production of this vegetable is concentrated mainly in a few European countries, and over recent years European production increased very much and consumption widened, since the vegetable was "discovered" as a parallel to lettuce for fresh salads by broader parts of the population.

#### Estimated Chicoree Production 1972

France	200,000 tons
Belgium	70,000 "
Italy	35,000 "
Netherlands	20,000 "
W. Germany	<u>10,000 "</u>
Total World	<u>335,000 tons</u>

Yields vary from 14 t/ha in France to 22 t/ha in Germany. The season is Sept. to May. This product fetches about twice the price of comparable vegetables because of its demand structure and its compactness.

Trade circles foresee a rising and spreading market and it is believed that demand will extend in such a way that frozen as well as coldstored chicoree will soon be offered.

It is suggested that the Agricultural Institute in Banja Luka collects information and conducts field trials since, a priori, the ecological conditions in BK seem favorable. While these tests go on the West European market should be observed and test sales in 3-4 urban centers in Yugoslavia should be started with demonstrations to evaluate consumer acceptance.

If a market for fresh chicoree can be created within 3 years, it is foreseen that, as a next stage, demand could be created (domestic and abroad) for the frozen product.

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P. Some Considerations Regarding the Marketing of Selected Fresh Vegetables  
(Additional to the Vegetables Mentioned Before).

Some thoughts are presented here on fresh vegetables marketability. These are based on relevant information gathered in the project area and abroad in connection with processed foods. It is realized that these fresh standard products are not a priority subject for this study. They are mentioned as supplementary information only.

**Green Peas.** Green peas in fresh form (in pods) have limited chance only in the international market and are regularly traded in the domestic market. Harvest time is May and June and the producer receives ND 2.00 - 3.00/kg. West Germany imported in 1970 about 1500 tons of pods, the main suppliers being Italy, Hungary and Holland. The wholesale price fluctuated between DM 0.50 and 1.50/kg.

**Green Beans.** Green beans are harvested in July. This crop has to be fresh and green and of a length of around 10 cm. In this form it is best accepted on the market. The export market prospects are fair. West Germany imported in 1970 about 15000 tons. In 1968 Yugoslavia exported to West Germany 112 tons, but without continuity in the following years. Wholesale prices in West Germany are DM 0.80 to 2.30.

**Cucumbers:** In open field production supply is usually from July to September. If grown in hothouses the season can start earlier and be prolonged as well. If grown under plastic covers the harvest can start 2 to 4 weeks earlier. The difference in prices usually pays a good return on the investment. The market demand for size and shape varies according to purpose and variety. If no cold storage is involved the cucumbers have to reach the final consumer within 2 to 3 days after picking. West Germany imported in 1970 about 165,000 tons out of a total consumption of about 200,000, i.e. 83%. The main supply was from April to September but smaller amounts appeared on the market during the rest of the year. More than half of imports came from open fields. The West German market demands cucumbers which are long, straight and slender. Wholesale prices are DM 0.40 to 1.30, depending on the period of the season.

**Tomatoes.** In the open field production is usually from July to October. Tomatoes can be considered as well as cucumbers as a typical hothouse crop. Growing under plastics can advance harvesting by up to a month. The tomato when picked has to be firm and unblemished. According to the duration from picking till consumption the degree of red coloration at picking time is established. Yugoslav prices are ND 2 to 6 for the producer. W. Germany imported in 1970 about 300,000 tons of tomatoes which represented 91% of consumption. More than 70% of the imports came from Holland and the rest mainly from Spain and the Canary Islands, Rumania, Bulgaria and Italy. Most of the imports were from April to November, while smaller amounts were supplied during the rest of the year. Wholesale prices fluctuate from DM. 0.85 to 5.00/kg.

**Carrots.** Carrots appear on the market in September and October. Growing under plastic is not recommended. In order to receive a good price carrots have to be clean and without green collers, 10 to 12 cm long, with smooth surface and without a wooden core. W. Germany imported in 1970 about 70,000 tons, representing 25% of consumption. The main suppliers were Italy, Holland and France. Principal months of supply were from November to July. Since most of Germany's own production appears on the market in September, this month being also the major production season in Yugoslavia, fresh carrots cannot be counted on as favourable for export. However, the national market pays good prices, ND 4 to 6, and carrots can definitely be considered for freezing.

**Cabbage.** Main production is in August and September. Plastic and different varieties could advance the season considerably but the economic feasibility of growing under plastic has to be established as the local market pays quite a low price for cabbage, i.e. ND 1.00 to 1.50/kg. West Germany is a large consumer of cabbage but production is also high. Therefore only seasons of low production, for different reasons, would enable exports to them. In 1970 West Germany imported about 30,000 tons,

all the year around less June and July. August and September were the months with lowest imports. It is not recommended to think of cabbage as an export crop.

**C a u l i f l o w e r .** Main production of cauliflower is from June to October. Using plastics the season could be advanced up to one month. Cauliflower must be cut at time and handled with care. The West European market is not feasible for the project region as its imports are mainly from December to May (W. Germany in 1970 = 160,000 tons).

**S p i n a c h .** Spinach appears now in the project region from June to October. Widening the range of varieties could help prolonging the season up to almost all the year around (limited only by snow). Prices at the local market are ND 3,00 to 5,00. The product has to reach the consumer quickly in order to ensure a good quality, i.e. large, green and fresh leaves. The export market is nearly non-existent as most West European countries produce their own spinach fully mechanized, but the national market - fresh and eventually as frozen product - appears very interesting.

**G r e e n P e p p e r .** Main production is from July to October. This crop can greatly benefit from plastic sheets. Using this technique harvest time can be advanced up to one full month. Prices vary on the local market from ND 2,50 to 5,00. The fruit has to be large, firm, unblemished and not discoloured. There is nearly no production of green pepper in West Germany. In 1970 West Germany imported about 53,000 tons. About fifty percent came from Italy and 20% from Hungary. Other suppliers were Yugoslavia, Bulgaria, Rumania and Israel. Yugoslavia exported to West Germany in 1970 1400 tons compared to about 4300 tons in 1966. Lowest prices are received in September to October (0,50 DM/kg), while in December to January prices soar to DM 3,50 to 4,00/kg.

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9 Potatoes - Markets for Fresh and Processed Potatoes, and Development Aspects.

1) Fresh Potatoes.

<u>Annual Imports/Exports of Main Potato</u>			
<u>Trading Countries in Europe</u>			
<u>C o u n t r y</u>	<u>Y e e r</u>	<u>Imports</u> (Thous. Tons)	<u>Exports</u> (Thous. Tons)
Belgium	1968	50	120
	1969	120	165
	1970	100	75
Denmark	1970	22	36
W. Germany	1970	875	NIL
G. Britain	1970	275	NIL
France	1968	175	310
	1969	175	560
	1970	200	275
Italy	1968	225	225
	1969	290	210
	1970	275	255
Poland	1968	NIL	520
	1969	NIL	195
	1970	NIL	397

The scarcity of potatoes in Yugoslavia in certain months is known. Prices rise in low season, while during high season prices are often unsatisfactory for the producers.

In Yugoslavia generally and in the BK region in particular potatoes are a one season crop. Harvest time is August and September. The crop has then to be stored for most of the rest of the year. B&H production supplies a little more than half of the republic's requirements. The balance is imported from the Slovenia, Srbijs and Vojvodine.

With the rising standard of living and nutrition the demand for fresh potatoes decreases, similar to other staple foods. Although Yugoslavia has not yet reached the top of the consumption curve, this will probably happen within a few years.

Potatoes still account for the highest volume (tonnage) of fresh vegetable trade in Europe. On the other hand they fetch the lowest unit price among the vegetables internationally traded. With the rising standard of living the per capita consumption in most countries is decreasing, and imports in most countries are in the last years on the decrease. The main importing countries in Europe are West Germany, Italy, Great Britain, France, Spain, Switzerland and Belgium. It is interesting to note that many of the main importers are also the main exporters. The reasons for this is that potatoes are a commodity which the population, if consuming, is consuming all around the year and it is the least elastic among the vegetables since potatoes are still a staple food and part of the basic diet in many countries. Potatoes are a seasonal crop which can be stored under regular conditions for a few weeks only, and in cold and/or controlled atmosphere storage for up to 4 to 6 months. Price structure and policy define in each region which alternative is more feasible - storing (including loss and handling expenses) or import/export of potatoes according

to seasons. If the second alternative is selected there exists also a quality benefit as fresh potatoes are of better quality than stored ones. In many countries the import/export alternative follows these patterns.

## 2) Processed Potatoes.

Several enterprises and institutions in Yugoslavia and in BK are thinking in terms of potato processing. The Kombinet in particular is planning to make the sub-region of Glamoc, in the South-Western part of the project area, a potato-intensive area, with processing facilities.

The team did not at this stage go into all phases of these considerations, particularly as many of them are preliminary on the part of the Kombinet.

However, discussions were held, documents reviewed and possibilities were explored.

Our comments on development possibilities, based on preferred demand directions of the market, are the following:

- As mentioned above, the consumption of fresh potatoes in Yugoslavia is going down, as is to be expected in the context of urbanization and movement towards more sophisticated diets. This does not mean that there is no market for processed potatoes; on the contrary, potato snacks are popular with the young generation and institutional uses of processed potatoes (chips, french-fried, etc.) should have potential. The large success of fried-packed, precooked-packed and quickfrozen potatoes in many potato-eating countries points in this direction.

In any case the subject justifies and demands further detailed study, with particular reference to the consumer preferences on the domestic market, since the STANDARD processed potato products do not seem exportable.

- Two potato products with a large market potential and which can stand a high price should definitely be considered:

### a. Potato Salad (for retail and institutional wide-radius distribution).

Market surveys all over the country, including the tourist areas, have shown that this product appears as a desired product and is in complete under-supply.

Naturally, this product is tied up with sufficient cool storage (not freezing) facilities but these are existent in a large-enough number of outlets, for such semi-preserves.

It is recommended that steps be taken to examine the situation towards setting up a first line, with simple facilities, to enter this market. Sales arrangements should be made in Sarajevo, Zagreb and on the Coast, with trading enterprises that are associated with retail outlets in these areas.

Two tons per day (in plastic cups with treated covers) could be a starting production.

Production could be done by Vitaminke in the baby food plant, or earlier in its existing plant. This would add about 2.5 million diner sales income to Vitaminke for the first stage (2 ton/day).

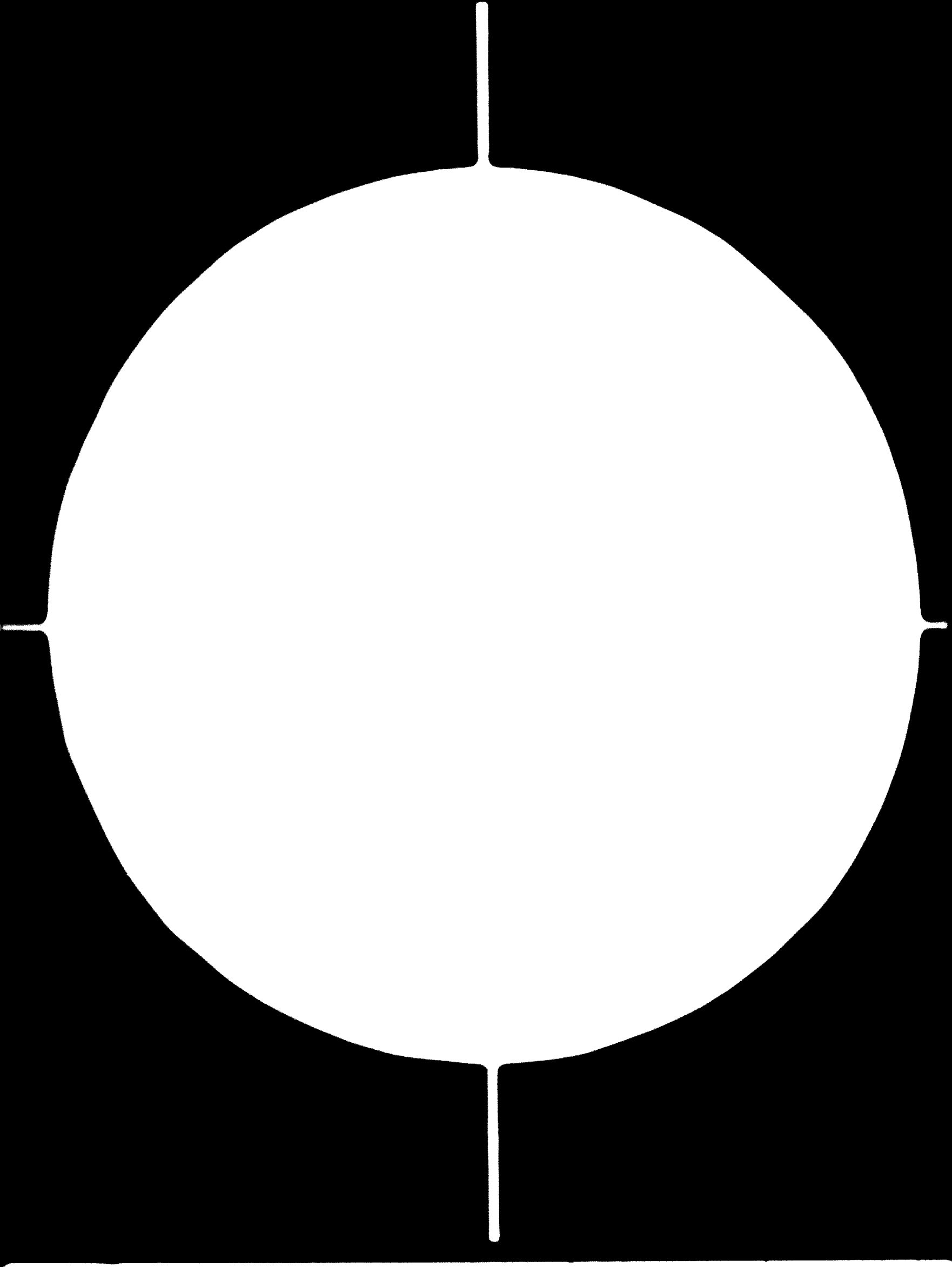
### b. Potato Snacks - hardbaked type (for retail sales).

A new type of potato-snackfood, made by hardbaking small potato pieces, has been developed in Western Europe and is successfully marketed there and in the USA. Setting up a plant with an initial output of about 400 tpy should be considered. This would give an initial (ex-factory price) turnover of about 200,000 dollars (3.5 million dinars) for a one-shift operation and production could be expanded with the growing market.

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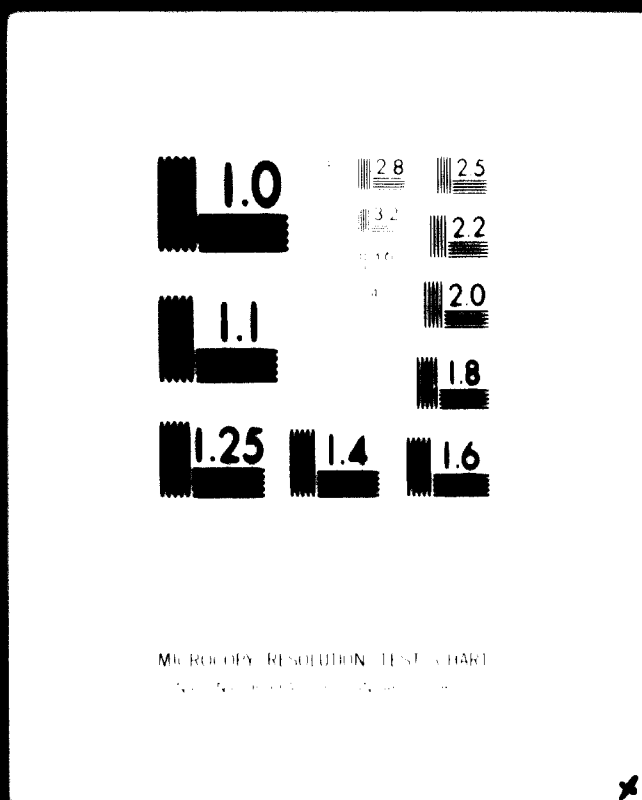


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than other berries. Most commercial varieties are from the USA. There are reports that juices produced from these varieties have an inferior flavor, compared with the wild varieties. Therefore approval should be received from processing plants before planting large areas of a variety. Birds can be quite troublesome to blueberries. Although until now there is no special problem of birds in the region, with increase and diversification of agricultural production in the region, they might become a problem in the future.

Berries usually benefit from acid soils, which is the case in many parts of the region. This, as well as favorable climatic conditions and a relatively easy market, point to the introduction of berries of different types within the region.

It is recommended:

- a) Priority be given to a coordinated program of berry cultivation in BK, in various areas of the region.
- b) A detailed development program should be worked out, for and on behalf of Vitaminka and the Kombinat who will be the main processors of berries in the region.
- c) A full agrotechnical and food technological study should be made by a competent body, in coordination with the Cecak Institute, on:
  - c.1. Varieties best suited for cultivation and choice of locations in project area.
  - c.2. Selection for table and processing strains.
  - c.3. Decisions on site of gradually introduced cultivations, and on methods of harvesting (which will determine cultivation techniques).
- d) Contact be established between Vitaminka and other berry processors, for exchange of information and for decisions on specialization.

With the advent of large scale berry cultivation for both fresh and processing markets, it is important to consider the advantages of a balance between specialization and having wide assortments.

If joint marketing, at least for export, could be developed between Vitaminka and the other processors, this could benefit the whole industry since the economy of scale, plus widely available supplies from several areas, would give better earnings and - even more important - the possibility of building up a name in the markets for guaranteed supplies which is a main consideration with Buying Organizations in the European markets.

- e) The supply of fresh berries to the various markets should be seen as a "processing" stage as well, since good grading, temperature control and sophisticated packaging needs are expected for future large scale sales to farther markets.

Thus the whole project - including fresh berry distribution - should be in the hands of the processors. The roof organization should determine whether Vitaminka or the Kombinat will be entrusted to develop the raw material base agrotechnically, but in any case supplies should be assured for both processing enterprises.

Since the whole matter of cultivated berries is new to the region, it is recommended that a development budget of about \$ 25,000 is allocated to Vitaminka and the Kombinat to work, together with the Agricultural Institute in Sarajevo, on a practical program.

Row o) **Sorghum.** This crop is grown on a small scale within the project area. Where grown the results are very good. The main reason for not planting large areas is that the feedmix concentrate plant is opposed to using this grain as a substitute for maize. The reasons are not clear. Sorghum is substituting maize, as animal feed, in many countries. In particular case of the region, the milk cattle of the Kombinats are overfed with maize (50% of the concentrates as grain and additional amount as silage).

As for the growing season sorghum regularly competes with maize. Still, there exists a possibility which should be tried. Short period varieties of sorghum can be planted immediately after wheat or rye harvesting (end of July or beginning of August). Although the yield of this late sorghum is expected to be lower, the benefit by better utilization of the land and of the machinery should leave a good net income to the producer. According to information gathered this had already been successfully tried within the region. There might be in certain years an insufficient availability of water in the soil. It should be remembered that sorghum is a crop which has deep roots and is usually grown in arid and semi-arid zones. The response of sorghum to complementary irrigation is very good. This could be observed in the year 1972 which had high summer rainfall.

An area of about 30 hectares on the road from Nova Topola to Srbac has an estimated average yield of about 6-7000 kg/ha.

It is recommended that the social sector includes this crop on a large scale, after working out any agrotechnical and economic/logistic project about it.

Row q) **Asparagus.** This would be a new crop to the area. There is no information about this crop in Yugoslavia but our market inquiries show that large amounts could be sold in fresh or canned form in Yugoslavia at good prices. There are large areas of asparagus in Hungary which is one of the suppliers of fresh asparagus to Western Germany (after France, Holland, Spain and Formosa). The demand in Europe is for white asparagus, contrary to the USA where the green one is preferred. In order to obtain white asparagus the soil should not crack and be very fertile. If heavier soils are used they should have a structure which does not lead to cracking when the soil is dry - or artificial irrigation is required. White asparagus can be mechanized only to a small extent (the green one can be harvested mechanically). The amount of labor is very high. The demand of the international market is very specific for length and width of the spears, and even more for color. If the marketing is through industry additional labor is required for peeling (by hand) of the spears. This work is usually done by industry and not by the producer. Asparagus should be looked upon more as a fruit crop than as a vegetable. The nursery requires a full year and after planting the plant "gathers strength" for two years until the first commercial harvest. This means that in practice only in the fourth year the first crop will be obtained. Therefore asparagus is a labor intensive as well as a capital intensive crop. The land is idle for three years and labor and materials have to be invested. As the main eventual export market for this crop is the European market only white asparagus can be recommended. Although much labor is required this crop is recommended for the social sector. It can be applicable also in the private sector but the main constraint is the investment (three years labor and materials plus idle land). If financial resources should be available to the private farmer an area of 1 dunam (1/10 ha.) should be considered per person available. This is based on the amount of labor for harvesting and crop treatment after harvesting (grading by color, length and width). Contrary to strawberries, small children and elderly people cannot be employed in harvesting as the cutting of white asparagus requires skill. It should be noted that during the harvesting time, the area has to be inspected and cut daily. The fruit has to be exposed to light as little as possible (otherwise it starts to turn green). It is recommended to see this as a model development of new crops in line with the rising living standards in Yugoslavia and its export markets. Development should be stagewise - first for the local market and then fresh and canned and frozen for the export market.

- Row r) **B r o c c o l i** is a variety of cauliflower producing under suitable conditions slightly higher yields. The crop is recommended for the private sector. From the aspect of timing broccoli needs much care at harvest time and in handling of the harvested crop.
- Row s) **B r u s s e l s s p r o u t s** are of the same botanical family as cabbage and cauliflower, but their yields are lower. Brussels sprouts need more care than the other members of the family. Harvesting has to be manually and therefore it is recommended for the private sector. Both broccoli and Brussels sprouts can be incorporated into the "frozen vegetables" group for processing in the BG plant.
- Row t) **S w e e t c o r n** has basically the same problems and needs as ordinary maize. A few special aspects, however, have to be considered. Due to its sweetness, sweet corn is more vulnerable to insect attacks. If the area suffers from birds, sweet corn is usually among the first to be attacked. Furthermore sweet corn has to be harvested at a certain state of moisture. Even a short delay in harvest will change the nature of the product. If during the vegetative cycle optimum water/soil relations exist (with the aid of artificial irrigation where applicable), yields of 18-25 tons/ha can be achieved. Harvesting is done by machine which picks the cobs as a whole. The crop is primarily recommended for the social sector but there should be a considerable attraction in it for private farmers. The private farmer, if picking the corn by hand, might obtain a yield up to 10% higher, plus about 40 tons of green fodder which can be collected from the same land. If the corn is harvested mechanically, not more than 15 tons of green fodder can be considered. Although this green fodder will have less value than corn grown specially for green fodder, still about 12 kg would give 1 feeding unit. In the private sector this might enable the farmer up to about 3300 feeding units, which is the equivalent of maintaining (without the feed required for milk production) more than 2 cows for one year.
- Row u) **P o p c o r n** is generally grown from special hybrids adapted for this purpose. Plant population is denser than in ordinary corn - 90,000 plants per ha. versus 40-50,000 in ordinary maize. Without irrigation yields of 1-2 tons/ha. can be expected, while with irrigation up to 4 tons/ha. are reasonable. The grain moisture problems of popcorn are similar to the ones with ordinary maize. Harvesting can be done mechanically and the crop is recommended for the social sector.
- Row v) **B a b y c o r n** is grown from special hybrids of maize adapted for the purpose. Plant population is very high - 200-250,000 plants/ha. Irrigation is usually needed and disease control is extensive. Harvesting is by hand and requires 40-50 mandays/ha. Babycorn cannot be considered as a major crop but as a very specialized one. Studying the growing and supply problems will require a special effort. As with sweet corn there is a green fodder byproduct which is attractive to the farmer. The crop is recommended mainly for the private sector, although skill demands might shift it to the social sector.
- Row w) **M u s h r o o m s** as a quality crop for industry is a complex indoor cultivation crop requiring, if a constant supply is desired, a large investment. Artificially grown mushrooms need constant ventilation and supply of fresh air. Optimum temperature is 18-20° C. If the temperature drops suddenly the whole plantation can be lost, while slow reduction in temperature will reduce production. Another must is relative humidity which should be around 75%. All this together requires that mushrooms should be cultivated in specially designed installations, with ventilation, temperature and humidity control. Also, disinfection facilities are needed apart from the necessity to combat insects and diseases. Mushrooms nowadays are grown under very exact and even scientific conditions, requiring knowhow and skills and high investment. The preparation, annually, of the culture media made from horse-manure and compost is the main problem and knowhow in producing artificially grown mushrooms.

The crop is recommended for the social sector, unless some private farmers specialize in this crop, and will be given access to the high investment needed. Marketwise - as shown in the chapter on markets - there is a constantly growing market for such mushrooms and demand is expected to exceed supply for years. If a decision is taken to follow-up this recommendation, a working group should be formed who will study the ways and means to develop this project on the supply side.

Canned mushrooms would eventually be the major processed form for this production on the Yugoslav market - with parallel exports of raw material.

Row x) See subchapter on Soya within feedstuff chapter.

In the appendix, tables are given regarding agricultural data in B., BGM and Yugoslavia, and below a forecast is shown for 1975, made previous to the elaboration of the FAO/UNIDO project. Regarding vegetables, apart from 80% of the peas, all the vegetables were grown in the private sector.

It should be noted that there was no change in production during these years, apart from regular annual fluctuations.

Only green peas showed a considerable increase (120%) and cabbage and kale a decrease (22%).

### TOTAL PRODUCTION OF FRESH VEGETABLES

in tons - in the BK REGION

Product	REALIZATION			Forecast* 1975
	1969	1970	1971	
Potatoes	73 352	70 693	68 659	64 000
Carrots	652	688	764	900
Onions	4 759	4 772	5 012	5 500
Garlic	1 895	1 940	1 978	2 000
Beans	3 051	3 164	3 116	5 000
Peas	600	840	1 308	1 500
Cabbage and kale	20 044	17 275	15 886	18 000
Tomatoes	3 086	3 273	3 187	3 500
Peppers	2 753	2 976	2 853	3 000
Strawberries	290	426	268	350
Cantalope & Water Melon	2 932	2 737	2 549	2 500

\* Earlier forecast of project area authorized without reference to FAO/UNIDO project.

x x

Statistics on hand in production, yields and production of important crops, etc in BK are given in the appendix.

b Development of Special Land Areas for Supply of Raw Materials to the Foodprocessing Industries in BK

The areas to be planted for the execution of the foodprocessing plan, including part supply to the meat complex, as well as those already in production under vegetables and fruit, are mentioned in the tables in the chapter on vegetable production. In the same table, as well as in the accompanying explanations, the different sectors are set out to which the crops should be allocated

Detailed agricultural planning is beyond the scope of this report. Certain main points connected with the phased execution of the plan are, however, spelled out here:

1. Resource Optimization.

The human, land and financial resource inputs, by type and quantity, required to achieve an optimum output - within defined environmental and input constraints - can be calculated today by techniques which are available/known in Yugoslavia.

We ought to consider here the meaning of output in connection with the BK development program. Often "output" in a highly developed environment can be simplified to mean monetary income for the producing unit. In a developing situation as exists in BK where a development impetus has to be strengthened to create maximum added value income to the region, the criterion of output would be that of total real added value; due to sectorial price differences, dislocation or underdevelopment of parts of the productive chain, etc., it is not possible for the time being to "suboptimize" for each individual activity to the satisfaction of all. On the other hand it is possible to clearly optimize towards the final product, i.e. the upgraded product which goes to the final end-user.

It would therefore be important to set up a program of flexible criteria for land utilization, under the conditions existing and expected in the region. While this program would not have to be complicated and could neglect fine point of little influence on the calculation and decision pattern, it would have to be considerably more sophisticated than the procedures of today. Presently each activity in the region is considered separately and in a splintered way, and the only criterion employed is whether that particular activity will pay at the short-term price situation in the close environment (geographical or functional) of the producing body. While the individual producing body, being isolated and weak and having to follow the day-to-day market pattern, cannot be expected to act much differently, the planners - the Chamber of Commerce, the industry as a body, the banks and the authorities - can afford to take the longer view and to calculate the development program according to better criteria.

What is advocated here is not centralized planning, but all round long term consideration of integrated development so that the real functions of a market economy can be left to play their role, by the enterprises, within a development environment (priorities in resource allocation, pricing by buyers, suppliers, authorities, subsidies if/when required, activities integration, etc.) which has to be created by the planners and the enterprises together.

The 'model' program would have to be practically divided for short-medium-long term, with distinguishing characteristics for each type and value of activity so that the values assigned can be changed by the planners as the situation changes, and new problems and priorities come up for decision.

It is suggested that an ad hoc working group be set up for that purpose between the Chamber of Commerce, ZEP, representatives of the Republic Secretariat of Agriculture and representatives of the foodprocessing industry. They would take advice from agro-resource programming groups in other parts of Yugoslavia and would also consult with people from the agricultural institutes, farmers' cooperatives and regional trading organizations.

This working group should have a permanent secretariat which could be in either the Chamber of Commerce, ZEP, the agricultural institute or the strengthened agrotechnical/agro-economic unit of the Stojanovic Kombinat. The secretariat should be staffed, on the professional level, by one agronomist and one economist, both of whom should be put through short-term practical training courses in agricultural operations research/linear programming methods. Apart from working on the plans according to a well defined

multiyear program, this staff should prepare current information and explanatory notes on these matters for the farmers in a form understandable by the farmer. Technical assistance on such a service can be obtained.

The secretariat should also be in continuous contact with sources of "knowhow" because useful data are constantly being developed over the world as tools for such planning, on various levels of detail, for macroplanning and microplanning.

First calculations on approximate optimizations according to such a system will not have to wait until this secretariat works fully. Sufficient material is available in Banja Luka, Sarajevo and other easily accessible places to start specific plans for specific agricultural locations and crops needed for the intended development.

Although the model should be designed primarily for land utilization, it will have to take into account the logistics of connected matters (transport mode of marketing, etc.).

In this manner three main functions could be planned with criteria understood and agreed by all concerned:

- Selection, by categorization, of farmer groups/units/areas for supply of raw materials, with flexible incentives and clear contractual conditions.
- Organized crop production of varieties suitable for industrial processing and a product mix for sales to markets and sales to industry - without resort to "escape clauses" in supply contracts.
- Understanding of the quantitative connections between each change of input (amounts, costs, timing) and output (yields, grades, etc.); and between them and the costs along the chain "agricultural inputs-agricultural production - storage/grading/delivery - processing marketing".

## 2. Selection of Farmers

Once optimum land utilization factors are determined for a particular project, the right selection of farmers, and mode of approach to them, has to be studied and introduced into the model - not automatically, since human factors are involved, but according to groupings

It has been the team's impression that, with a few exceptions, the industry managements have not enough contact with the farmers - perhaps because the farmers do not appear as a representative association and because until now real contract farming and for contract fattening by the social sector of the area was restricted to initial activities of the Kombinat only. Although it would be exaggerated to state that the industry "does not know their farmers" it would be fair to say that what they know is "their farmer of yesterday". It has been demonstrated, at varying speeds and depths of success, in Yugoslavia and elsewhere that the farmer can be motivated, productivized and satisfied in a contract-supply relationship with defined buyers of his products. There is no reason why successively selected groups of farmers in BK cannot be moved quickly into that productive cycle.

The past ups and downs of development of cooperation between the social and private agricultural sectors are known and clear to all concerned but it is equally clear that today, with experience gained and a better organized larger industry able to let out sizeable supply contracts, the possibilities are much improved. This includes not only the possibilities of better contracts but also of better supply of inputs, including agricultural machinery.

While it is true that the average size of landholding is small and is therefore not suitable for some crops, it should be considered that:

- The problem is not one of ownership but of technological-cooperative organization (cooperation in the horizontal sense, i.e. between farmers). Modern competitive land utilization can today be done effectively only in an organized manner - of which the size of holding is only one out of many factors influencing the production cost and the profitability of the operation to the farmer and to the economy.

In Norway and Japan even today many farmers' holdings are not bigger than those in BK, and some are smaller. However, through contract growing on large adjacent areas by groups of farmers (each cultivating his plot) it is possible to use the economy of scale and exploit better the various inputs, including machinery, advisers, etc., and joint marketing cuts costs and improve price conditions.

- Many of the BK farmers have flexible households and are moving into a status of parttime farmers. For them any form of intensification of their agricultural work means added income, above their basic needs, and this factor should enable a large number of supply contracts to be drawn up.

### 3. Special Crops Self-Supply

The team considered a possibility for the self-supply by industry of special crops for part of the foodprocessing development projects treated in this report. This refers to certain vegetables, berries and new field crops.

Such a self-supply arrangement would be useful, quickly executable and would short circuit some of the problem situations that have to be overcome in getting private farmers to attempt new cultivations without the full technical control needed.

Land availability, of the right type and in suitable ownership, allowing effective cultivation was considered by BK industry as the limiting factor for such expansion-linkage with industry.

It is proposed to consider the following scheme for developing such self-supply:

- INCEL (the Banja Luka Cellulose Factory) controls two large arable under-utilized land tracts which could be made available for this project. One area of 150 ha. is located north of Laktasi, near the main road. This area is presently leased to private farmers who grow on it grains and storage crops. The adjacent areas of this lot are among the main vegetable producing areas of BK; therefore there should not be any climatological or soil problems for growing vegetables there.

The second area of (gross) 2,000 ha. is located in the hilly region south of Srbac. This area has slopes up to 10-15%, the soil is lighter, and it is composed of many lots. The microclimate might be a little different to that of the surrounding plains but it still is a very good area, and the slope is insignificant for modern agrotechnology.

Both areas were visited and inspected by the agricultural planner of the team, with representatives of INCEL.

- INCEL would be ready to consider participation in the exploitation of these areas for intensive agricultural supplies to the food processing industry.

- It is proposed to form an agricultural liaison section within INCEL which would work in association with Vitaminka and the Kombinat. This would enable the supply divisions of Vitaminka and the Kombinat to have one single main supplier, for the first period, of the varieties which need most attention. This supplier will receive fast and continuous feedback of results, and supplies could be organized via modern agrotechniques. New varieties, schedules, techniques can be introduced by negotiating between two knowledgeable bodies and via a mutually agreed method of accounting. Pilot and development budgets could be found and shared.

Parts of the land which will not be exploited for intensive crops can be allocated for new varieties of grains and improved production of green fodder, for exploitation and as a demonstration of possibilities.

- The structure of commercial service agreements between INCEL, Vitaminka and the Kombinat will have to be examined in detail after the decision will have been made to accept this recommendation. Vitaminka is on the one hand a priority user of these supplies since it has no other access to such sources. On the other hand managing the total area would be a burden to Vitaminka since understandably today they would only exploit the land under crops interesting/required for their processing while the rest of the land would get secondary attention. For an enterprise as big as INCEL it would not be advisable to enter agriculture by themselves on extensive crops solely as this, for reasons of turnover ratio compared with their main activities, will always be of last priority in allocating manpower, investments, etc. Therefore the extensive crops would for them be a complementary operation only to the intensive crops. The Kombinat has today and will continue to have the agrotechnical services but, again, for reasons of ratio to their turnover and crops product mix, these "special" lands should not be organizationally swallowed into the tens of thousands of hectares worked by the Kombinat.

The team feels that there is sufficient awareness of the possibilities in the region for a reasonable formula to be worked out on the exploitation of this land.

Considering all that has been expressed in the meetings in Banja Luka about the critical importance of suitable and guaranteed raw material supplies, and the various analyses in this report, the priority and importance of acting along the lines proposed will be understood.

All concerned who are familiar with conditions in the project area could easily realize the impact that the availability of 2,150 ha. underutilized additional good nearby land of suitable characteristics can have on the development of vegetable and fruit processing. Also, the farmers in adjacent villages would have an improved assured income from employment on partially intensive crops under modern cultivation.

5. COMMENTS ON THE EXISTING DEVELOPMENT PLANS AND INTENTIONS FOR VEGETABLE/FRUIT PROCESSING AS PRESENTED TO THE TEAM.

Reports prepared in 1970 and 1971 by Banja Luka Chamber of Commerce, ZEP (the Banja Luka Economic Research Institute who is also the Counterpart Agency for this project), the Kombinat, and others, as well as Vitaminka's expansion targets, show a clear and vital awareness and willingness of these leading institutions and enterprises about the needs, possibilities and directions of potential development.

All the material was translated by the team and reviewed in detail in the field work period and in our home offices. Field meetings were held, including such with several organizations and enterprises in various parts of Yugoslavia, and with cooperants and individual farmers in BK.

Our comments, which were presented verbally at various exchanges of views between the FAO Project Manager, the IDC team and the industry and communal groups concerned, can be summarized as follows:

- a. The project area is ecologically in an even better position for certain raw materials than assumed in these reports. It has specific ecological advantages for the growing of some fruits and vegetables for which demand in Yugoslavia and in the European hard currency markets is today, and expected for a long time, outstripping supply sources. Sweet maize, berries and asparagus as well as other vegetables/fruits are suggested by us as raw materials in this category.
- b. It is best to think in terms of concentrating on new high-quality products which fit into a proven developing overall demand pattern in Yugoslavia, and possibly abroad too. This is preferable to trying to imitate what several other Yugoslav factories did in an earlier stage of development in food processing. Of course, there are exceptions and each case has to be examined.
- c. The plums/prunas surplus problem, as painful as it seems, and is, should be treated regionally, as certain low-quality, low-yield fruit culture problems are treated in West Europe, or some coffee plantations in concentrated coffee-producing areas. Both constructive and "surgical" solutions to the plums problem are required as a part of overall development and streamlining of fruit production in the region. Individual solutions by one enterprise or community cannot bring practical solutions. This subject has been treated in the market/industry subchapter on plums.
- d. Cooperation by the private farmers for supplying suitable raw materials at the right variety/quality specifications and price can be obtained. The farmers may not all be knowledgeable or organized enough but they are intelligent, interested and willing, if credits, guidance and secure seller-buyer relations are developed between them and industry. Industry must be the initiator and carrier of such activities, so as to get processing-oriented raw material.

This system works elsewhere in Yugoslavia and in other countries in the West and East and is being constantly developed.

Contract relationships have to be defined and refined. These techniques can be learned in Yugoslavia and abroad and they need concretization. An ad hoc team from the interested enterprises in the region, plus a practical economist from one of the B & H agrocredit banks, could be asked by the Chamber of Commerce to make an intensive, short-term study of the present "state of the art" of industry-grower contracting in the vegetable/fruit sector, and adapt this to the specific selection of a defined number of contracts with chosen farmers, farmer groups or parts of villages.

Keeping in mind the various permutations of possibilities, including intensifying land use, agrotechnical techniques of early or late varieties, etc., and that many agricultural families in the BK areas are today mixed households as regards sources of income, we believe that by these improved contract procedures the raw material supply problem can be resolved for ALL the vegetable/fruit projects proposed by the enterprises which they should execute marketwise and/or which this report recommends.



- e. Specialization of each plant - of course with a sufficient product mix - on certain market sectors should be exercised in decisions on development programs altogether, and on "who will do what and with whom" in particular. If possible there should be specialization in a minimum of equipment lines and technologies as well - but this is not a rule. Equipment and technology can be bought if economically justified but marketing and keeping/developing one's market share and knowledge of the markets (and being known by the market) cannot be bought, only acquired via dynamic continuous organizational and integrative techniques.

This consideration holds both for the Yugoslav domestic and for the export markets.

Parts of the plans and ideas contained in the aforementioned documents and sources are very valuable since they show the right intentions. Their execution and success would be best assured if final reorganization and project choices were made according to a set of criteria, including those explained here; this particularly since Yugoslavia is becoming a market economy, with strong competitive forces acting along all sectors - and with full individual simultaneous initiative all over the Federation due to the decentralized self-management system.

- f. For the present development stage concentration of production in a few plants, based on the present facilities (existing or under construction/expansion) is preferable to dispersion, even if for some time this will mean delay of new food processing nuclei in some interested suitable communes in BK. These nuclei will be easier developed later, once the central plants get on their feet, economically and managerially. Meantime there are plentiful occasions for rural developers to integrate their efforts for organizing contract-farming on behalf of the central industries and they can thus be instrumental in industrializing agriculture, specializing in helping to produce and supply processing crops. Such an organization is essential and invaluable, and at the same time a suitable intermediate stage for later new processing nuclei in these rural regions.

This recommendation refers to the main food processing industries and activities and does not exclude certain field-oriented agroindustrial activities such as seed-farming, plum-grading, packing houses, etc. to be located in dispersed rural nuclei.

- g. Bosanska-Krajina as a whole is presently too weak, economically and in its population and market structure, to afford duplication, fragmentation and competitive conflict situations, if it wants to develop an industry quickly and soundly.

Not only is the vegetable/fruit processing sector (the existing plants and the facilities under construction) too small to develop as entirely separate plants but even with some measure of future integration among the regional vegetable/fruit processing plants these will need additional integration, of a different kind and on a different level, with other food processing plants in the region.

Specific recommendations are given in chapter 6 on organizational measures.

- h. There is an urgent need for the managements of the existing and presently developing facilities in this sector (i.e. Vitaminka, the Kombinat, Bedel) to add to the standard technoeconomic feasibility considerations in their development plans an additional "dimension" of how national sales (i.e. domestic sales over large areas of Yugoslavia), and possible later international sales, of the intended products can be achieved.

This remark should not be understood to imply that these enterprises did not give any thought to that vital point. However, until today production, sales and marketing scope was mainly restricted to the local radius, habits and demands of consumers, distributors, etc. Understandably, the organizational structures of the producing enterprises were geared to this size and type of market environment. Consequently, development plans were also conceived and presented in the light of past experience and influence of that environment, with insufficient detailed analysis of the implications of going into a wider national market (except the Bedel-Bosanska Banja Luka plant which is part of a national network).

We think that by any detailed analysis the enterprises will by themselves come to the inevitable conclusion that their main problems are neither financing nor raw material supplies, nor lack of projects, but to find and build up the marketing structure in order to break out of the project region with their products. This would

enable them to produce larger quantities of specialized products, for a larger market, without lagging behind the overall "tonus" of the industrial development in other regions of the Federation. It would also increase the opportunities to attract to BK trained personnel, at good salaries and interesting occupations, for such specializations in production and marketing development, from other parts of the Federation.

It appeared to us that recently the mobility of technically and managerially qualified personnel inside Yugoslavia had increased considerably, and that at the right conditions of challenge any developing enterprise in BK could with a reasonable effort find supplementary experienced personnel for those activities where practical experience in BK is lacking.

- i. The vegetable/fruit processing sector suffers from a situation in the financing field, similarly to other sectors, which in its case - like in the meat industry - acts as a brake to sound development. Because of insufficient supply of basic investment capital (from either accumulated surpluses or from bank credits) working capital is used increasingly to finance expansions. This leaves a large deficit in the working capital structure of the enterprises. For this reason - which is not peculiar to BK alone but exists in many industries in the Federation - there are not sufficient working capital funds available to finance the internal needs of the enterprise. Thus it is impossible to demand of the enterprise to organize its raw material supplies without giving it sufficient special working capital credits earmarked for that purpose.

If, therefore, the organization of raw material supplies will be undertaken by the processing industries, specific agrocredits will have to be put at the disposal of these industries.

Since these agrocredit funds will have a dynamics of their own (conditions, channelling, administration, direction, rotation) and the processing industry - except the Kombinat - has no specific large-scale experience in administering such funds, it is recommended to examine this matter by the Chamber of Commerce, Industry and the Banks so that a regional agroindustrial credit fund and management can be created. This recommendation holds for all the foodprocessing plants in the region.

\* \* \*

Recapitulating - the sets of comments on the various development programs refer to the general common problems of the foodprocessing industry, although they are given here in the context of the vegetables/fruit processing industry. These comments can be summarized, in the order in which they were given, as:

- a. There are local raw materials available or producible, a part of them even ecologically advantageously.
- b. Specialize on high-quality products, partly new ones, which fit into one of the rising demand patterns.
- c. Some problems, like that of plums surpluses, can be treated on a regional level only.
- d. Raw materials production should be organized by the industry as contract farming. Successful examples can be adapted from Yugoslavia and abroad.
- e. Criteria for choosing between alternative products, priorities, etc. on development should be via market sectors and market orientation.
- f. Processing industry should for the time being concentrate all production into a small number of enterprises - with rural "agencies" who would develop rawmaterial supplies on their behalf and who could later become the nuclei for processing in these communes.
- g. Avoid fragmentation, duplication, conflict-of-interest situations in the region.
- h. Reorganize development thinking, staffing and decisions in terms of a wider market, with different buying habits to the BK market, and make preparations for the necessary forward integrations.
- i. Create an agroindustrial credit fund and management to enable working capital funds to be funnelled to raw material suppliers.

- A marketing evaluation and test should be done (in off-season) with pilot quantities of canned, peeled potatoes which could be prepared by Vitaminka.
- Parallely to implementing these industrial possibilities a decision should be taken on a different project, on a larger scale, which the team considers important and feasible for the region. This concerns the setting up of a large Potato Storage Facility which would store potatoes under "controlled atmosphere" conditions from the harvest period till off-season sale a few months later in winter.

It was noted by the team that the price and availability of fresh potatoes fluctuated very much - at producer's and at retail level, the reason being that there was no buffer storage of commercial quantities of potatoes available.

With the new technology of controlled atmosphere storage, where some oxygen is withdrawn from the cold storage rooms and other gases are introduced, which has been developed in the USA but is today used in several agriculturally advanced regions in Europe and elsewhere, it is possible to store several varieties of vegetables and fruit for periods of many months without these products losing or changing their texture, taste, look and aroma.

It is recommended to study a project to store potatoes under controlled atmosphere in order to arrive at a better supply schedule.

This could be regarded as a pilot project towards the productivization of the annual fresh vegetable supply, by flattening out the uncontrollable very large seasonal price fluctuations dividing the savings.

The project of controlled atmosphere storage of potatoes on which feasibility data are given in the relevant section is suggested here as a case for further examination - not for immediate implementation. It might be found out - on studying the raw material closer as well as price movements and transport logistics, that cold storage for shorter periods, or buying from other regions, could be a better solution.

\* \* \*

r Vegetable Seeds - Market Considerations

Some vegetable seeds are produced in Yugoslavia and sold both domestically and exported. However, this branch can be considered to be in its infancy. Newer methods have been developed and also demand in many countries has risen in quantity, range and quality. The BK region could, for ecological reasons, produce certain seeds which are not producible in countries with other climates. This and other relevant observations have also been stressed by FAO experts who worked in the project area.

Such a project would need study in depth in all aspects - market, ecology, processing technique.

Initial remarks and technoeconomic data for such a type of plant are given later in the relevant section.

\* \* \* \*

Export activities are important, and Voce-Export as well as other firms should be included in the above efforts. However, exports should be started in most cases only after a product has been sold successfully on the domestic market, (or after a specific pilot-export project has been undertaken as per h.2.2.b. above). There will be exceptions to this. In any case, all goods intended for export - whether produced solely for export or as an extension of domestic marketing, will have to be produced at full export standards. These include not only quality and price but also minimum quantities from one source, packaging and other requirements.

\* \* \* \*

6. PROPOSED DEVELOPMENT PROJECTS FOR VEGETABLE/FRUIT

PROCESSING IN BK

- A. The following sections deal with the proposed development projects in the vegetable and fruit processing field. The projects were chosen via a number of criteria, as set out below:
1. Probability of "safe" and expanding markets.
  2. Accessibility or Producibility of the right raw materials
  3. Possibilities of introduction of improved marketing methods by the enterprises - shortrange and mediumrange.
  4. Profitability to the enterprise and to the region.
  5. Acceptance of the suggestions by the enterprise.
  6. Priorities, in the following order:
    - Fuller utilization and productivization of existing facilities.
    - Expansion of existing facilities.
    - New facilities.
- B. The projects represent a synthesis of former thoughts and plans of the enterprise and of new suggestions by the team, with modifications introduced by the team as per the above stated criteria.
- C. The division of projects among the enterprises represents a modus which was agreed in the various individual meetings as well as roundtable conferences with the plants, the latter being attended also by the FAO Project Manager and the representatives from UNIDO/Vienna and FAO/Rome.
- D. Technoeconomic Feasibility Data are given for the proposed product lines. These data take into account existing equipment and space, wherever applicable. It will be noted that in some cases there are different jumps in investment needs between expansion stages for one product line. These jumps result from the need for new investments in equipment or space, upon reaching full capacity by the output of the prior stage.
- It is therefore recommended that the enterprises delineate for themselves a marketing schedule which will first utilize that full stage for which the first expansion investment will be decided, specifically for each product line.

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a. Fruit and Vegetable Processing Expansion Projects by Vitaminka

Background

Vitaminka in Banja Luka is the only fruit and vegetable processing facility in the region (Bedei-Bosanka being a bottling plant) and, as mentioned at the beginning of this part of the report, about 5 million dollars were invested since the earthquake, i.e. in 1970 and 1971, for a complete reconstruction of the plant, including associated infrastructure.

The region has also invested in a quickfreezing line in the coldstorage section of the new Bosanska-Gradiska regional slaughterhouse of the Kombinat, presently under construction. Part of this quickfreezing line was intended for quickfreezing of peas and beans, and is suitable for quickfreezing of other vegetables and berry fruit.

Development Considerations for Vitaminka

As has been discussed in several chapters of this report, the targets in the food-processing industry of the region can be best reached by:

- Productivization of invested resources, i.e. in the case of Vitaminka a solution is needed on how to increase the generation of real assets (products and surplus accumulation) from the investment made, end/or how to generate considerably more assets by a small additional investment.
- Organizational specialization, which in the case of Vitaminka should include
  1. Concentration of all specific fruit/vegetable processing in Vitaminka's hands as far as technology and marketing is concerned.
  2. Efforts towards resolution of the problem areas between Vitaminka and the Kombinat in the one field of partial duplication, and between Vitaminka and Bedei-Bosanka in another such partial field.
  3. Efforts towards gradual marketing coordination over the Federation, for certain of Vitaminka's present and future products, with other present or potential producers/sellers of similar products.
- Market-oriented forward integrative arrangements, i.e. in the case of Vitaminka there is a need to find ways to penetrate better into the nationwide market by making association(s) with enterprises who have such networks.
- Raw-material-oriented contract/cooperation organization, i.e. in the case of Vitaminka the taking up of direct responsibility and control of securing larger scale, better raw material supplies.
- Selection of high-quality, high-priced products in order to survive in tomorrow's domestic and export markets, which in the case of Vitaminka means the addition of lines of more sophisticated products - and consequently even more attention to b), c) and d) above.

The suggestions and project proposals in this report for vegetable and fruit processing in BK, and for the expansion of Vitaminka in particular, are being made in order to assist in following these criteria, towards gradual practical solutions.

Vitaminka's Existing Operation and Expansion Plan Submitted by Vitaminka

The tabulation below shows the structure of Vitaminka's recent production and their plan for expanded production in 1975:

	<u>Production (Tons)</u>		Total	SALES - MD (Ex-Factory Price)
	<u>Processed Veg.</u>	<u>Processed Fruit</u>		
Produced <u>1971</u>	4,900	3,960	8,860	
Plan for <u>1972</u>	5,305	6,110 (of which 1,450 t fruit juices)	11,415	79 mill. MD
Plan for <u>1975</u>	9,900 <sup>a)</sup>	13,730 <sup>b)</sup> (of which 6,600 t fruit juices)	23,630	175* mill. MD

\* IDC estimate. It is assumed that average sales/ton will grow because of increased fruit juice sales.

a) Processed Vegetables

Peas	3,000 t
String beans	1,000
Cucumbers	1,500
Peppers	1,400
Djuvec	1,000
Ajvar	1,000
Fruit conc.	500
Beetroot	500
	<u>9,900</u>

b) Processed Fruit

Mixed marmalade	2,500 t
Jams (regular)	1,000
Compotes (Cherry/Peach)	1,530
Sweetened fruit nectars	1,100
Pasteur. pulp	600
Pasteur. juices	600
Fruit juices	6,000
Candied fruit (regular)	400
	<u>13,730</u>

The team visited all the Vitaminka facilities several times and were given full technical and financial information relevant to the enterprise and its expansion scheme. The possibilities and limitations of the markets and raw material supplies were discussed between the Vitaminka management and team members. The team's tentative proposals on the Vitaminka expansion and the vegetable and fruit sector were presented to the Vitaminka management in August and September and considered acceptable. The need and procedures for a constructive solution towards cooperation between Vitaminka, the Kombinat and Badel respectively were also discussed by the team separately with the enterprise involved.

Based on the above and on the various markets, raw material and product analyses discussed before in this part of the report, dealing with various stages of vegetables and fruit processing, the team's comments and recommendations are stated below.

1. Existing Operation of Vitaminka

Vitaminka is just starting production in its new plant, built/reconstructed after the October '69 earthquake. The new plant is well designed and well built and has enough space for present and part of future production. Considering the investment of about 5 million dollars from public funds (Commune and Banks) it is imperative to increase production and profitability quickly in order to pay off the investment capital credit; (despite the favorable conditions - 15 years at 4%) this in addition to all the other reasons for increased production.

Present products of processed vegetables and fruit are shown in the foregoing lists. They constitute standard prime products of cannery, and the balance sheet and raw material requirements are equally the standard results of such a product assortment.

Raw materials supply is the most painful point in the view of the Vitaminka management and one of the painful points in the view of the team. Vitaminka has presently no agricultural production facility of its own, as the Stojanovic Kombinat has and as some other vegetable/fruit processing plants in other regions of Yugoslavia have. Today's raw material requirements of Vitaminka are covered as follows:-

#### Fruits:

90% comes from the BK region. Only peaches and plums are grown in plantations, the other fruit by individual farmer families owning a few trees each. Vitaminka has buying points in the fruit growing regions where a Vitaminka employee deals with the individual growers. Cherries and strawberries are bought from farmer cooperatives (Zadruga) on contract. Only in the case of strawberries does Vitaminka "organize" growing by supplying the young plants.

Concentrates/pulps are mainly citrus and are imported from abroad by Voce-Export/Zagreb with whom Vitaminka is integrated for purchasing and for export marketing. (Voce-Export has 2-3 similar arrangements in other regions for the supply of fresh and processed produce for export marketing).

#### Vegetables:

- a. Beans are supplied partly by the Kombinat on yearly contract, partly from cooperatives in Vojvodina on yearly contract.
- b. Peppers, eggplant, cucumbers and similar vegetables are bought from various suppliers, depending on prices and availability.
- c. Peas - which in Vitaminka's 1971 production accounted for 25% of vegetables processed and in their submitted 1975 plan will account for 30% of expanded processed vegetables output - are being supplied by the Kombinat, mechanically harvested, under a ten-year recent agreement which assured Vitaminka these supplies on the understanding that Vitaminka would not set up quickfreezing facilities for peas. (According to the Kombinat plans, Vitaminka's peas requirements will at any time be about 20% of the Kombinat's intended total pea harvests). It should be remarked here that peas are a relatively new crop in Yugoslavia, and particularly the growing of peas by the social sector, mainly destined for processing, is completely new; thus the problem area between Vitaminka and the Kombinat is a part of the expected problem situations requiring solution, which turn up as a result of efforts at structural modernization in the vegetable processing branch.

Marketing of Vitaminka's domestic sales (which presently still is the great majority of its sales) is directly to various grocery selling organizations.

Employment in 1972 was about 400 (operators, administrative and sales).

Vitaminka stated they considered the enterprise as belonging to the top five vegetable/fruit processing bodies in Yugoslavia. This evaluation may have reflected Vitaminka's market standing during the earlier stages of the development of the Yugoslav vegetable/fruit processing industry but there are indications that due to the earthquake reconstruction period, Vitaminka may have lost this position since enterprises in other regions had meantime increased production and sales considerably. The team does not believe that the specific market-ranking today of Vitaminka is of significance. The problem is rather that sales are restricted to the BK region and to a small extent to other regions, i.e. Vitaminka has not penetrated, in its production segments, a sufficiently broad market, and it is proposed that in Vitaminka's steps towards their expansion program (including their originally intended expansion products as well as whichever new products proposed in this report will be added) the enterprise will set its management goals towards achieving better market penetration via the procedures which have been mentioned in other pages of this report.



## 2. Future Operations of Vitaminka

A development program is proposed for consideration and decision so that Vitaminka can undertake the necessary organizational and other steps for quick execution of these parts of the program which will be approved and financed.

### a. Submitted Program

Production should be increased in line with the production expansion program submitted for 1975, with minor modifications which are referred to later in this chapter.

### b. Additional Production

Several new product lines are proposed here, to be added by Vitaminka at its Banja Luka plant. These product lines are partly executable without additions of equipment or of space, partly need some additional equipment, and partly need added space plus added equipment.

One product line (Babyfood) would be a completely new production department.

These product lines are proposed as a result of all the considerations discussed in earlier chapters of the report and have been conceived and evaluated according to the criteria set out for Vitaminka's and the region's development needs.

Specific feasibility data on these product lines are given in the next pages.

### c. Raw Material Supplies

The total Vitaminka development program, as well as the improvement of fruit/vegetable cultivation in the BK area destined for industrial processing or for modern fresh handling, will need a decision by Vitaminka, the Chamber of Commerce and other authorities involved that Vitaminka will organize - selectively and gradually but fully:-

- Its direct raw material supplies - by contract growing and/or direct technical management of land areas such as the INCEL AREAS.
- Stimulation, coordination and technical management of creating better existing, and new, fresh vegetables and fruit which will be partly sold as fresh and later partly enter the industrial upgrading cycle.

In this way the technology of horticulture plus processing horticultural products (from grading through upgrading and selling) would be under the influence of Vitaminka.

There will be differences of emphasis of involvement but Vitaminka should become the recognized "carrier" of these activities.

In the specific case of peas the supply should be handled by the Kombinat.

### d. Marketing

The enterprise should make efforts to link up with national distributors for certain products, including the new products proposed in this report. It is not necessary to link up exclusively with one firm but rather to have links for each product line.

At the same time it is considered essential that the brandname VITAMINKA should be better known all over the Federation -

- Via wider market penetration
- Via integration arrangements which will still allow Vitaminka's name to appear on the label (joint sales with Bedel of some products, sales in the Dalmatian tourist areas jointly with PIK Napok, etc.)
- Via Vitaminka's sale of quickfrozen vegetables/fruit from the Bosanska-Gradiska quickfreezing facility which should act partly as a contract-freezing installation.

It has to be recognized that only through strengthening Vitaminka by helping it to have its brandname and brand products sold all over (logistically reachable) regions in the Federation will it be possible to build a strong base for the BK vegetable-fruit processing sector. Later on Vitaminka could "spin off" some production into other, new centers but for the next years it is proposed to decide on the concentration plus integration mode.

a. Organization

Vitaminka should become a part of the BK foodprocessing roof-organization which it is proposed to set up and should act as the technology/planning/raw materials organizing/information arm of this body in the vegetable-fruit sector.

\* \* \*

3. Proposed Additional Production

The new products proposed for additional production are shown in the table, together with the required additional fixed investments needed (at today's prices) and the annual sales achievable (at today's ex-factory price levels as assumed for each product, based on the Yugoslav market and on Vitaminka's specific production costs).

The "Stages" do refer to alternatives, i.e. it is in some cases possible to start immediately with Stage 2 or 3 if and when the market is considered large enough and if and when the raw materials will become available. In some cases, as for part of the jams and for all the babyfood, raw materials are available, but for sweetcorn, babycorn, asparagus and mushrooms the respective period till availability (longest in the case of asparagus) will dictate the stages.

The feasibility data pages indicate, inter alia, at which stage, i.e. at which output additional investments in equipment or area have to be made, and whether added investments between stages are required.

Processing costs have been given for each product or product type. Since raw material prices and consequently final product prices fluctuate much more than processing costs, it was considered, for the sake of clarity, to give the latter only since Vitaminka can, towards its decisions, introduce its raw material costs into the calculation. The processing cost, today's raw material prices and assumed finished product prices were, however, checked by us vis-a-vis Vitaminka's present costing breakdown and a fairly low sales price was taken considering the proposed quality of the products.

New Product Lines Proposed for Vitaminka's Expansion Program  
(Investment and Sales Given in Million ND)

	<u>Stage 1</u>			<u>Stage 2</u>			<u>Stage 3</u>		
	<u>Output(t)</u>	<u>Inv.</u>	<u>Sales</u>	<u>Output(t)</u>	<u>Inv.</u>	<u>Sales</u>	<u>Output(t)</u>	<u>Inv.</u>	<u>Sales</u>
Babyfood	1,500	9.2	28	3,000	7.1	56	6,000	12.6	112.0
Jams/Confitures (High-Quality)	2,500	4.2	20	4,000	3.0	32	6,000	4.2	48.0
Canned Sweet Maize (Kernels)	2,200	1.7	15	4,400	6.0	30	8,800	6.2	59.0
Candied Fruit (High Quality)	60	1.1*	1.7	120	0.1	3.4	240	0.1*	6.8
Pickled Baby Maize	500	-	3.4	1,000	-	6.8	1,500	1*	10.0
Canned Mushrooms (Cult.Champignons)	350	0.7	10.0	750	-	22.5	750	-	22.5
Canned Apple Prod. (Compote & Sauce)	800	5.1	6.0	1,600	4.2	12.0	1,600	-	12.0
Canned Asparagus	140	0.8	3.2	1,120	4.1	27.0	1,120	-	27.0

\*\*

\*\*

\*\*

Total fixed investment estimate for  
all three stages = 71 mill. ND.

Total Sales      297.3  
=====

\* No investment if sweet maize kernels line is set up.

\*\* Investments cannot be added up per stage because of phasing - see next page.

The phasing of the investments will be a matter for specific consideration by Vitaminka and the foodprocessing reorganization. Some investments can be prepared, as explained above, some can only be undertaken when the raw material will become available.

It is seen, however, that by execution of this scheme - the reasons for which and its specific products selection have been explained in the report - it would be possible to achieve an added sales turnover of about 300 million MD ex-factory, with an added investment of about 71 million MD in equipment, floor area and engineering/installation costs. The adoption of this program, or parts/stages thereof, could contribute materially to resolve several problems:-

- Vitaminka would become a large efficient producer, utilizing its assets optimally and profitably for itself and the region.
- Vitaminka would have a product mix suitable for the envisaged markets of tomorrow on which sub-programs or sub-facilities somewhere else in the region could be based later
- Vitaminka would create a raw material base for itself and be able to control part of its production "tailor-made".
- Vitaminka would have the "industry standing" to negotiate integrative and other association measures as well as export contracts.

Although the added sales of 300 mill. MD will look very large to the eye on first reading, and the more so if this sum is added to the 175 mill MD which Vitaminka wishes to produce/sell by its "standard" expansion program submitted, it should be remembered that this expanded turnover is proposed and considered possible due to a horizontal widening of Vitaminka's potential product mix. All products proposed would be sold to broader market segments and thus would not compete quantitywise with the standard products contained in Vitaminka's present and expansion production schemes.

Working capital figures included in the feasibility data sheets are given as if each product/stage will be done separately. In practice it is expected that much less nett working capital will be needed because of the cycle movements of the moneys/obligations involved along the line.

\* \*

## Comments on Specific Products

### Babyfood

It is recommended that VITAMINKA should start the production of homogenized preserved ready-to-eat babyfood on a vegetable-fruit-meat basis. Feasibility details are given in the following pages. It is suggested to start with an annual production of 10 million jars (1,000 tons). This is not considered a large quantity since it is the type of product that would not be used as a supplement or fortifier or dessert but as a full diet.

Knowhow and technical assistance would be available from a well known West European firm who expressed their readiness to assist in setting up such production.

Raw material supplies for these quantities are available to Vitaminka in the Banja Luka area. Production would be facilitated since the babyfood plant would be an additional wing in the Vitaminka compound.

Before execution of the program a detailed feasibility study, including the physical link-up with Vitaminka's plant units, the product mix to be selected, and all aspects of marketing, should be done.

### Jams/Confitures & Candied Fruit

It is proposed to instal a line for these products based on the cold vacuum cooking process. This gives jams/confitures and candied fruit of much higher quality which can be sold additionally and separately to the standard products which are in Vitaminka's production program. Vitaminka had applied some time ago to UNIDO for advice on this matter and for that reason, too, it was considered useful to propose here the specific solution.

### Canned Sweet Maize Kernels

Sweet corn production is mentioned before in its various aspects, as well as its use in the quickfreezing installation for quickfrozen sweet corn-on-the-cob production.

As the sweet corn season does not overlap the pea season, the same equipment can be used for sweet corn and for pea canning, except some preparatory equipment.

### Pickled Babycorn

Babycorn growing has been mentioned before in the report.  
Babycorn canning will use the sweet corn/pea line.

### Canned Champignons

Cultivated mushrooms growing has been mentioned before in the report, as well as the market situation for fresh and canned mushrooms sales.

### Canned Apple Products

Apple compote and applesauce are presently not available in wide distribution in Yugoslavia. This product should find a good market, particularly off-season. Small initial quantities have been proposed which could be increased after market penetration in a few selected areas of the Federation.

### Canned Asparagus

The growing and fresh/canned sales of asparagus were discussed before. The asparagus program would belong to the new activities of Vitaminka where it would become involved from the growing stages and Vitaminka could parallelly be active in selling packed fresh asparagus as well. However, in order to achieve a high quality product, it will be three years after the first plantings before commercial quantities will be widely marketable.

- 1) PROPOSED ENTERPRISE: VITAMINNA
- 2) PROPOSED LOCATION: Banja Luka
- 3) a) PRODUCT LINE: BABYFOOD (homogenized - ready to eat) PLANT
- b) VARIETIES: Dozens of different meat, vegetable or fruit combinations are possible using the equipment proposed
- c) PACKAGING: 100 gr Glass Jars, 12 Jars in Carton
- 4) MODE OF PROJECT: Addition to Existing Plant
- 5) PLANNED OUTPUT:

<u>Stage</u>	<u>Output (Tons nett product/year)</u>
1	1,000
2	3,000
3	6,000

- 6) ANNUAL SALES ESTIMATES:  
(Assumed on-factory price obtainable at December 72 Yugoslav price Levels)

<u>Stage</u>	<u>Annual Sales (Mill. MD)</u>
1	28.0
2	85.0
3	112.0

- 7) PROCESSING SEASON:

All year round

- 8) FACILITIES - EXISTING AND NEW:

A new separate production area will be set up for Stage 1 to ensure the necessary high quality standards.

The area and the equipment will be expanded in 3 stages. No existing facilities are utilized.

- 9) FIXED INVESTMENT ESTIMATE (Mill. MD):

<u>Stage</u>	<u>1</u>	<u>2*</u>	<u>3*</u>
Equipment	4.200	7.000	14.500
Buildings	3.400	6.000	11.000
Engineering & Installation	1.500	2.100	2.000
<b>Total Fixed Investment</b>	<b>9.200</b>	<b>16.200</b>	<b>28.000</b>
.....			
Working Capital	5.000	10.000	20.000

\* Cumulative Total

#### 4 VEGETABLE, FRUIT AND GRAINS PRODUCTION AS RAW MATERIAL FOR BK FOOD & FEEDPROCESSING INDUSTRY

Although the project deals with foodprocessing it was considered useful to show the present and expected future possibilities in production and supply of fresh vegetables. This interconnects with the basic problem of competition of the "fresh" market with the industry for raw material supply. A complete analysis and forecast of the foreseeable interactions, as far as the BK region is concerned, would be important and could be done by the institutes of the project area, possibly with FAO cooperation. This analysis should define, measure and forecast the interactions "intensification of land use by growing more vegetables and an optimum program of their marketing (fresh - industry - domestic - export)" and arrive at a program executable by the regional industry, agriculture, trading organization and authorities. This program should be coordinated with other regions, with the Poljobanka, Jugokonzerva and others.

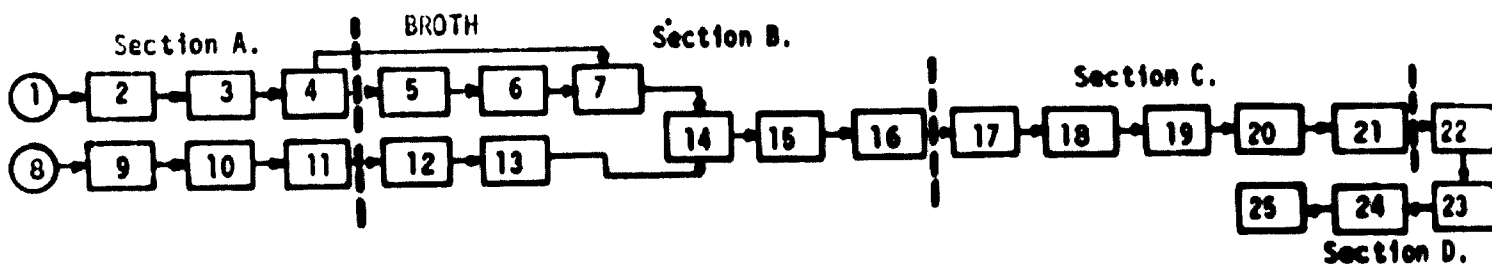
Most of the agricultural areas within the project region are under grains and in this chapter on raw materials consideration of grains has been added to vegetables and fruit. Only limited areas, mainly near Lektasi, Banja Luka and to a smaller extent near Sanski Most, Prnjavor and Bosenska Gradiska, grow vegetables and fruits. These areas are not sufficient to supply the needs of the region and even in season vegetables and fruits are imported from other regions and republics. Still, some of the fruits and vegetables produced in the BK region find their outlet to Zagreb and Split and the domestic market grows continuously.

The main problems which prevent intensification of the existing areas and incorporation of new areas are physical marketing possibilities and credit facilities. Owing to existing infrastructure most of the planted areas are near the road net. This being natural, extension of areas has to be accompanied by road developments. The farmer can be expected to increase the production of these crops as long as he will be sure that there is a proved outlet for his produce. The processing industry, with reasonable contracts obliging both parties, is surely one of the safest ways to cause this. Still, it has to be considered that in order to increase production, financial resources are necessary and regularly unavailable to the private farmer. Therefore an extensive credit program has to be developed to be directed by the processing industry for financing the production cycle of the farmer. By increasing this production the farmer will encounter a lot of problems, be it with selected/certified seeds, fertilizers, chemicals or harvesting and crop handling. Also the demand of the processing industry for quality and timing is, in many cases, much more stringent than the local market for fresh produce. While the local market responds usually by paying lower prices industry might reject the whole produce. Therefore extension service and organization (farm management and agricultural planning) have to be increased in order to integrate with marketing and credit problem solutions. This question is dealt with in other chapters of this report where the role of industry and other enterprises in the stimulation of raw materials supply is discussed.

Most of the following crops (vegetables and grains) and fruits can be introduced and/or increased only if the abovementioned problems will be solved. The risks which the farmer - especially the private individual - will and can take, are limited. Raw material supply and processing industry have to be looked on as one integrated complex, within which one "division" serves the other. If instruments in regional management will not be created where agriculture will help the processing industry and vice versa, both will stagnate. The problem is not "which came first - the hen or the egg" but can agriculture and the processing industry live in symbiosis.

BABYFOOD (homogenized - ready to eat) PLANT

PROCESS DESCRIPTION



**Section A.**  
**RAW**  
**MATERIAL**  
**STORAGE**  
**AND**  
**PREPARATION**

- 1. Meat and Poultry
- 2. Cold Storage
- 3. Thawing
- 4. Cooking
- 8. Vegetables & Fruit
- 9. Storage
- 10. Peeling
- 11. Washing

**Section B.**  
**SIZE**  
**REDUCTION**  
**AND**  
**MIXING**

- 5. Deboning
- 6. Grinding
- 7. Mixing
- 12. Blanching & Cutting
- 13. Mixing
- 14. Finishing
- 15. Deaerating
- 16. Homogenization

**Section C.**  
**FILLING**  
**AND HEAT**  
**TREATMENT**

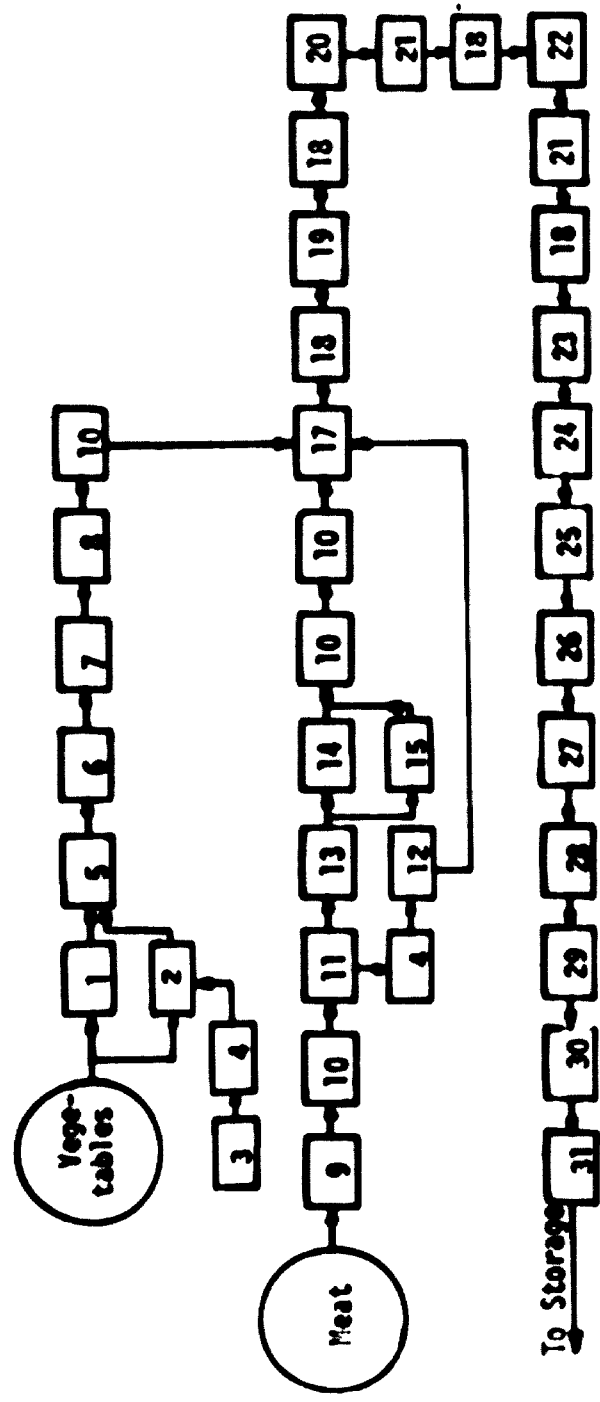
- 17. Pasteurizing
- 18. Filling
- 19. Capping
- 20. Sterilizing
- 21. Cooling

**Section D.**  
**LABELLING**  
**AND FINAL**  
**PRODUCT**  
**STORAGE**

- 22. Drying
- 23. Labelling
- 24. Casing
- 25. Storage

- 1 Abrasive Peeler
- 2 Lye Peeler
- 3 Lye Preparation & Storage Unit
- 4 Centrifugal Pump
- 5 Soaker Washer
- 6 Reel Washer
- 7 Sorting Table (Belt)
- 8 Blancher & Cutter
- 9 Rinsing Tanks
- 10 Carts
- 11 Cooking Kettles
- 12 Broth Storage Tanks
- 13 Deboning Table
- 14 Meat Grinder
- 15 Pulper
- 16 Carts Elevator
- 17 Mixing Tanks
- 18 Mono-Pump
- 19 Colloid Mill
- 20 Finisher
- 21 Balance Tanks
- 22 Deaerator
- 23 Homogenizer
- 24 Pasteurizer
- 25 Filler
- 26 Sealer & Coder
- 27 Retorts Carts
- 28 Retorts
- 29 Dryer
- 30 Labeller
- 31 Case

11) DIAGRAMATIC FLOWSHEET:



12) DIRECT MANPOWER:

Staff	1	2	2
Operators	25	40	50

13) UTILITIES:

Power (kWh/year)	300,000	450,000	525,000
Water (M <sup>3</sup> /year)	90,000	180,000	360,000
Steam (Tons/year)	9,000	18,000	36,000
(Peak Kg/hr)	6,700	13,400	26,800



BABYFOOD (homogenized - ready to eat) PLANT

14) MATERIALS REQUIRED:

The ingredient figures are approximate-exact figures depending on formulations chosen.

	<u>SCALE</u>	<u>1</u>	<u>2</u>	<u>3</u>
1) <u>Feeds</u>	Chicken (tons) clean eviscerated	200	400	600
	Beef " without bones	100	200	400
	Veal " with bones	100	200	400
	Carrots "	160	320	640
	Green Beans "	160	320	640
	Potatoes "	180	360	720
	Apricots "	160	320	640
	Peaches "	180	360	720
	Apples "	320	640	1280
	2) <u>Packaging Materials (Quantities)</u>	Jars (160 gr) Mill	11	22
Labels - Mill		11	22	44
Lids (for Jars) Mill		11	22	44
Carton Cases (for 12 Jars) - Thous.		900	1,800	3,770

15) PROCESSING COSTS (Mill. NB/Year)

<u>SCALE</u>	<u>1</u>	<u>2</u>	<u>3</u>
Packaging Material	12.000	24.000	47.000
Utilities	6.500	11.000	21.000
Direct Labor	0.000	1.200	2.000
Overhead Share*	1.400	2.000	2.000
<u>Amortization</u>	<u>0.000</u>	<u>1.500</u>	<u>2.000</u>
<b>Total (Mill. NB/Year)</b>	<b>20.000</b>	<b>39.700</b>	<b>75.000</b>
-----			
Unit Processing Cost (NB/Jar Product)	2.05	1.98	1.80
	***	***	***

\* Includes maintenance, administration and transportation

BABYFOOD (homogenized - ready-to-eat) PLANT16. PROCESSING COST SENSITIVITY

ITEM <sup>(1)</sup>	Stage 1		Stage 2		Stage 3	
	ITEM CHANGE (-%)		ITEM CHANGE (-)		ITEM CHANGE (-)	
	± 10%	± 20%	± 10%	± 20%	± 10%	± 20%
LEADS TO CHANGE IN PROCESSING COST/UNIT (-%)						
Packing Material	5.8	11.6	6.0	12.1	6.2	12.4
Utilities	2.7	5.4	2.7	5.4	2.7	5.5
Direct Labor	0.4	0.8	0.3	0.6	0.3	0.5
Overhead Share	0.7	1.3	0.5	1.1	0.4	0.8
Amortization	0.4	0.9	0.4	0.8	0.4	0.8

(1) Changes of different levels in different items may be calculated by addition of the appropriate percentages.

- 1) PROPOSED ENTERPRISE: VITAMINKA
- 2) PROPOSED LOCATION: Banja Luka
- 3) a) PRODUCT LINE: JAMS & CONFITURES (high-grade) LINE
  - b) VARIETIES: High Quality Jams, Confitures and Pulp Jams from Cherries, Apricots and Others
  - c) PACKAGING: Glass Jars fitted with twist-off lids, 1/2-1 Kg.each, carton outer cases
- 4) MODE OF PROJECT: Addition to Existing Plant
- 5) PLANNED OUTPUT:

<u>Stage</u>	<u>OUTPUT</u> (tons nett product/year)
1	2,500
2	4,000
3	6,000

- 6) ANNUAL SALES ESTIMATES:  
(Assumed ex-factory price obtainable at December 72 Yugoslav price levels)

<u>Stage</u>	<u>Annual Sales</u> (Mill. ND)
1	20.0
2	32.0
3	48.0

- 7) PROCESSING SEASON:  
Half year. Will be balanced by CANDIED FRUITS LINE production

- 8) FACILITIES - EXISTING AND NEW:

At each of the 3 stages new equipment and new areas will be added.  
Note should be taken that by stage 3 a cumulative 2,100 sq.m. of storage area will have been required.

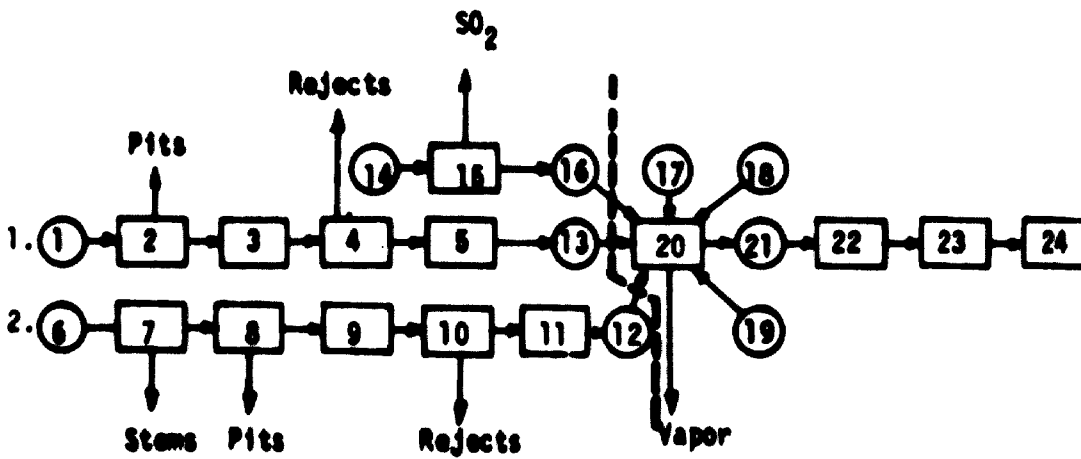
- 9) FIXED INVESTMENT ESTIMATE (Mill. ND):

Stage	<u>1</u>	<u>2*</u>	<u>3*</u>
Equipment	1.700	3.400	5.600
Buildings	1.500	2.510	3.900
<u>Engineering &amp; Installation</u>	<u>1.000</u>	<u>1.300</u>	<u>1.900</u>
Total Fixed Investment	4.200	7.210	11.400
Working Capital	3.000	4.000	5.500

\* Cumulative Total

JAMS AND CONFITURES (high-grade)LINE

10) PROCESS DESCRIPTION

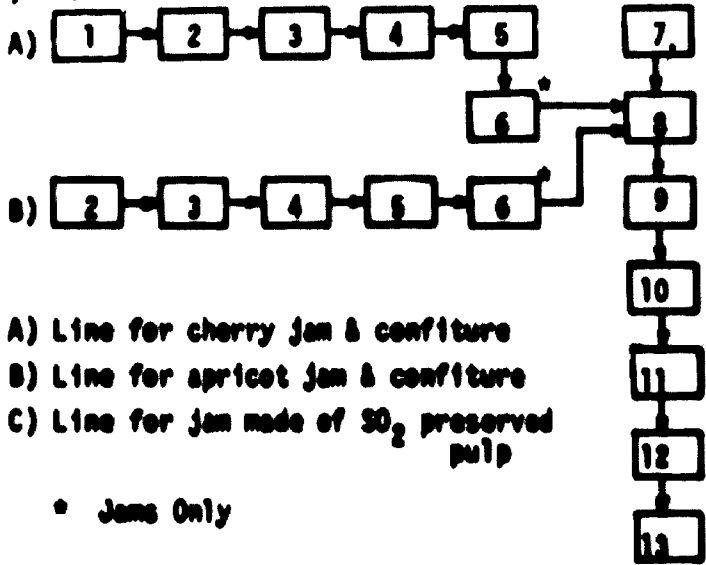


- |  |     |                             |    |
|--|-----|-----------------------------|----|
| <b>Section A.</b><br><b>RAW MATERIAL TREATMENT</b> | 1.  | Apricots                    | 1. |
|  | 2.  | Pitting - Pits              |    |
|  | 3.  | Washing                     |    |
|  | 4.  | Sorting - Rejects           |    |
|  | 5.  | Chopping                    |    |
|  | 6.  | Cherries                    | 2. |
|  | 7.  | Stemming - Stems            |    |
|  | 8.  | Pitting - Pits              |    |
|  | 9.  | Washing                     |    |
|  | 10. | Sorting - Rejects           |    |
|  | 11. | Chopping                    |    |
|  | 12. | Pulp                        |    |
|  | 13. | Pulp                        |    |
|  | 14. | Pulp                        |    |
|  | 15. | Evaporation $SO_2$ - $SO_2$ |    |
|  | 16. | Pulp                        |    |

- |   |     |                        |
|---|-----|------------------------|
| <b>Section B.</b><br><b>JAM PREPARATION AND PACKAGING</b> | 17. | Water                  |
|   | 18. | Sugar                  |
|   | 19. | Acid Solution          |
|   | 20. | Vacuum Cooking - Vapor |
|   | 21. | Pectin                 |
|   | 22. | Holding                |
|   | 23. | Filling                |
|   | 24. | Packaging              |

**JAMS AND CONFITURES (high-grade) LINE**

11) **DIAGRAMMATIC FLOWSHEET:**



1. Steamer
2. Fitting Machine
3. Soaker Washer
4. Washing Drum
5. Sorting Belt
6. Chopping Equipment
7. Steam Jacketed Kettle
8. Vacuum Evaporator
9. Holding Tank
10. Filler
11. Closing Machine
12. Labeller
13. Caser

A) Line for cherry jam & confiture  
 B) Line for apricot jam & confiture  
 C) Line for jam made of 30% preserved pulp  
 \* Jams Only

12) **DIRECT MANPOWER:**

Stage	1	2	3
Operators	10	14	20

13) **UTILITIES:**

Stage	1	2	3
Power (KWh/year)	31,000	45,000	72,000
Water (M <sup>3</sup> /year)	12,000	20,000	30,000
Steam (Ton/year)	940	1,450	2,000

14) **MATERIALS BALANCE:**

For 1 Ton of Product

Material	Cherry Jam or Confiture		Apricot Jam or Confiture		Jam made from Preserved Pulp	
	Kg.	Kg.Total	Kg.	Kg.Total	Kg.	Kg.Total
<b>Ingredient:</b>		1,304		1,369		1,279
Fruit	625		610		0	
Sugar	630		630		630	
Water	126		126		126	
Pectin	1		1		1	
Acid Solution (50% Citric Acid by wt.)	2		2		2	
Pulp	0		0		520	
<b>Residues and Rejects:</b>		304		369		279
Stems	15		0		0	
Pits	60		60		0	
Rejects	30		30		0	
Vapor	279		279		279	
<b>Product</b>		1,000		1,000		1,000

JAMS AND CONFITURES (high-grade) LINE

## 15) PROCESSING COSTS (Mill.ND/Year)

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Packaging Material	6.200	9.900	14.800
Utilities	0.660	1.000	1.500
Direct Labor	0.130	0.190	0.260
Overhead Share*	0.850	1.000	1.150
<u>Amortization</u>	<u>0.350</u>	<u>0.600</u>	<u>0.850</u>
Total (Mill.ND/Year)	8.190	12.690	18.560
.....			
Unit Processing Cost (ND/Ton Product)	3,280	3,170	3,140
	.....	.....	.....

\* Includes maintenance, administration and transportation

## 16) PROCESSING COST SENSITIVITY

ITEM <sup>(1)</sup>	Stage 1		Stage 2		Stage 3	
	ITEM CHANGE (%)		ITEM CHANGE (%)		ITEM CHANGE (%)	
	± 10%	± 20%	± 10%	± 20%	± 10%	± 20%
LEADS TO CHANGE IN PROCESSING COST/UNIT (%)						
Packing Material	7.6	15.2	7.8	15.6	8.0	16.0
Utilities	0.8	1.6	0.8	1.6	0.8	1.6
Direct Labor	0.2	0.8	0.1	0.3	0.1	0.3
Overhead Share	1.0	2.1	0.8	1.6	0.6	1.2
Amortization	0.4	0.8	0.5	0.9	0.5	0.9

(1) Changes of different levels in different items may be calculated by addition of the appropriate percentages.

- 1) PROPOSED ENTERPRISE: VITAMINKA
- 2) PROPOSED LOCATION: Banja Luka
- 3) a) PRODUCT LINE: CANNED SWEET MAIZE KERNELS LINE
- b) VARIETIES: SWEET CORN
- c) PACKAGING: Canned in brine, 1/2 Kg. each, carton outer cases
- 4) MODE OF PROJECT: Addition to existing plant
- 5) PLANNED OUTPUT:

<u>Stage</u>	<u>Output</u> (tons nett product/year)
1	2,200
2	4,400
3	8,800

- 6) ANNUAL SALES ESTIMATES:  
(Assumed ex-factory price obtainable at December 72 Yugoslav price levels)

<u>Stage</u>	<u>Annual Sales</u> (Mill. MD)
1	18.0
2	30.0
3	59.0

- 7) PROCESSING SEASON:

75 working days in August-October. This does not overlap the pea season

- 8) FACILITIES - EXISTING AND NEW:

For stage 1 the pea line will be used, plus some additional equipment.  
For stage 2 a new production line needing 400 sq.m. area will be set up.  
No additional area will be needed for stage 3.

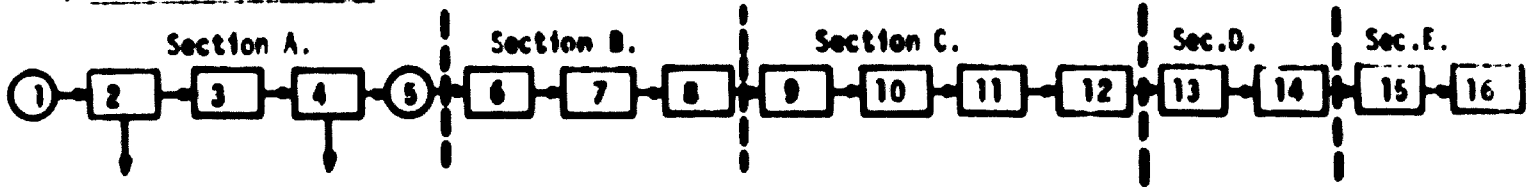
- 9) FIXED INVESTMENT ESTIMATE (Mill. MD):

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Equipment	0.510	3.400	0.600
Buildings	1.000	3.200	3.200
<u>Engineering &amp; Installation</u>	<u>0.190</u>	<u>1.100</u>	<u>2.200</u>
Total Fixed Investment	1.640	7.700	13.900
.....			
Working Capital	2.500	5.000	12.000

• Cumulative Total

CANNED SHEET MAIZE KERNELS LINE

10) PROCESS DESCRIPTION:



**Section A.**  
**RAW MATERIAL TREATMENT**

1. Sweet Corn
2. Husking
3. Grading
4. Cutting
5. Maize Kernels

**Section B.**  
**MAIZE KERNEL TREATMENT**

6. Washing
7. Sorting
8. Blanching

**Section C.**  
**FILLING & CLOSING**

9. Kernels Filling
10. Cold Brine Filling
11. Exhausting
12. Closing

**Section D.**  
**STERILIZING**

13. Sterilizing
14. Cooling

**Section E.**  
**PACKAGING**

15. Labelling
16. Casing



R O U	Crop	1)	2)	3) Possible degree of mechanization			6)	7)	8)
		Sector respon- sible for growing	Availab. of the Product (harvest time)	Crop Protec- tion	Harvest- ing	Handle- after harvest- ing	% of yield lost by improv. of inputs and tech- niques	Strat- egy needed or worth- while	Labor inten- sity
a)	Potatoes	P + S	VII, IX	P	N.P.	N.P.	20%	N U	l
b)	Green Peas	S	V, VI	P	P	P	10%	- -	l
c)	Green Beans	S	VII	P	P	P	10%	- -	l
d)	Cucumbers	P + S	VII, VIII, IX	P	N.P.	P	20%	N U	h
e)	Tomatoes	P + S	VII, VIII, IX, X	N.P.	N.P.	P	15%	N U	h
f)	Carrots	S	IX, X	P	N.P.	N.P.	15%	- U	h
g)	Cabbage	P + S	VII, VIII	P	P	N.P.	10%	N U	m
h)	Apples	S	IX, X	N.P.	S.D.	P	-	N U	m
i)	Walrus	S	IX, X	P	P	P	-	N U	l
j)	Cauliflower	P	VI	P	S.D.	P	-	N U	m
k)	Spinach	P + S	VI, VII, VIII	P	P	P	20%	N U	l
l)	Green Pepper	P + S	VII, VIII, IX	N.P.	P	P	-	N U	h
m)	Strawberries	P	VI, VII	P	P	S.D.	-	N U	h
n)	Berries	P	VI, VII	P	P	S.D.	-	N U	h
o)	Sorghum	S	VIII	P	P	P	-	- U	l
p)	Rye	S	VII	P	P	P	-	- -	l
q)	Asparagus	S	IV, V, VI	P	N.P.	P	-	N U	m
r)	Broccoli	P	VI	P	S.D.	P	-	N U	m
s)	Broccoli Sprouts	P	V, VI	P	S.D.	P	-	N U	m
t)	Sweet Corn	S	IX	P	P	P	-	- U	l
u)	Popcorn	S	IX	P	P	P	-	- U	l
v)	Babycorn	P + S	VI, VII	P	P	N.P.	-	- U	m
w)	Washrooms	S	cannot supply	P	P	P	-	N U	h
x)	Soya	S	IX	P	P	P	20%	- U	l

**Explanation of Symbols:**

P = Priv. Sector  
S = Gov. Sector

P = Fully Mechanized  
N.P. = Nearly Fully Mechsd.  
P = Partly Mechanized  
S.D. = To a Small Degree  
Mechanized

N = Needed  
U = Seen  
Worthwhile  
l = low  
m = mediu  
h = high

CANNED SWEET MAIZE KERNELS LINE

11) DIAGRAMMATIC FLOWSHEET:



- |                   |                           |                    |
|-------------------|---------------------------|--------------------|
| 1 Husker          | 6 Sorting Belt and Tables | 11 Closing Machine |
| 2 Grading Machine | 7 Blancher                | 12 Retort          |
| 3 Cutter          | 8 Filler (Kernels)        | 13 Cooler          |
| 4 Soaker Washer   | 9 Filler (Cold Brine)     | 14 Labeller        |
| 5 Washing Drum    | 10 Exhauster              | 15 Caser           |

12) DIRECT MANPOWER:

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Operators	19	36	65

13) UTILITIES:

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Power (Kwh/year)	24,000	42,000	78,000
Water (M <sup>3</sup> /year)	24,000	48,000	96,000
Steam (Tons/year)	680	1,350	2,700

14) MATERIALS BALANCE:

For 1 Ton of Product (Kernels and Brine)

Material	Kg.	Kg.Total
<u>Ingredients:</u>		2,686
Sweet Corn-on-Cob	2,200	
Salt	38	
Water	337	
<u>Residues and Rejects:</u>		1,686
Sheaves	80	
Cobs	1,540	
Rejects	38	
<u>Product</u>		1,000

15) PROCESSING COSTS (Mill. ND/Year):

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Packaging Material	2,200	4,500	9,000
Utilities	0.420	0.830	1.700
Direct Labor	0.130	0.250	0.450
Overhead Share*	0.240	0.300	0.300
<u>Amortization</u>	<u>0.120</u>	<u>0.250</u>	<u>1.400</u>
<b>Total (Mill. ND/Year)</b>	<b>3.110</b>	<b>6.830</b>	<b>12.930</b>
.....			
Unit Processing Cost (ND/Ton Product)	1,410	1,570	1,470
	.....	.....	.....

\* Includes maintenance, administration and transportation

CANNED SHEET MAIZE KERNELS LINE16. PROCESSING COST SENSITIVITY

ITEM (1)	Stage 1		Stage 2		Stage 3	
	ITEM CHANGE (-%)		ITEM CHANGE (-%)		ITEM CHANGE (-%)	
	± 10%	± 20%	± 10%	± 20%	± 10%	± 20%
LEADS TO CHANGE IN PROCESSING COST/UNIT (-%)						
Packing Material	7.0	14.1	6.6	13.2	7.0	13.9
Utilities	1.4	2.7	1.2	2.4	1.3	2.6
Direct Labor	0.4	0.8	0.4	0.7	0.3	0.7
Overhead Share	0.8	1.6	0.4	0.9	0.3	0.6
Amortization	0.4	0.8	1.4	2.8	1.1	2.2

(1) Changes of different levels in different items may be calculated by addition of the appropriate percentages.

- 1) PROPOSED ENTERPRISE: VITAMINA
- 2) PROPOSED LOCATION: Banja Luka
- 3) a) PRODUCT LINE: CANDIED FRUITS LINE
  - b) VARIETIES: Cherries, Plums, Apricots and Others
  - c) PACKAGING: Fancy Carton Boxes, 1/4 kg. each with Collations
- 4) MODE OF PROJECT: Addition to Existing Plant
- 5) PLANNED OUTPUT:

Stage	Output (Tons nett product/year)
1	00
2	100
3	200

- 6) ANNUAL SALES ESTIMATES:  
(Assumed ex-factory price obtainable at December 72 Yugoslav price levels)

Stage	Annual Sales (Mill. MD)
1	1.7
2	3.4
3	6.8

- 7) PROCESSING SEASON:  
Half year. Will be balanced by JAMS & CONFITURES (high-grade) LINE

- 8) FACILITIES - EXISTING AND NEW:  
This line does not require new building. The line uses a good deal of the equipment belonging to the JAMS AND CONFITURES (high-grade) LINE.

- 9) FIXED INVESTMENT ESTIMATE (Mill. MD):

Stage	1	2 <sup>o)</sup>	3 <sup>o)</sup>
Equipment	0.170	0.200	0.200
Buildings	0	0	0
Engineering & Installation (inc. know-how)	0.630	0.700	0.800
<b>Total Fixed Investment</b>	<b>1.000</b>	<b>1.100</b>	<b>1.200</b>
Working Capital	0.200	0.200	0.200

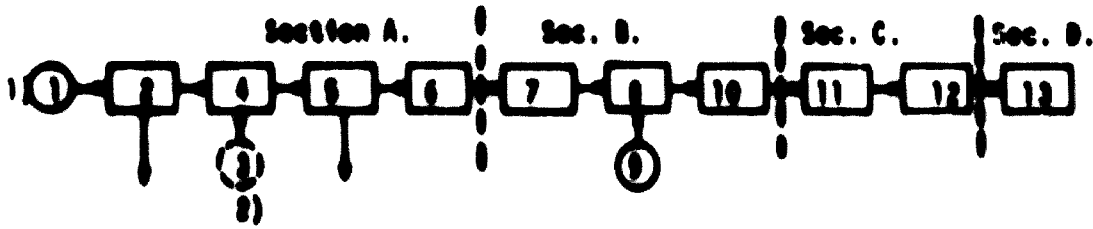
o) Cumulative Total

oo) The investment in this line is an addition to the Stage 1 of JAMS AND CONFITURES (high-grade) LINE. It consists of packing tables, tray and holding tanks. There is no requirement for an additional area, as this line is more compact than the JAMS AND CONFITURES one.

ooo) This investment is an addition to Stage 2 of JAMS AND CONFITURES (high-grade) LINE.

**CANDIED FRUITS LINE**

**10) PROCESS DESCRIPTION:**



- 1) Cherries Line
- 2) Plums Line

- Section A.**
- 1. Cherries
  - 2. Stemming
  - 3. Plums
  - 4. Washing
  - 5. Sorting
  - 6. Grading

- Section B.**
- 7. Cooking
  - 8. Vacuum Syruping
  - 9. Holding in Syrup

- Section C.**
- 10. Rinsing
  - 11. Draining & Drying

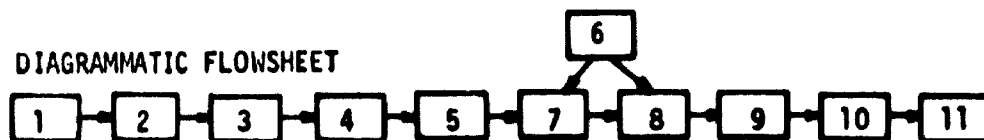
- Section D.**
- 12. Packaging

**CANDIED  
FRUITS  
TREATMENT**

**PACKAGING**

CANDIED FRUITS LINE

11) DIAGRAMMATIC FLOWSHEET



- |                                       |                     |
|---------------------------------------|---------------------|
| 1 Stemming Tables (for cherries only) | 7 Cooking Kettle    |
| 2 Soaker Washer (for either fruit)    | 8 Vacuum Evaporator |
| 3 Washing Drum                        | 9 Holding Tank      |
| 4 Sorting Belt                        | 10 Trays            |
| 5 Grading Machine                     | 11 Packing Tables   |
| 6 Syrup Preparation Tank              |                     |

SECTION 1

12) DIRECT MANPOWER:

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Operators	9	17	28

13) UTILITIES:

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Power (KWh/year)	14,400	14,400	23,500
Water (M <sup>3</sup> /year)	1,200	2,300	4,500
Steam (Tons/year)	60	120	340

14) MATERIALS BALANCE:

For 1 Ton of Products

Material	Cherries		Plums	
	Kg.	Kg.Total	Kg.	Kg.Total
<u>Ingredients:</u>		1430		1475
Fruit	765		750	
Sugar	665		725	
<u>Residues and Rejects:</u>		430		475
Stems	15		0	
Rejects	35		35	
Sugar	30		30	
Evaporated Water	350		410	
<u>Product</u>		1000		1000

15) PROCESSING COSTS (Mill. ND/Year)

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Packaging Material	0.200	0.400	0.800
Utilities	0.040	0.070	0.210
Direct Labor	0.130	0.190	0.260
Overhead Share*	0.050	0.070	0.080
Amortization	0.110	0.120	0.130

- |   |                                     |    |                   |
|---|-------------------------------------|----|-------------------|
| 1 | Stemming Tables (for cherries only) | 7  | Cooking Kettle    |
| 2 | Soaker Washer (for either fruit)    | 8  | Vacuum Evaporator |
| 3 | Washing Drum                        | 9  | Holding Tank      |
| 4 | Sorting Belt                        | 10 | Trays             |
| 5 | Grading Machine                     | 11 | Packing Tables    |
| 6 | Syrup Preparation Tank              |    |                   |

12) DIRECT MANPOWER:

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Operators	9	17	28

13) UTILITIES:

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Power (KWh/year)	14,400	14,400	23,500
Water (M <sup>3</sup> /year)	1,200	2,300	4,500
Steam (Tons/year)	60	120	340

14) MATERIALS BALANCE:

For 1 Ton of Products

Material	Cherries		Plums	
	Kg.	Kg.Total	Kg.	Kg.Total
<u>Ingredients:</u>		1430		1475
Fruit	765		750	
Sugar	665		725	
<u>Residues and Rejects:</u>		430		475
Stems	15		0	
Rejects	35		35	
Sugar	30		30	
Evaporated Water	350		410	
<u>Product</u>		1000		1000

15) PROCESSING COSTS (Mill.ND/Year)

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Packaging Material	0.200	0.400	0.800
Utilities	0.040	0.070	0.210
Direct Labor	0.130	0.190	0.260
Overhead Share*	0.050	0.070	0.080
Amortization	0.110	0.120	0.130
<b>Total (Mill.ND/Year)</b>	<b>0.530</b>	<b>0.850</b>	<b>1.480</b>
.....			
Unit Processing Cost (ND/Ton Product)	8,800	7,080	6,170
	.....	.....	.....

\* Includes maintenance, administration and transportation

CARRIED FRUITS LINE16. PROCESSING COST SENSITIVITY

ITEM (1)	Step 1		Step 2		Step 3	
	ITEM CHANGE (-%)		ITEM CHANGE (-%)		ITEM CHANGE (-%)	
	± 10%	± 20%	± 10%	± 20%	± 10%	± 20%
LEADS TO CHANGE IN PROCESSING COST/UNIT (-%)						
Packing Material	3.8	7.5	4.7	9.4	5.4	10.8
Utilities	0.7	1.5	0.8	1.7	1.4	2.8
Direct Labor	2.5	4.9	2.3	4.5	1.8	3.6
Overhead Share	0.9	1.9	0.8	1.6	0.5	1.0
Amortization	2.1	4.2	1.4	2.8	0.9	1.8

(1) Changes of different levels in different items may be calculated by addition of the appropriate percentages.



- 1) PROPOSED ENTERPRISE: VITAMINKA
- 2) PROPOSED LOCATION: Banja Luka
- 3) a) PRODUCT LINE: CANNED PICKLED BABYMAIZE COBS LINE
- b) VARIETIES: Sour Pickled Baby maize
- c) PACKAGING: Glass Jars
- 4) MODE OF PROJECT: Expansion of Product Lines
- 5) PLANNED OUTPUT:

<u>Stage</u>	<u>Output (Tons nett product/year)</u>
1	500
2	1,000
3	1,500

- 6) ANNUAL SALES ESTIMATES:  
(Assumed ex-factory price obtainable at December 72 Yugoslav price levels)

<u>Stage</u>	<u>Annual Sales (Mill.MD)</u>
1	3.4
2	6.8
3	10.0

- 7) PROCESSING SEASON: June - July

- 8) FACILITIES - EXISTING AND NEW:

Some equipment for rawmaterials treatment as sweet maize line,  
Packaging equipment for glass jar filled products exists.

- 9) FIXED INVESTMENT ESTIMATE (Mill.MD):

Total Fixed Investment	No need for additional fixed investment (if sweet maize line is set up)
Working Capital	Part of canning section working capital

- 10) PROCESSING COST:

Part of Vitaminka's canning line cost - as other products produced today.

CANNED PICKLED BABYMAIZE COBS LINE

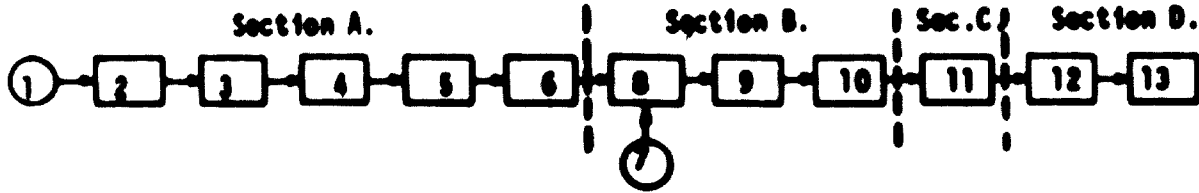
- 11) DIAGRAMATIC FLOWSHEET:



- |                   |                         |                   |
|-------------------|-------------------------|-------------------|
| 1 Husker          | 5 Blancher              | 9 Closing Machine |
| 2 Soaker Washer   | 6 Filling Tables        | 10 Pasteurizer    |
| 3 Sorting Belt    | 7 Brine Filling Machine | 11 Labeller       |
| 4 Grading Machine | 8 Exhauster             | 12 Caser          |

**CANNED PICKLED BABYMAIZE COBS LINE**

**12) PROCESS DESCRIPTION:**



- Section A.**  
**RAW MATERIAL TREATMENT**
- 1. Baby Corn
  - 2. Husking
  - 3. Washing
  - 4. Sorting
  - 5. Size Grading
  - 6. Blanching

- Section B.**  
**FILLING & CLOSING**
- 7. Filling
  - 8. Exhausting
  - 9. Closing

- Section C.**  
**PASTEURIZING**
- 11. Pasteurizing
- Section D.**  
**JARS TREATMENT**
- 12. Labelling
  - 13. Casing

**13) PROCESSING COST SENSITIVITY**

ITEM (1)	Stage 1		Stage 2		Stage 3	
	ITEM CHANGE (%)		ITEM CHANGE (%)		ITEM CHANGE (%)	
	± 10%	± 20%	± 10%	± 20%	± 10%	± 20%
LEADS TO CHANGE IN PROCESSING COST/UNIT (%)						
Equipment	2.5	5.1	SAME AS STAGE 1			
Engineering and Equipment	7.5	14.9				

(1) Changes of different levels in different items may be calculated by addition of the appropriate percentages

- 1) PROPOSED ENTERPRISE: VITAMINKA
- 2) PROPOSED LOCATION: Banja Luka
- 3) a) PRODUCT LINE: CANNED MUSHROOMS LINE
- b) VARIETIES: Whole and Chopped Mushrooms (Champignons)
- c) PACKAGING: Canned in Brine, 1/2 Kg. each, carton outer cases
- 4) MODE OF PROJECT: Expansion of Product Lines
- 5) PLANNED OUTPUT:

<u>Stage</u>	<u>Output</u> (Tons nett product/year)
1	360
2	760
3	760

- 6) ANNUAL SALES ESTIMATES:  
(Assumed ex-factory price obtainable at December 72 Yugoslav price levels)

<u>Stage</u>	<u>Annual Sales</u> (Mill.MD)
1	10.0
2	22.6
3	22.6

- 7) PROCESSING SEASON:  
All year round.

- 8) FACILITIES - EXISTING AND NEW:

For all stages a simple line will be set up, based mainly on manual operations. Some new equipment is needed, but the line would fit into the existing pos line building.

- 9) FIXED INVESTMENT ESTIMATE (Mill.MD):

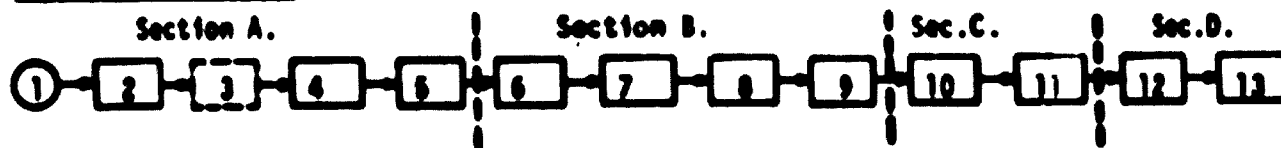
<u>Stage</u>	<u>1</u>	<u>2*</u>	<u>3*</u>
Equipment	0.170		
Buildings	0	same as stage 1	
Engineering & Installation	0.600		
<b>Total Fixed Investment</b>	<b>0.670</b>	<b>same as stage 1</b>	
Working Capital	2.800	5.000	Same as Stage 2

\* Cumulative Total

**GRAIN PRODUCTION IN SOUTHERN AFRICA AS AN INDICATOR FOR AGRICULTURAL POLICY REFORMS**

7)	8)	9)	10)	11)	12)	13)	14) Requirement for the project (processing)	15) Requirement for the project (processing)
Invest. needed or worth- while	Labor intensity	Capital intensity	Average yields kg/ha	Average Price \$/kg (1974) at farm- gate	Price policy	General Market Sit. #0.	Tons	Haar.
N V	l	l	6.000	0.75	P.P.	S	10000-20000	7000-10000
- -	l	n	2.000	2.00	P.P.	N		
- -	l	n	3.000	2.00	P.P.	N	100-200	80-90
N V	n	l	15.000	4.00	P.P.	S		
N V	n	n	20.000	3.00	P.P.	N		
- V	n	n	10.000	4.00	P.P.	S	100-200	80-90
N V	n	l	25.000	1.00	P.P.	S		
N V	n	n	40.000	2.50	P.P.	S	1000-2000	80-90
N V	l	n	5.000	1.50	M.G.P.	S	50000*	16000
N V	n	l	17.500 <sup>0</sup>	2.10	P.P.	S		
N V	l	n	10.000	2.50	P.P.	N		
N V	n	n	15.000	2.50	P.P.	N		
N V	n	n	0.000	10.00	P.P.	S	1000	100
N V	n	n	N.A.	N.A.	P.P.	S	500-1000	N.A.
- V	l	n	3.000 <sup>0</sup>	1.00 <sup>0</sup>		N	50000*	14000
- -	l	n	2.500 <sup>0</sup>			N		
N V	n	n	2.000 <sup>0</sup>	10.00 <sup>0</sup>	P.P.	N	100-200	90-100
N V	n	l	17.500 <sup>0</sup>	2.00 <sup>0</sup>	P.P.	N		
N V	n	l	6.000 <sup>0</sup>	3.00 <sup>0</sup>	P.P.	N		
- V	l	n	20.000 <sup>0</sup>	2.00 <sup>0</sup>	P.P.	N	10000-20000	900-1000
- V	l	n	2.500 <sup>0</sup>	1.50 <sup>0</sup>	P.P.	N	200-300	80-100
- V	n	l	1.000 <sup>0</sup>	2.50 <sup>0</sup>	P.P.	N		
N V	n	n	N.A.	15.00 <sup>0</sup>	P.P.	N	1000-2000	N.A.
- V	l	n	1.150	1.22	M.G.P.	N	10000	70000-80000

N = Needed      l = low                      e = estimated      P.P. = Free & Fluctuating      S = Some Surplus      \* Assuming that feed-mix concentrates will include 30% maize and 20% sorghum.  
 V = Econ. Worthwhile      n = medium                      M.G.P. = Min. Govt. Price      X = No Surplus

CANNED MUSHROOMS LINE10) PROCESS DESCRIPTION:

Section A. 1. Mushrooms  
 RAW MATERIAL 2. Sorting, Trimming & Quality Grading  
 PREPARATION 3. Chopping  
 4. Washing  
 5. Blanching

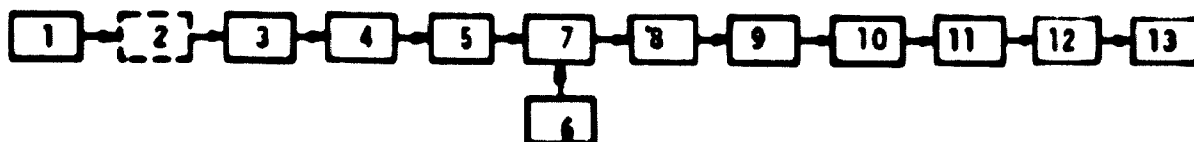
Section B. 6. Filling  
 FILLING & 7. Brine Filling  
 SEALING 8. Exhausting  
 9. Sealing

Section C. 10. Sterilizing  
 STERILIZING 11. Cooling

Section D. 12. Labelling  
 PACKAGING 13. Casing

CANNED MUSHROOMS LINE

11) **DIAGRAMMATIC FLOWSHEET:**



- |   |   |    |                 |
|---|---|----|-----------------|
| 1 | Sorting and Trimming Tables                     | 7  | Brine Filler    |
| 2 | Chopping Machine (not used for whole mushrooms) | 8  | Exhauster       |
| 3 | Soaker Washer                                   | 9  | Sealing Machine |
| 4 | Blancher  | 10 | Retort          |
| 5 | Filler or Tables                                | 11 | Cooling Tank    |
| 6 | Brine Preparation Tank                          | 12 | Labeller        |
|   |   | 13 | Caser           |

12) **DIRECT MANPOWER:**

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Operators	4	7	Same as Stage 2

13) **UTILITIES:**

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Power (Kwh/year)	600	600	
Water (M <sup>3</sup> /year)	3,400	6,700	Same as Stage 2
Steam (Tons/year)	70	130	

14) **MATERIALS BALANCE:**

For 1 Ton of Mushrooms in Brine

Material	Kg.	Kg.Total
<u>Ingredients:</u>		1,195
Mushroom	478	
Water	559	
Salt	11	
<u>Residues and Rejects</u>	195	195
<u>Product</u>		1,000

15) **PROCESSING COSTS (Mill.ND/Year)**

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Packaging Material	0.750	1.400	
Utilities	0.060	0.100	Same as Stage 2
Direct Labor	0.110	0.190	Stage 2
Overhead Share*	0.170	0.220	2
<u>Amortization</u>	<u>0.070</u>	<u>0.070</u>	
<b>Total ( Mill.ND/Year)</b>	<b>1.160</b>	<b>1.980</b>	<b>Same as Stage 2</b>
.....			
<b>Unit Processing Cost (ND/Ton Product)</b>	<b>3,000</b>	<b>2,060</b>	<b>Same as Stage 2</b>
.....			

\* Includes maintenance, administration and transportation

CANNED MUSHROOMS LINE16. PROCESSING COST SENSITIVITY

ITEM <sup>(1)</sup>	Stage 1		Stage 2		Stage 3	
	ITEM CHANGE (-%)		ITEM CHANGE (-%)		ITEM CHANGE (-%)	
	± 10%	± 20%	± 10%	± 20%	± 10%	± 20%
LEADS TO CHANGE IN PROCESSING COST/UNIT (-%)						
Packing Material	6.5	12.9	7.0	14.1		
Utilities	0.5	1.0	0.5	1.0		
Direct Labor	0.9	1.9	1.0	1.9		
Overhead Share	1.5	3.0	1.1	2.2		
Amortization	0.6	1.2	0.4	0.8		

(1) Changes of different levels in different items may be calculated by addition of the appropriate percentages.

- 1) PROPOSED ENTERPRISE: VITAMINKA
- 2) PROPOSED LOCATION: Banja Luka
- 3) a) PRODUCT LINE: APPLES COMPOTE AND SAUCE LINE
- b) VARIETIES: Apple Compote (slices in syrup) and Apple Sauce. (The compote will be preferred, if fruit quality is good)
- c) PACKAGING: Cans, 1/2 Kg. - 3.1/2 Kg. each, carton outer cases
- 4) MODE OF PROJECT: Addition to Existing Plant
- 5) PLANNED OUTPUT:

<u>Stage</u>	<u>Output (Tons nett product/year)</u>
1	800
2	1,600
3	1,600

- 6) ANNUAL SALES ESTIMATES:  
(Assumed ex-factory price obtainable at December 72 Yugoslav price levels)

<u>Stage</u>	<u>Annual Sales (Mill.MD)</u>
1	6.0
2	12.0
3	12.0

- 7) PROCESSING SEASON:  
September-October. Cold storage possible if processing is to be delayed.

- 8) FACILITIES - EXISTING AND NEW:  
A new line erected on 300 sq.m. of production area will be needed already in Stage 1, as no existing equipment is suitable and available at the time required.

- 9) FIXED INVESTMENT ESTIMATE (Mill.MD):

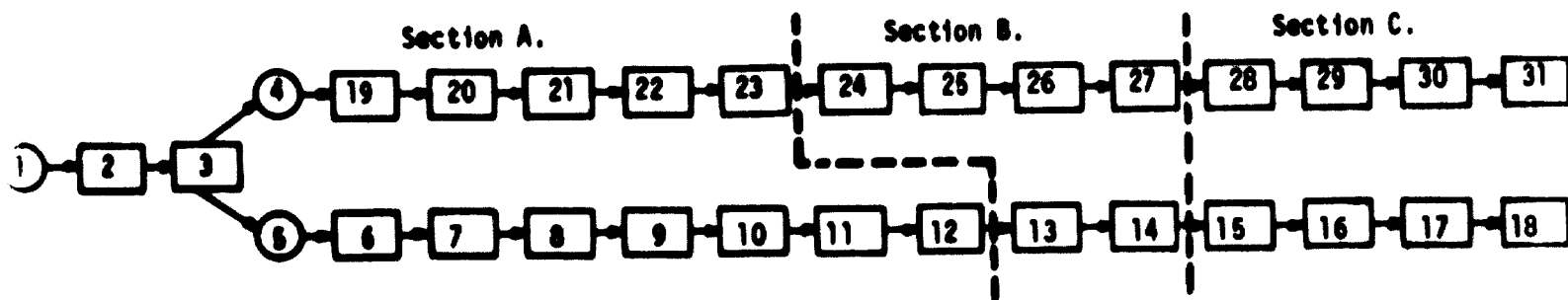
<u>Stage</u>	<u>1</u>	<u>2*</u>	<u>3*</u>
Equipment	2.300	4.420	
Buildings	1.700	3.100	Same as Stage 2
<u>Engineering &amp; Installation</u>	<u>0.920</u>	<u>1.800</u>	
Total Fixed Investment	5.060	9.320	Same as Stage 2
.....			
Working Capital	1.500	2.500	Same as Stage 2
	.....	.....	.....

\* Cumulative Total



APPLE COMPOTE & SAUCE LINE

10) PROCESS DESCRIPTION:



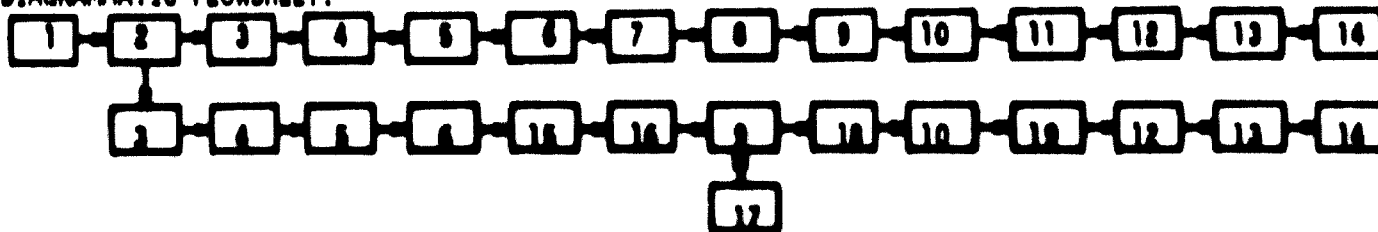
- Section A.**  
**RAW MATERIAL PREPARATION**
1. Apples
  2. Washing
  3. Quality Grading and Sorting
  4. Apples for Compote
  5. Apples for Sauce
  6. Grading (Size)
  7. Peeling & Coring
  8. Inspection & Trimming
  9. Cutting
  10. Sugar Addition
  11. Cooking
  12. Finishing
  19. Grading (Size)
  20. Peeling & Coring
  21. Inspection and Trimming
  22. Slicing
  23. Vacuumizing & Blanching

- Section B.**  
**FILLING & CLOSING**
13. Filling
  14. Closing
  24. Filling
  25. Syrup Filling
  26. Exhausting
  27. Closing

- Section C.**  
**STERILIZING OR PASTEURIZING**
15. Pasteurizing
  16. Cooling
  17. Labelling
  18. Casing
  28. Sterilizing
  29. Cooling
  30. Labelling
  31. Casing

APPLES COMPOTE AND SAUCE LINE

11) **DIAGRAMMATIC FLOWSHEET:**



- |   |                                     |    |                        |
|---|-------------------------------------|----|------------------------|
| 1 | Soaker Washer                       | 10 | Sealing Machine        |
| 2 | Grading & Sorting Tables            | 11 | Boiling Water Tank     |
| 3 | Grading Machine                     | 12 | Cooler                 |
| 4 | Peeling & Coring Machine and Tables | 13 | Labeller               |
| 5 | Inspection Belt and Table           | 14 | Caser                  |
| 6 | Slicing Machine                     | 15 | Vacuum Unit + Blancher |
| 7 | Cooker                              | 16 | Filling Tables         |
| 8 | Finisher                            | 17 | Syrup Preparation Tank |
| 9 | Filling Machine                     | 18 | Exhauster              |
|   |                                     | 19 | Retort                 |

12) **DIRECT MANPOWER:**

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Operators	17	30	Same as Stage 2

13) **UTILITIES:**

<u>STAGE</u>	<u>1</u>	<u>2</u>	<u>3</u>
Power (KWh/year)	4,500	6,900	
Water (M <sup>3</sup> /year)	8,000	16,000	Same as Stage 2
Steam (Tons/year)	200	400	

14) **MATERIALS BALANCE:**

For 1 Ton of Product

Material	Apple Sauce		Apple Compote (Slices in Syrup)	
	Kg.	Kg.Total	Kg.	Kg.Total
<b><u>Ingredients:</u></b>		1,600		1,335
Apples	1,500		835	
Sugar	100		150	
Water	0		350	
<b><u>Residues and Rejects:</u></b>		600		335
Cores, Peels and Rejects	600		335	
<b><u>Product</u></b>		1,000		1,000

## APPLES COMPOTE AND SAUCE LINE

## 15) PROCESSING COSTS (MILLION/Year):

Stage	1	2	3
Packaging Material	1.800	2.900	Same
Utilities	0.180	0.290	as
Direct Labor	0.080	0.130	Stage
Overhead Share*	0.440	0.880	2
Amortization	0.480	0.720	
<b>Total (MILLION/Year)</b>	<b>2.590</b>	<b>4.590</b>	<b>Same as Stage 2</b>
<b>Unit Processing Cost (MILLION/Ton Product)</b>	<b>3,240</b>	<b>2,870</b>	<b>Same as Stage 2</b>

\* Includes maintenance, administration and transportation

## 16) PROCESSING COST SENSITIVITY

ITEM (1)	Stage 1		Stage 2		Stage 3	
	ITEM CHANGE ( $\pm$ %)		ITEM CHANGE ( $\pm$ %)		ITEM CHANGE ( $\pm$ %)	
	$\pm$ 10%	$\pm$ 20%	$\pm$ 10%	$\pm$ 20%	$\pm$ 10%	$\pm$ 20%
	LEADS TO CHANGE IN PROCESSING COST/UNIT ( $\pm$ %)					
Packing Material	5.8	11.6	6.3	12.6		
Utilities	0.6	1.2	0.6	1.3		
Direct Labor	0.3	0.6	0.3	0.6		
Overhead Share	1.7	3.4	1.2	2.4		
Amortization	1.6	3.2	1.6	3.1		

(1)

Changes of different levels in different items may be calculated by addition of the appropriate percentages.

- 1) PROPOSED ENTERPRISE: VITAMINKA
- 2) PROPOSED LOCATION: Banja Luka
- 3) a) PRODUCT LINE: CANNED ASPARAGUS LINE
  - b) VARIETIES: Whole Asparagus, Cut Asparagus
  - c) PACKAGING: Canned in Brine, 1/2 Kg. and smaller Cans. Carton Outer Cases
- 4) MODE OF PROJECT: Expansion of Product Lines
- 5) PLANNED OUTPUT:

<u>STAGE</u>	<u>OUTPUT</u> (tons nett product/year)
1	140
2	1.120
3	1.120

- 6) ANNUAL SALES ESTIMATES:  
(Assumed ex-factory price obtainable at December 72 Yugoslav price levels)

<u>STAGE</u>	<u>Annual Sales</u> (Mill.MD)
1	3.2
2	27.0
3	27.0

- 7) PROCESSING SEASON:

May - June

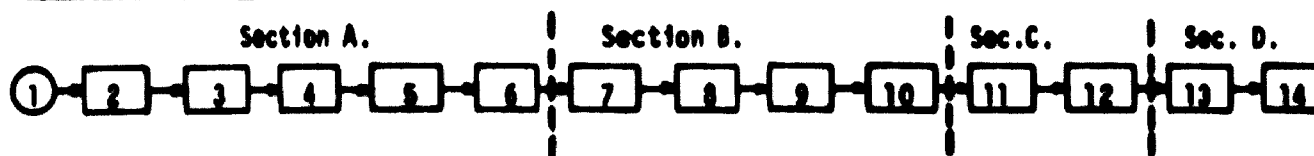
- 8) FACILITIES - EXISTING AND NEW:

For stage 1 a simple line will be set up based mainly on manual operations. Some new equipment is needed but the line does fit into the existing pea line building. Stage 2 represents the minimum requirements for a mechanized line needing an extra 400 sq.m. production area.

- 9) FIXED INVESTMENT ESTIMATE (Mill.MD):

<u>STAGE</u>	<u>1</u>	<u>2*</u>	<u>3*</u>
Equipment	0.100	1.800	Same as Stage 2
Buildings	0	2.000	
<u>Engineering &amp; Installation</u>	<u>0.600</u>	<u>1.100</u>	
Total Fixed Investment	0.700	4.900	Same as Stage 2
Working Capital	0.500	3.000	Same as Stage 2

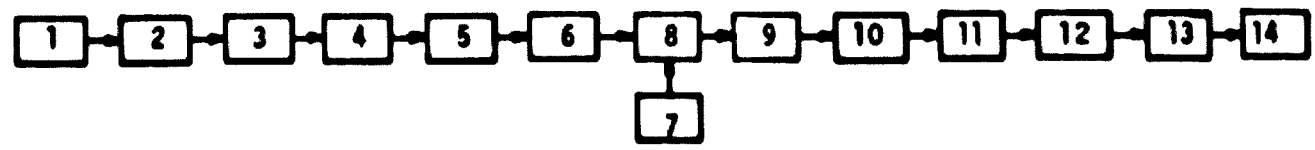
\* Cumulative Total

CANNED ASPARAGUS LINE10) PROCESS DESCRIPTION:MAIN EQUIPMENT

		<u>2 t/day</u>	<u>16 t/day</u>
Section A.1. Asparagus RAW MATERIAL PREPARAT.	2. Washing	Washing Equipment	Spray Washer
	3. Sorting	Sorting Tables	Sorting Conveyor
	4. Grading	Grading Tables	Grading Machine
	5. Cutting	Cutting Tables	Cutting Machine
	6. Blanching	Blancher (Bath)	Blancher
Section B.7. Filling FILLING AND SEALING	8. Brine Filling	Filling Tables	Filling Tables
	9. Exhausting	Brine Filler	Brine Filling Machine
	10. Sealing	Exhauster (Bath)	Exhauster
		Sealing Mach. semi-automatic	Automatic Sealing Machine
Section C. STERI- LIZING	11. Sterilizing	Retort	Retort
	12. Cooling	Cooler (Bath)	Cooler
Section D. PACKAG- ING	13. Labelling	Labelling	Labeller
	14. Casing	Casing Tables	Caser

CANNED ASPARAGUS LINE

11) DIAGRAMMATIC FLOWSHEET:



- |                    |                          |             |
|--------------------|--------------------------|-------------|
| 1 Spray Washer     | 6 Filling Tables         | 11 Retor    |
| 2 Sorting Conveyor | 7 Brine Preparation Tank | 12 Cooler   |
| 3 Grading Machine  | 8 Brine Filler           | 13 Labeller |
| 4 Cutting Machine  | 9 Exhauster              | 14 Caser    |
| 5 Blancher         | 10 Sealing Machine       |             |

12) DIRECT MANPOWER:

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Operators	8	10	Same as Stage 2

13) UTILITIES:

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Power	750	4,800	Same as Stage 2
Water	1,600	12,800	
Steam	30	220	

14) MATERIALS BALANCE:

For 1 Ton of Product in Brine

Material	Kg.	Kg.Total
<u>Ingredients:</u>		1,145
Asparagus	715	
Salt	9	
Water	421	
<u>Residues and Rejects:</u>	145	145
<u>Product</u>	-	1,000

16) PROCESSING COSTS (Mill.ND/Year):

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Packaging Material	0.030	0.240	Same as Stage 2
Utilities	0.110	0.770	
Direct Labor	0.040	0.050	
Overhead Share*	0.070	0.140	
Amortization	0.080	0.400	
<b>Total (Mill.ND/Year)</b>	<b>0.330</b>	<b>1.600</b>	<b>Same as Stage 2</b>
.....			
Unit Processing Cost (ND/Ton Product)	2,360	1,430	Same as Stage 2
	=====	=====	=====

\* Includes maintenance, administration and transportation

a. Remarks to 'Table Showing Key-Data on Vegetable/Fruit Production in Project Area as Raw Material for Local Processing'

General

The table is structured according to crops, ranging from the relatively well established crops, through the ones grown to a lesser extent, to the new crops recommended to be grown in the region and which can be absorbed to a great part by the industries referred to in this report. Within each group of crops they are organized by vegetable, fruits and grains.

The different parameters (columns) are by numerals, while the crops (rows) are given alphabetically.

Following is a general description of each column and row. Whenever a certain square required special detailing it is dealt with whenever describing the parameter or crop.

Column 1. Where both sectors are recommended, the first mentioned should be the first choice. The preference is mainly due to the interchange between labor intensity (column 8) and capital intensity (column 9).

Column 3-5. Reference to mechanization is based on degrees of mechanization according to existing technologies in the world to date. It is assumed that the land preparation for all crops can be done mechanically, therefore this type of mechanical operation does not appear in the chart. For all three columns the definition of the codes is as follows:

F = Fully. Except for the operator no additional manpower is needed.

NF = Nearly fully. Apart from the operator of the machine, additional manpower - a small amount - is needed.

P = Partial. The operation is mainly done manually and machinery is only a partial accessory.

SB = To a small degree. Mechanization can be applied even less than under the Partial code.

Special note for square 4.g. For green asparagus nearly fully mechanization is possible at harvesting, while for white asparagus at harvest time only mechanization to a small degree is applicable.

Column 6. The percentage figure stands for the expected increase in produce which can be expected after applying higher quantities, or at all, agricultural inputs like selected seeds, fertilizers, herbicides, insecticides, mechanization etc. (but excluding irrigation). This parameter should be related only to the private sector, as the social sector already uses these improved agrotechniques to a great extent, and any further applications will produce generally a much lesser increase in produce. This has to be analyzed in detail, crop by crop and by each input by itself, and the interaction between them.

Column 7. Climatological conditions define the season when crops can be grown. Most crops are summer crops and need accumulation of heat. For most crops optimal temperature conditions exist when there is near to no rainfall, and the moisture extraction from the soil by the plants is higher than the rainfall. If the water accumulated in the root area of the soil cannot provide the amount needed in order to obtain optimal yields, in conjunction with other inputs i.e. fertilizers, artificial irrigation should be supplied.

CANNED ASPARAGUS LINE16. PROCESSING COST SENSITIVITY

ITEM <sup>(1)</sup>	Stage 1		Stage 2		Stage 3	
	ITEM CHANGE (-%)		ITEM CHANGE (-%)		ITEM CHANGE (-%)	
	± 10%	± 20%	± 10%	± 20%	± 10%	± 20%
LEADS TO CHANGE IN PROCESSING COST/UNIT (%)						
Packing Material	0.9	1.8	1.5	3.0		
Utilities	3.4	6.8	4.0	9.6	SAME AS STAGE 2	
Direct Labor	1.2	2.4	0.3	0.6		
Overhead Share	2.1	4.2	0.9	1.8		
Amortization	2.4	4.8	2.5	5.0		

(1) Changes of different levels in different items may be calculated by addition of the appropriate percentages.



b. Fruit and Vegetable Expansion Projects by the Kombinat

1. Background

The main present project which should be supported for implementation and expansion is the quickfreezing installation in Bosanska Gradiska. The introduction of new frozen vegetable and fruits items, as detailed below, should be given first priority. The ready-to-eat dishes, in their various stages of sophistication, should be kept in the implementation plan but - considering experience in Yugoslavia hitherto and parallel investments in other regions - it would be helpful to first engage in a program of testmarketing and contracting with buyers.

Vitaminka's technological experience, name and partial coldstore capacities should be used optimally by the Kombinat, as suggested below.

A second project deals with a project of potato storage under controlled atmosphere conditions. Like all large coldstorage projects this will demand a fairly large investment, and controlled atmosphere storage costs 20-25% more than regular coldstorage. However, considering the situation in the area and in Yugoslavia as a whole - lack of reasonably priced potatoes for many months because of one planting season and insufficient storage capacity - a first quality stored product could be marketed up to seven months after start of storage. It is proposed that, the Kombinat should start with the working out of detailed plans for the examination of such a project.

\* \* \*

2. Development Considerations for the Kombinat in the Quickfrozen Vegetable/Fruit Field

Since the Kombinat has invested in the freezing plant, it is proposed to resolve the situation in a constructive way which would utilize the assets and knowledge of the Kombinat and of Vitaminka. Meetings were held with the Managements who expressed readiness to move towards closer cooperation and it is to be hoped that in technology and marketing of these products they will appear as the Kombinat/Vitaminka group.

Efforts should be made by the Kombinat to concentrate on medium to highpriced products of the type which can carry the freezing and transport costs, competitively to production in other Yugoslav enterprises and inside the EEC customer countries. Frozen products of berries of all types, cherries - particularly the Maraska type - sweet maize, asparagus, sprouts, broccoli, spinach should be developed, in addition to the standard peas, beans and similar products which eventually could be sold domestically only, while the first mentioned types are saleable internationally.

Decisions should be taken towards:

- a. Adding to the intended peas/beans/carrots freezing lines at the Bosanska-Gradiska plant further preparation equipment for sweet maize, kernels, berries, sweet maize-on-the-cob, asparagus. These products would be added - partly immediately and partly later when the new crops will be available for processing. Adding sprouts, broccoli, spinach to the present program. Delaying frozen potato products projects until the marketability of frozen potatoes is clearer.
- b. Making "co-pack" arrangements with processors or trading enterprises (Scandinavia and/or Germany-Austria, Switzerland, United Kingdom) for producing under their guidance and label - both final products and intermediates for reprocessing.
- c. Setting up the internal apparatus in the Kombinat management to deal with development of the quickfrozen foods sector, considering the special importance of such developments.
- d. Having the quickfrozen vegetables and fruit sold domestically via the VITAMINKA label so that Vitaminka could strengthen its position as the processed vegetables and fruit enterprise of the region.

- e. Making Vitaminka responsible for quality control supervision and organization of the vegetable/fruit products (frozen and otherwise) which will be produced in the Kombinat installations.
- f. Starting on a small assortment of ready-to-eat meat/vegetable institutional packs for contract sales to industrial and other daily clients in the BK region, including the factories at Zenica and Prijedor as well as to hospitals and some Government institutions. The procedures outlined by the Kombinat for entering this market look reasonable and should be executed as soon as the freezing plant will have been run in with simple vegetable packs. On the other hand, the Kombinat and Vitaminka might find it profitable if Vitaminka's off-season coldstorage could be used as an extender for holding and distribution of some ready-to-eat items. This could be studied further.
- g. Due to the potential world market developments and their impact on Yugoslav exports, as well as considering the parallel expansion programs of several agroindustrial Kombinats and other enterprises, it is suggested that the Kombinat urge Jugofrigo to set up a system of integrative product and marketing arrangements, as well as an up-to-date continuous exchange of information in this dynamic field. Towards that the Kombinat should coordinate mutually satisfactory arrangements with enterprises which develop food processing and marketing facilities in the Sarajevo, Mostar and Brcko areas, as well as with the expanding Zagreb freezing plant so as to obtain marketing cooperation for its line of quickfrozen products for a larger area of B&H and part of the Dalmation Coast.
- h. Specifically regarding the above, the Kombinat should consider to establish, together with the MEPOK Kombinat in Mostar, cold storage facilities (wholesale and selected retail) in the Dalmation coast tourist areas so as to open up that market sector for its intended quickfrozen products. Since there is a considerable need for coldstorage facilities in that coastal area for other products too, the financing need not be presented solely as a part of the quickfrozen foods project.
- i. The Kombinat agrotechnical service should be given the task of contacts with Institutes in Yugoslavia (Cacak, Novised) and abroad regarding agrotechnical experience on varieties of vegetables and fruit suitable for freezing. This information should then be used in supplying the inputs and extension guidance to the employees or cooperants of the Kombinat/Vitaminka group who would deal with the contracts for raw materials for the quickfreezing sector.
- j. It is suggested that the Kombinat should be in contact with the PIKs in Zagreb, Beograd and Sarajevo in order to work out a common supply, contracting, pricing and promotion initiative, also the possibility of specializing in some products that will be retail marketed in areas of wider radius. Also, since they will together have a large percentage of the quickfreezing capacity in the country, a working group could be formed between them to study technological progress in this field (which is very fast), product varieties, marketing methods, and maintain contacts with potential buyers of products and suppliers of technology abroad. In this way it might be possible to develop products with special appeal on the export markets and to sell them, via co-pack agreements.

This working group could evolve into the technocommercial arm of Jugofrigo in the frozen food sector, and as such maintain continuous contact with the frozen food trade associations in West Europe and other countries, with Interfrigo, TIR and similar bodies whose cooperation will be essential if an intracountry coldchain is to be built up.

3. Comments on the Setting-up of the Kombinat Quickfreezing Plant in Bosanka-Gradiska.

The initial design program of the plant was mainly for a peas-beans line for which the Kombinat has the raw materials from its own sources.

As pointed out above, the Kombinat should make efforts from the beginning to plan for export, in addition to competing on the domestic market for its share of the standard peas-beans products. Peas and beans should be considered for the domestic market only since they are low-priced products and are produced very cheaply by Germany, England, Austria and other countries.

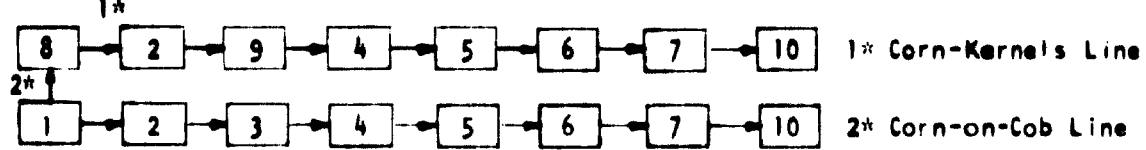
The tunnel ordered by the Kombinat has a capacity of 2.5 t/hr. and can therefore freeze 4,000 annual tons per shift. Approximately this quantity would be taken up by the peas-beans-peppers-carrots production for the local market, plus the initial stage of the ready-to-eat (meat and vegetables) assortments for institutional sale (up to 20,000 portions equivalent per working day).

Additional products, as recommended in this report, would be worked in a second shift and later even in a third shift, which are desirable to improve the economic efficiency of the overall operation (including sales, management and development staff).

These would be sweet maize ("sweetcorn") kernels and sweet corn-on-the-cob, for the local and export markets. Here the Kombinat would have the ecological advantage of preferred raw material supplier, as well as enter a growing market of a large-tonnage demand. Depending on sales, annual production of up to 5,000 eventual tons might be considered. Sweet maize could be introduced earliest, with proper organizational and technical assistance. Only the special preparatory equipment (husker, grading machine, washing equipment, belts, and cutting machine) would have to be added; (cost about 40,000 dollars). The blancher, freezing packaging equipment and storage are the same as for the pea-line.

QUICKFROZEN MAIZE LINE

DIAGRAMMATIC FLOWSHEET



- |                    |                     |                        |
|--------------------|---------------------|------------------------|
| 1. Husker          | 4. Sorting Conveyor | 7. Packaging Equipment |
| 2. Soaker Washer   | 5. Blancher         | 8. Cutting Machine     |
| 3. Grading Machine | 6. Freezer          | 9. Washing Drum        |
|                    |                     | 10. Storage            |

Further utilization of the plant could be made by gradually producing quantities of sprouts, broccoli and spinach - all of which are known and should not present any difficulties. Raw materials supply should be organized by the Kombinat/Vitaminka group from Kombinat lands and/or cooperants and/or working the free INCEL lands (see section on raw materials production). Parts of these quantities could be used by the plant later to add to the assortment of vegetables in its ready-to-eat institutional meals, parts would be sold domestically, particularly in the tourist areas, and test exports could be started either via the Jugofrigo trading network or via an initial stage "co-pack" agreement with buyers from abroad.

Additionally, quick-frozen berries should be produced - first in pilot quantities and later on more, depending on marketability and raw material supply (see section on Vitaminka - berries). The only additional equipment required would be a stemmer and washing equipment at a cost of about 25,000 dollars.

QUICKFROZEN BERRIES LINE

## DIAGRAMMATIC FLOWSHEET:



- |                  |                        |
|------------------|------------------------|
| 1. Stemmer       | 5. Freezer             |
| 2. Soaker Washer | 6. Packaging Equipment |
| 3. Washing Drum  | 7. Storage             |
| 4. Sorting Belt  |                        |

\* \* \* \* \*

If this program would be carried out - in threeshift operation and with a very small additional investment in equipment (plus possibly some extension of storage rooms in BG or in market areas) - the products could be sold at low prices and profitably due to maximal plant and staff utilization, and a product-mix would be obtained which would give the Kombinat/Vitaminka a chance to enter a promising field with new products for the domestic market, starting in a non-risky way in the export market, and supplying products to which the foreign tourists are used and which they have been looking for in the areas where they stay.

With full plant utilization ADDED sales could be up to two million dollars revenue, ex-factory prices.

\* \* \* \* \*

Asparagus would be added after some years when commercial quantities will have become available after a number of growing seasons (see discussion on asparagus in agricultural production chapter).

\* \* \* \* \*

4. Development Considerations for the Kombinat in Potato Storage.

Controlled atmosphere storage could be applied to potatoes and although the technology of application has to be learned, this would not be difficult and the decisive point is that controlled atmosphere storage of various vegetables and fruit has been proven a technical and commercial success in many storage plants and that the costs are known

Feasibility data are given overpage from which it can be seen that the investment is rather high - at least 65 million dinars for a reasonably sized facility; however, the project could be profitable by the storage enterprise sharing the season/off-season price difference with the consumer, i.e. the consumer would pay less than today and buy "as-fresh" potatoes, and the storage plant would charge the retailers part of the summer-winter price differential

Self costs for the storage operation (without raw material costs) including surplus accumulation, would be about 1.1 - 1.2 ND per kg. (about 0.5 ND/kg processing costs plus 20% [of basic investment] capital charges - interest on basic and working capital and surplus). This enterprise could pay all its costs and bring a surplus of about 5 million ND per season, plus income from other storage activities.

It is recommended to consider this project for the Glamoc, or any other, area in the project region where coordinated potato supply to the plant can be organized by the Kombinat. The project region produces today about 70,000 tons potatoes per season and increasing the regional output could be achieved in the potato-producing area.

\* \* \* \* \*

- 1) PROPOSED ENTERPRISE: KOMBINAT
- 2) PROPOSED LOCATION: GLAMOC REGION
- 3) a) PRODUCT LINE: POTATO STORAGE (Controlled Atmosphere) FACILITY
- b) VARIETIES:
- c) PACKAGING: Received and delivered in Sacks
- 4) MODE OF PROJECT: New Plant
- 5) PLANNED OUTPUT: See Storage Capacity

<u>Stage</u>	<u>Tonn Storage Capacity</u>
1	18,000
2	28,000
3	38,000

- 6) ANNUAL SALES ESTIMATES:  
(Assumed ex-factory price obtainable at December 72 Yugoslav price levels)

Depends on price level of potatoes and month(s) sold. At 28,000 tons per season sales could be about 70 million dinars.

- 7) PROCESSING SEASON:  
Potatoes are put into storage during August and September
- 8) FACILITIES - EXISTING AND NEW:  
There are no existing facilities in the project area. This is an entirely new plant.
- 9) FIXED INVESTMENT ESTIMATE (Mill.MD):

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Equipment	30.000	60.000	70.000
Buildings	30.000	60.000	70.000
<u>Engineering &amp; Installation</u>	<u>5.000</u>	<u>0.000</u>	<u>11.000</u>
Total Fixed Investment	65.000	100.000	151.000

\* Cumulative Total

POTATO STORAGE (Controlled Atmosphere) FACILITY

## 10. PROCESS DESCRIPTION



		<u>MAIN EQUIPMENT</u>
1.	Process	Compressors Compressor Motors
2.	Receiving	Structures Condensers
3.	Room Loading	Cooling Towers Diffusers
4.	Cooling	Water Pumps Piping etc.
5.	Unloading	Insulation Insulation Doors Electrical Boards Forklift Truck

POTATO STORAGE (Controlled Atmosphere) FACILITY

## 11) DIRECT MANPOWER:

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Operators	10	12	15

## 12) UTILITIES:

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Power (KWh/year)	1,600,000	2,700,000	3,800,000
Water (M <sup>3</sup> /year)	N E G L I G I B L E		

## 13) PROCESSING COSTS (Mill.ND/Year):

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Packaging Material	0	0	0
Utilities	0.450	0.700	1.000
Direct Labor	0.250	0.300	0.400
Overhead*	2.500	3.000	4.500
Amortization	4.500	7.500	10.500
<b>Total (Mill.ND/Year)</b>	<b>7.700</b>	<b>11.500</b>	<b>16.400</b>
.....			
Unit Processing Cost (ND/Ton Product)	513	460	468
	***	***	***

\* Includes maintenance, administration and transportation

## 14) PROCESSING COST SENSITIVITY

ITEM	Stage 1		Stage 2		Stage 3	
	ITEM CHANGE (±%)		ITEM CHANGE (±%)		ITEM CHANGE (±%)	
	± 10%	± 20%	± 10%	± 20%	± 10%	± 20%
LEADS TO CHANGE IN PROCESSING COST/UNIT (±%)						
Utilities	0.6	1.2	0.6	1.2	0.6	1.2
Direct Labor	0.3	0.6	0.3	0.5	0.2	0.5
Overhead Share	3.2	6.5	2.6	5.2	2.7	5.5
Amortization	5.9	11.7	6.5	13.1	6.5	12.8

#### c. Development Possibilities of Badel-Bosanka

Despite the high profitability of Badel-Bosanka and its assured market outlet, or because of it, the team is of the opinion that Badel-Bosanka could still expand considerably, forward (to the market), backward (developing new rawmaterial supplies), and sideward (broadening its range) by undertaking some systematic development steps, in coordination with Vitaminka. Such an association would act in the following direction:

- (i) It would utilize the strengths of the two enterprises which are the marketing network of Badel and the technological experience and primary production facilities of Vitaminka.
- (ii) The widened production would give more "Lebensraum" to both in specialized sales of various soft drinks where each plant could market one set of lines of those to be developed.
- (iii) It would assure rawmaterial supplies in a large expansion of production to Badel, within the rawmaterial contracting network (including promoting new cultivations) which Vitaminka will anyway have to build up in order to keep and expand its market position for its own, other, range of products.
- (iv) This would result in de-facto associative partial integration between the two enterprises, in a manner of mutual business advantage, and tend to resolve today's conflict-of-interest situation between Vitaminka and Badel.

In order to arrive at a program of action the environment of the softdrinks industry in Yugoslavia has to be considered. This was summarized in the former markets section.

The team feels that if Badel-Bosanka and Vitaminka cannot find a way of mutual coordination, this will weaken both plants in a field that is one of the most profitable in the foodprocessing industry and also shows one of the highest growth rates in Yugoslavia.

#### d. Vegetable Seeds Processing

A region with increasing vegetable production as the one recommended in this report, should consider growing and processing its own vegetable seeds. Standards and regulations for seed productions are set on Federal and Republic level. Areas suitable for vegetable production are regularly also suitable for their seed production.

Usually seeds are grown in season when at ripening time the relative humidity is low. Certain isolation, especially from the same botanic family, is an advantage. The criteria for each type are different in several aspects and can only be defined according to needs, standards and prices.

Seeds are grown only on contract with the seed processing plant. Apart from standards and regulations defined by Government there is a constant inspection of the fields by the processing plant and Government officials. Both inspectors have the right, during all stages of seed growing and processing, to reject the seeds. If the rejection is during the early stages the crop still serves for the conventional market.

It is common that the seed processing plant pays the producer according to the results of the processing in accordance with the percentage of grade A seeds. Vegetable seeds are traded in accordance to demand and supply, regularly only with the limit of being within the requirement of standards and regulations. Therefore the percentage of grade A seeds is the make or break for both producer and processor. It is sometimes customary that the processing plants have their own fields or at least supply the harvest machinery and/or transportation of the seeds to the processing plant.

In the case of this project it is recommended that on the Kombinat or on the INCEL land, vegetable seed production should be commenced and a vegetable seed processing plant be erected.

The question of which vegetables should be incorporated in the vegetable seed project has to be studied in detail, considering the requirements and the potential. If standards and percentages of grade A seeds are high, an export market to other areas in Yugoslavia and countries all over the world can be envisaged. The unit price of vegetable seeds is very high; therefore transportation costs are marginal.

In order to obtain high quality seeds, specific machinery is required for most of the types. This again requires a detailed economic analysis in order to study the most feasible alternative. It is assumed that the Kombinat has the ability to run a vegetable seed operation for its own benefit and the benefit of the region and its foodprocessing industry.



Before making the material balance the types, varieties, hectareage, standards and general feasibility have to be defined and worked out. Experience in seed production is available in other areas of Yugoslavia and technical assistance should be possible to obtain from these enterprises, from agricultural institutes as well as from abroad.

This project is recommended for further follow-up because of:

- The high ecological suitability of parts of the region for seed production, as has also been pointed out before by FAO experts.
- The possibility of a high added value to the seeds by putting them through an industrialized processing plant.
- The growing international market for highquality seeds, including a market in developing countries with whom Yugoslavia has trade.
- The high agrotechnical knowhow content in producing best grade A seeds - a technique which is being constantly developed further and thus, with a number of agronomists of BK being able to specialize and to create a seedfarming sector, a project with permanency could be gradually evolved

The seed processing plant must have access to agrotechnical knowhow, to local, domestic and international exchange of information and marketing, and at the same time must be in constant contact with the farmers who grow the seeds.

The factors need to be considered when making a decision whether a new body should be encouraged to undertake this project - perhaps under the technical patronage of the Kombinat - or whether this should be a working unit of an existing body.

The equipment, and out of it the constructed and total area of the seed processing plant, depends on specific operations which can either be done mechanically or manually or not at all.

The range of this equipment and its specification is a very wide range. Some of it even depends on types of weeds which are common in the region - or on diseases, as Antragnosa in peas which effects the color of the grain and therefor can be rejected by an electronic eye.

The minimum equipment which should be considered is as follows:

<u>Equipment Type</u>	<u>Cost \$</u>	<u>Capacity (Kg/h)</u>
Clipper	9,000	300 - 900
Trier	2,500 - 4,000	100 - 300
Gravity Separator	3,500	200 - 600
Elevator	3,000	
Drier	2,000	

Each machine requires some tenths of sq m. for operation area. The total area of the plant depends mainly on the specific equipment, or manual work areas.

For a plant processing 400 - 500 tons of vegetables seeds/year indicative figures would be:

2000 sq.m. 25% of which constructed.

\$ 150,000 of investment in site development, construction and equipment.

10 operators.

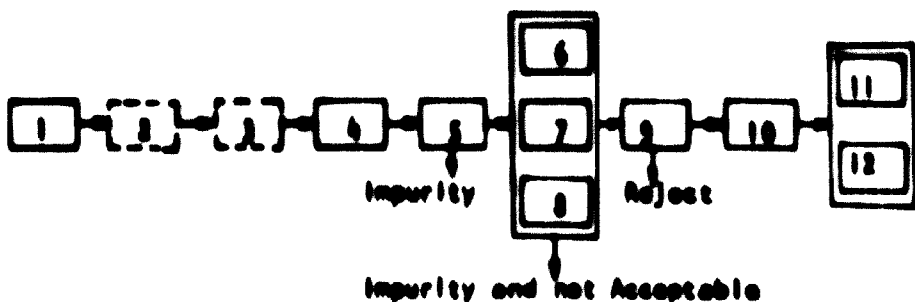
Following is a diagrammatical flowsheet and process description for a seed processing plant.

The code N stands for necessity to apply irrigation in order to obtain a commercial crop, while the code W stands for economical feasibility in order to obtain an even higher yield with lower unit price in order to market the produce to industry at a competitive price.

- Column 8. Labor intensity is measured not only by the amount of man-days per area unit but also the degree of skill required. Thus L (low) stands for low amount of labor and skill, M (medium) stands for labor low and high skill or labor high and low skill, while H (high) stands for labor and skill high.
- Column 9. Capital intensity is measured by amount of capital requirement as well as by the duration. Thus L (low) stands for standard machinery and equipment, M (medium) stands for specific, medium term amortizable machinery and equipment and/or high costs of inputs, while H (high) stands for perennial crops and/or specific, short term amortizable machinery and equipment.
- Column 10. The average yield is the general trend of yield in the BK region as examined by us from various local crosschecked data. No exact statistics exist, as most of the produce comes from the private sectors which do not keep in general acceptable records and registration. The percentage of increase (column 6) is related to the figures in this column.
- Column 11. The average price, like the average yield, cannot be calculated exactly as there are variations depending on seasons and location of the farm. The prices are at producers' level. (See also column 12).
- Column 12. M.G.P. stands for minimum Government fixed prices. Many times, and especially in the out-of-harvest season the farmer receives a higher price. For instance in September 1972 the M.G.P. for maize was MD 1.10, while the market price (for the producer) was MD 1.30 - 1.40.
- Column 13. This column is related to the present (1972) market situation.
- Column 14. The requirement in this column equals the requirement of related industry according to the minimum and maximum capacity recommended in the following chapters. (Additional to existing development/expansion plans prior to this study).
- Column 15. The hostrage is calculated considering the increase of yields in column 10 by the percentage which appears in column 6.
- Row a) P o t a t o e s are today grown mainly in the private sector. However, since this crop can be mechanized nearly fully, it is recommended to grow it in the social sector too. In profitability, potatoes compete favorably with grain crops. Suitable inputs could boost yields considerably in the private sector.
- Row b) G r e e n p e a s are recommended mainly for the social sector which is already growing it. The mechanization and management required in order to receive profitable crops are in the hands of the Kombinat and they should increase its hostrage of peas.
- Row c) G r e e n b e a n s are recommended to be grown similar to green peas. The recommendation is for the varieties of beans which can be mechanized i.e. not the string beans.
- Row d) C u c u m b e r s are a comparatively quick crop, but compared to green peas and beans they demand much more care, observation and exact harvest time. The labor requirement is quite high and has to be at hand during harvest time on a daily basis. The growth of the fruit is very rapid, so that if the cucumbers are destined for "pickles", they have to be picked daily in order to receive the correct uniform size and thickness. Therefore the private sector is recommended for this crop.

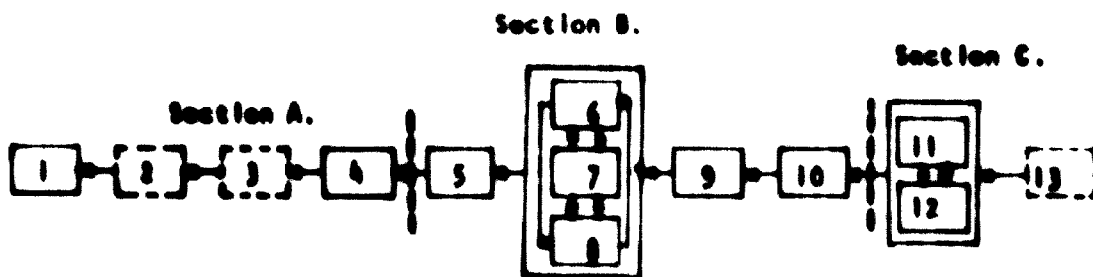
**SEED PROCESSING PLANT**

**1) DIAGRAMMATIC FLOWSHEET**



- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1. Periodical Supervision and Approval of Acceptance for Seeds</li> <li>2. Harvesting Machines Owned/Operated by Seed Processing Plant</li> <li>3. Trucking to Seed Processing Plant Organized by Plant</li> <li>4. Laboratory Tests for Purity and Germination + Mini Processing</li> <li>5. Clipper</li> <li>6. Trier</li> </ol> | <ol style="list-style-type: none"> <li>7. Gravity Separator</li> <li>8. Specific Machinery</li> <li>9. Laboratory Final Tests for Purity, Germination, Germination in Sand, Weight, Size</li> <li>10. Mixer with Disinfectants</li> <li>11. Hand Packing Semi-Automated Packing Machine<br/>Automatic Packing Machine<br/>Weights &amp; Weighing Machines<br/>Labelling &amp; Labelling Machines</li> <li>12. Temperature &amp; Humidity Conditioning (natural or artificial)</li> </ol> |
|---|--|

**2) PROCESS DESCRIPTION**



- Section A. BEFORE PROCESSING STAGE**
1. Supervision of Vegetative Cycle
  2. Harvesting
  3. Transportation
  4. Testing

- Section B. PROCESSING STAGE**
5. Cleaning/Milling
  6. Sorting (Length)
  7. Gravity Separation
  8. Special Treatments
  9. Final Testing
  10. Disinfection

- Section C. CONDITIONING FOR MARKETING**
11. Packaging
  12. Drying
  13. Marketing

   - Optional Operations by the Seed Processing Plant

## 4.B. MEAT PROCESSING INDUSTRY

### 1. INTRODUCTION

The existing abattoirs in the project area are described in the following pages of this chapter and data on meat production and consumption in BK, and Yugoslavia, are given in the tables in the appendix.

Projections for meat consumption for various countries, including Yugoslavia, have been made by various sources, mainly FAO and OECD, and summarized tables are enclosed here.

FAO/IBRD issued in 1972 a report updated to December 1971 titled "Yugoslavia Livestock Sector Review". This two-volume report contains detailed information on livestock in Yugoslavia and could serve as reference on many matters. The team had the possibility of studying this report after the completion of its fieldwork and found that its conclusions on BK contained partly the same findings as appeared in the FAO/IBRD report, and partly the situation in BK today seems more critical since livestock is much less developed than the Yugoslav average. On the other hand the team sees in a large livestock development program, vertically integrated, the major solution to overall income improvement in the region and therefore examined and proposed such a scheme which would involve the setting up of a series of modern plants. This would not be in contradiction to the need, expressed in the FAO/IBRD report, to modernize meatprocessing plants elsewhere in the Federation. The actual meat demands, domestically and for exports, will increase in quantity but also in quality by such amounts that both types of schemes could show merit as self-liquidating investments from the international financing aspect.

\* \* \*

### 2. THE YUGOSLAV MARKET PATTERN

Overpage a consolidated table is given from the FAO/IBRD report which summarized the various Yugoslav FAO and OECD statistics and projections for Yugoslavia's meat production, trade and consumption. It is seen that the forecasts assume a growth of about 50% in Yugoslav percaput consumption of beef/veal and poultry, between 1970 and 1980. Considering the present dynamics of economic development in Yugoslavia, and that the starting point in 1970 represents one of the lowest percaput meat consumptions in Europe, (8.3 kgs/yr beef/veal compared to 24 kg/yr in the upper-range European countries and 17 kg/yr in the middle-range countries - similar ratios regarding consumption of all types of meat), the forecasts may have been on the low side and similar work done in 1972 may have arrived at different figures. However, for the purposes of this project these figures and projections should certainly serve as the best presently available.

Other data of interest, apart from statistics appearing in the tables in the appendix, are the following:

Total percaput meat consumption rose to 31.4 kg in 1970.

On-farm consumption of meat is still about 60% of the total meat consumption and does not change much in absolute quantities - the increase of total meat consumption in the country comes more from quick increase of the urban consumer's consumption.

Sausage and Canned Meat Consumption increased between 1965 and 1970 from 40,000 tons to 72,000 tons and from 22,000 tons to 30,000 tons respectively.

## COMPARISON OF MEAT PRODUCTION AND DEMAND PROJECTIONS

('000 Tons)

I t e m s	1970		1975		1980	1985	
	Actual	FAO 1/ (inter- polated)	OECD 2/	IFT 3/ Yugo- slavia	FAO	OECD	
Beef and Veal	Production a/	245	306-326	284	400-420	388	385
	Net trade b/	- 73	-(82-92)	- 52	-(150-170)	-101	- 83
	Consumption Total	172	210-230	232	250-260	287	302
	Consumption per capita, kg.	8.3	9.7-10.6	10.7	12-13	12.5	
Mutton and Lamb	Production	48	58-68	72		78	78
	Net trade	- 5	-(3-4)	+ 6		+ 2	+ 24
	Consumption Total	43	56-66	78		80	102
	Consumption per capita, kg.	2.1	2.6-3.0	3.6		3.5	
Pig Meat	Production	339	370-390	389	500	420	446
	Net trade	- 48	-(25-35)	- 35	-(100-110)	- 10	- 21
	Consumption Total	291	340-360	354	390-400	410	425
	Consumption per capita, kg.	14.1	15.7-16.6	16.3	18-19	17.9	
Poultry	Production	142	167-187	139		213	188
	Net trade	- 1	-(2-4)	- 7		- 5	- 9
	Consumption Total	141	165-185	132		208	179
	Consumption per capita, kg.	6.8	7.6-8.5	6.1		9.1	
Total Meat	Production	774	926-946	884		1099	1097
	Net trade	-127	-(115-125)	- 88		-114	- 89
	Consumption Total	647	(806-826)	796		985	1008
	Consumption per capita, kg.	31.4	37.2-38.1	36.7		43.1	

a/ The production figures are from provisional data prepared by the Federal Institute for Statistics for inclusion in Stocarstvo I Ribarstvo 1970. The net trade figures are derived from Statistics of Foreign Trade of the SFR Yugoslavia - Year 1970. The tonnages for canned and dried meats and livestock exported have been adjusted to equivalent carcass weight.

b/ Net trade figures are shown (+) for excess of projected demand over projected production and (-) for exports in 1970 and excess of projected production over projected demand.

## SOURCES:

- 1/ FAO. Commodities Division, Projections Prepared for Committee on Commodity Problems Study Group on Meat, June 1971.
- 2/ OECD, 1968. Agricultural Projections for 1975 and 1985.
- 3/ Yugoslavia Institute for Foreign Trade, Belgrade, July 1971.

MEAT CONSUMPTION IN TOTAL /IN 000 T/ AND PER CAPITA /IN KG/ IN THE 1959-1969 PERIOD

	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
Beef	116	120	119	138	119	120	121	135	148	170	174
Pork	206	232	225	209	204	241	279	247	279	281	275
Mutton	56	57	43	51	40	37	38	46	44	52	47
Poultry meat	61	65	63	61	54	71	80	87	93	106	119
Edible offal	35	63	64	40	42	46	53	48	57	66	-
at	3.5	2.5	3.0	2.0	2.0	2.5	2.9	2.8	3.3	2.6	-
Fish	23	26	24	21	24	25	28	23	34	38	-
Horse meat	1	1	2	3	3	3	2.7	1	1	1	-
<u>Per Capita</u>											
Beef	6.4	6.7	6.4	7.2	6.2	6.2	6.2	6.8	7.4	8.8	8.5
Pork	11.3	13.9	12.0	11.1	10.7	12.5	14.3	12.5	13.9	13.9	13.5
Mutton	3.1	1.5	2.3	2.2	2.1	1.5	1.9	1.3	2.2	2.6	2.3
Poultry meat	3.3	2.5	3.4	3.2	3.4	3.7	4.2	4.4	4.7	5.3	5.8
Edible offal	1.9	3.4	3.4	2.1	2.2	2.4	2.7	2.4	2.8	3.2	-
Deer meat	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-
Fish	1.3	1.4	1.2	2.1	1.3	1.3	1.5	1.7	1.7	1.8	-
Horse meat	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	-

### 3. THE WORLD MARKET PATTERN

Meat Balances Projections for most countries have been worked out by FAO and OECD and tables are given in this section.

Preliminary country data for 1972 show that many of the projections were on the low side, probably since at the time of forecast the economic upswing in West Europe could not have been foreseen in its full effects. However, it could be that the rate of increase will level off since a saturation point must occur; this seems to have been taken into account in the forecasts.

The projections do not include the possibility that the Soviet Union might become a net importer of meat, particularly from countries with which it has a large trading exchange.

\* \* \* \*

The export targets assumed for the BK meat complex - which could be realized in full from a rawmaterial supply aspect by 1978/79 - are shown in the table on the BK meat complex financial structure at the end of this chapter of the report. Although they may appear large when seen in terms of today's Yugoslav exports they have to be seen in the structure of the total trading situation of Yugoslavia, end of Western Europe, a few years hence.

\* \* \* \*

### 4. COMMENTS ON THE EXISTING MEAT INDUSTRY IN BK

#### A. Introduction

The present meatprocessing industry consists of a number of municipal slaughterhouses which are small, badly equipped and cannot be considered an industry or the basis for expansion. This comment applies also to the new Banje Luka municipal abattoir. Recently the Stojanovic Kombinat has planned a new regional slaughterhouse and coldstorage facilities (where also a quickfreezing line for meat/vegetable dishes and for vegetable/fruit is included) in Bosanske-Grediske. This slaughterhouse is being completed now, and can be viewed as the first basis for a modern meatprocessing industry in the project area.

#### B. Background

The reasons for the underdevelopment of meatprocessing in BK hitherto are well known to the enterprises and authorities in BK and B & H. Animal husbandry has, till lately been concentrated on the low-yield "Busha" cattle, with Simmenthal cattle having been introduced very recently only. The private farmers who hold 94% of the region's 240,000 head of cattle, lack financing, technical guidance and marketing security. This results in a regressive economy in the meatproduction sector of the agricultural areas, with such occurrences as slaughtering of young calves, (in 1971 30,000 young calves were slaughtered by the farmers), non-

**EXPORTS OF LIVESTOCK AND LIVESTOCK PRODUCTS**

(Selected items and years)

4 125

I t e m	1969			1970		
	No. of Head	Volume Tons	Value 1,000 Din.	No. of Head	Volume Tons	Value 1,000 Din.
<b>1. Live Animals</b>						
Cows	1,102	599	3,840	73	39	270
Bulls	2,749	914	5,118	579	210	1,410
Oxen	2,864	1,877	12,002	662	473	3,591
Buffaloes	243	37	183			
Heifers	4,700	1,732	11,985	2,376	841	6,687
Yearlings	37,613	12,858	89,720	68,215	21,109	188,077
Calves	65,598	16,251	143,944	5,342	1,584	14,540
Bovine cattle for breeding	391	75	686	23	7	120
Ewes and rams for slaughtering	13,631	681	3,314	51	3	111
Lambs	222,030	6,265	32,603	131,435	3,700	24,355
Ewes for breeding	1,231	45	226	-	-	-
Pigs	15,731	1,563	18,304	17,259	1,689	16,661
Horses for slaughtering	66,280	26,934	144,618	52,692	20,894	130,226
Draught, riding & breeding horses	75,175	23,256	131,105	46,083	13,779	95,512
Asses and mules	5,760	429	1,094	4,771	381	1,038
Miscellaneous small animals	-	301	8,522	-	494	8,836
<b>Sub-total</b>			<b>611,763</b>			<b>491,434</b>
<b>2. Meat</b>						
Beef		71,572	809,225		47,534	725,995
Veal		974	14,610		345	6,568
Calf meat in carcasses		889	12,183		29	488
Mutton		260	1,789		-	-
Lambs meat		4,068	53,445		3,000	49,561
Pork meat in various forms		7,657	97,570		20,246	243,746
Killed turkeys, geese, ducks and guinea fowl		991	10,410		976	11,774
Horse meat		29	245		30	301
Offals and livers from poultry and other animals		941	9,676		690	6,701
Meat of other small animals		685	9,857		695	10,728
<b>Sub-total</b>			<b>1,019,010</b>			<b>1,055,862</b>
<b>3. Dried, Salted and Smoked Meats, and Sausages</b>						
Salted pig meat, dried or salted pig fat, smoked pork, smoked meat and salted or smoked edible offals		75	1,562		74	1,976
Sausages		247	5,574		273	7,412
<b>4. Products Presented in Airtight Containers</b>						
Sausages		20	270		23	342
Beef		6,923	70,858		6,041	67,780
Pork		12,624	197,077		13,972	251,268
Poultry		35	518		30	484
Ham		4,154	77,843		5,212	107,912
Meat preparations		110	1,043		106	1,077
<b>Sub-total</b>			<b>354,745</b>			<b>438,251</b>



**EXPORTS OF LIVESTOCK AND LIVESTOCK PRODUCTS (contd.)**  
 (Selected items and years)

	1969		1970			
	No. of Head	Volume Tons	Value 1,000 Din.	No. of Head	Volume Tons	Value 1,000 Din.
<b>5. Milk and Milk Products</b>						
Powdered milk		87	267		18	56
Fresh milk		12,201	11,681		10,485	11,538
Cream and butter		1	14		1	10
Cheeses of various types		482	5,897		497	6,582
Sub-total			<u>17,859</u>			<u>18,186</u>
<b>6. Eggs</b>						
Fresh eggs		102	1,076		133	675
Powdered and frozen eggs		38	288		1,196	6,684
Sub-total			<u>1,364</u>			<u>7,359</u>
<b>7. Skins, Hides and Wool</b>						
Raw and dried cattle, horse and calf skins		1,718	22,780		840	8,508
Raw and dried sheep, goat and lamb skins with and without wool		428	9,760		207	5,750
Leather wastes and skins of other animals		4,118	9,481		2,486	2,750
Sub-total			<u>42,021</u>			<u>16,955</u>
Total			<u>2,046,762</u> *****			<u>2,028,047</u> *****

Source: SFRJ Stat. YRBK 71.

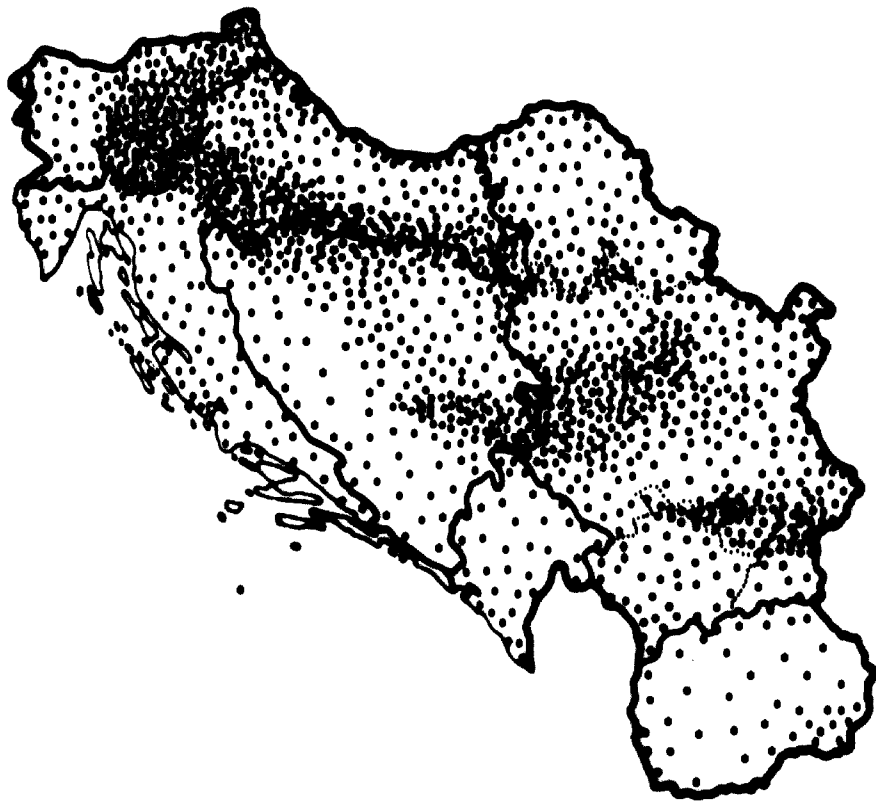
## IMPORTS OF LIVESTOCK AND LIVESTOCK PRODUCTS

(Selected items and years)

I t e m	1969			1970		
	No. of Head	Volume Tons	Value 1,000 Din.	No. of Head	Volume Tons	Value 1,000 Din.
<b>1. Live Animals</b>						
Heifers				38	12	91
Calves				50	16	122
Bovine cattle f. breeding	1,144	565	7,441	1,892	1,051	14,053
Ewes and rams	506	15	620	2,236	103	2,266
Pigs f. breeding and other purposes	7,542	193	2,311	1,751	134	3,965
Draught, riding and breeding horses	13	7	440	11	5	265
Poultry f. breeding and young poultry	-	586	23,086	-	1,849	52,894
Misc. small animals	-	62	1,889	-	236	3,072
Sub-total			<u>35,787</u>			<u>76,728</u>
<b>2. Meat</b>						
Beef					7,607	75,039
Pork meat in various forms		1,621	13,607			
Mutton					99	561
Killed turkeys, ducks and game		49	540		581	4,734
Sub-total			<u>14,147</u>			<u>80,334</u>
<b>3. Dried, Salted &amp; Smoked Meat, Sausages &amp; Edible Offals</b>						
Dried, salted and smoked meat		95	1,002		109	1,329
Sausages & meat extracts		101	3,563		330	9,695
Edible offals		151	1,107		4,934	43,487
Sub-total			<u>5,672</u>			<u>54,511</u>
<b>4. Products presented in air-tight Containers</b>						
Beef		13	114		20	223
Meat preparations		6	209		41	327
Liver pastes		-	-		1	5
Sub-total			<u>323</u>			<u>555</u>
<b>5. Milk and Milk Products</b>						
Fresh milk		2,863	2,121		12,591	11,484
Butter		4,034	20,733		6,770	31,252
Diff. types of powd. milk		422	721		2,529	9,370
Diff. types of cheese		45	406		60	547
Sub-total			<u>23,981</u>			<u>52,653</u>
<b>6. Eggs in different forms</b>						
Eggs in diff. forms		213	2,294		5,227	29,927
Sub-total			<u>2,294</u>			<u>29,927</u>
<b>7. Skins, Hides, Wool and Leather Wastes</b>						
Raw cattle hides		19,153	130,651		34,130	228,414
Dried cattle hides		107	729		100	853
Raw & dried skins of horses, asses, mules, calves, goats, swine and other animals		5,690	40,602		5,097	54,062
Sheep & lamb skins in different forms		9,293	99,157		16,532	179,077
Leather wastes, dust and used leather		704	475		922	756
Sub-total			<u>271,614</u>			<u>463,162</u>
Total			<u>353,818</u>			<u>757,852</u>

Source: Statistics of Foreign Trade of the SFR, Yug. Fed. Inst. of Statistics

# YUGOSLAVIA — CATTLE POPULATION



1 DOT = 10000 HEAD

BEEF AND VEAL: PRODUCTION, CONSUMPTION AND NET TRADE  
 IN 1969 AND FORECASTS FOR 1973 AND 1975  
 ('000 m.t. dressed carcass weight)

	Indigenous Production			Net Trade		
	1969	1973	1975	1969	1973	1975
Belgium	228	254	269	- 22	- 24	- 26
Luxemburg	12	13	14	0	0	+ 1
France	1,600	1,730	1,730	+ 105	+ 100	+ 30
Germany	1,186	1,286	1,316	- 205	- 245	- 292
Italy	779	825	835	- 450	- 495	- 525
Netherlands	293	324	338	+ 19	+ 13	+ 10
EEC	4,098	4,432	4,502	- 553	- 651	- 802
Denmark	234	193	193	+ 137	+ 95	+ 92
Finland	111	110	110	+ 14	+ 10	+ 5
Iceland	1	1	2	0	0	0
Norway	58	56	57	+ 1	0	0
Sweden	166	150	143	+ 15	- 3	- 12
Nordic countries	570	510	505	+ 167	+ 102	+ 85
Ireland (1)	321	383	406	+ 265	+ 323	+ 347
United Kingdom	762	898	924	- 444	- 329	- 313
Austria (2)	178	172	184	13	+ 5	+ 16
Switzerland	124	142	148	- 41	- 35	- 35
Total Western Europe (3)	6,053	6,537	6,669	- 593	- 585	- 702
Greece	86	100	( 110)	- 56	- 51	(- 50)
Portugal	85	79	83	- 7	- 7	- 6
Spain	255	385	440	- 113	- 15	0
Turkey	182	250	296	+ 11	+ 32	+ 51
Yugoslavia	275	290	325	+ 100	+ 127	+ 150
Southern Europe	883	1,104	1,254	- 65	+ 86	+ 145
Total OECD European countr.	6,936	7,641	7,923	- 658	- 499	- 557
Canada	901	1,076	1,166	+ 16	+ 54	+ 79
United States (1)(4)	9,902	10,982	11,458	-1,010	-1,050	-1,075
North America	10,803	12,058	12,624	- 994	- 996	- 996
Japan	160(a)	233	268	- 14	- 23	- 30
New Zealand(5)	377	447	493	+ 243	+ 310	+ 356
Total OECD (6)	18,276	20,379	21,308	-1,423	-1,208	-1,227

1. Including slaughterings of live imports.
2. Carcass weight.
3. 15 countries listed above.

4. Slaughterings of live imports amounted to about 145,000 tons in 1969.
5. 1968/69, 1972/73, 1974/75.

6. Incl. Yugoslavia and New Zealand, but excl. Australia, whose exports averaged 281,000 tons during 1967/68-69/70.

a) 1968

Source: OECD

It has to be considered that in the last years varieties have been developed which ripen at one time and therefore can be mechanically picked by a special combine. Introduction of these new varieties will take time, as they have to be tested first under the BK region's conditions. These new varieties, if applied, should be introduced in the social sector - which can afford the machinery and thereby benefit from its advantages.

- Row e) Tomatoes should be looked upon similarly to cucumbers (row d.). As the vegetable cycle is longer than cucumbers, even more labor is required. Phytopathology is an important factor, and requires much labor and expenses for chemicals. If the tomatoes are grown on stakes, in order to obtain higher yields, even higher costs have to be considered. Apart from the amount of labor needed, their skill is a dominant factor. Private sector farmers, with above average skill are recommended to grow this crop. Tomatoes as well have proven varieties which ripen at one time and can therefore be harvested by a tomato combine. As far as known one combine of this type was already imported into Yugoslavia, although until now there was no success in putting it into operation. These varieties are of course grown without stakes and produce at lower yields. This reduction of income is offset by much lower harvest cost. If these varieties are introduced they suit fully the social sector.
- Row f) Carrots can be cultivated and harvested on a nearly fully mechanized basis. This crop is ideally suited for the social sector.
- Row g) Cabbage grown from seedlings is a comparatively simple crop. There is no special demand for skill, nor is the amount of labor required high. Cabbage can today be mechanized to a high extent. Hence the suitability for the social sector as well.
- Row h) Apples of high grade, and in larger orchards, are grown today by the social sector. Like similar fruits this is a capital-intensive crop. In order to supply the fresh market as well as industry with a defined and uniform fruit, development of further areas should be within the social sector. Only uniform fruit - i.e. variety (not grade) can be absorbed in great amounts by industry. The private sector which is growing and will continue to grow apples, can be considered only as a marginal supplier of apples for industry.
- Row i) Maize is well established in the social sector by virtue of the crop's suitability to large areas and full mechanization. The main new input which may be profitably added is water. Irrigation could probably boost yields substantially compared with actual results. Maize is as well a dominant crop of the private sector and will continue to be so. Changes in crops will be on account of maize (in the private sector), but still the hectareage and tonnage will stay high. It has to be considered that the supply of maize from the private sector is unstable because a part of the produce is used on the farm. Oscillations in yield influence the market considerably because the private farmer has a fixed usage amount and only surpluses are marketed. Therefore each additional ton goes to the market and increases the percentage of marketable maize much more than the percentage increase in yield.
- Row j) Cauliflower is grown from seedlings like cabbage. It is a more delicate crop than cabbage, yields less and is less mechanizable. This crop is recommended for the private sector.

P I G M E A T (Thous. Met. Tons)

	1961-1963					1975					1985				
	Production	Stocks	Exports	Imports	Trade (Net) Imp. + Exp. -	Availability	Production	Balance	Utilization	Production	Balance	Utilization	Production	Balance	Utilization
Canada	446	+1	23	25	+2	447	568	-	568	-	668	689	-	668	
USA	5,399	+16	170	95	-75	5,308	6,066	-	6,066	-	6,878	6,878	-	6,878	
South America	5,845	+17	193	120	-73	5,755	6,634	-	6,634	-	7,567	7,567	-	7,567	
Belgium-Lux	208	-	21	14	-7	201	328	-30	298	-37	366	404	-37	366	
France	1,245	-	22	71	+49	1,294	1,751	+74	1,825	+89	2,104	2,104	+89	2,104	
Germany	2,043	-	9	86	+77	2,120	2,645	+115	2,760	+133	3,057	3,057	+133	3,057	
Italy	313	-	8	40	+32	345	510	-	510	-	660	660	-	660	
Netherlands	420	-	139	5	-134	286	621	-207	414	-250	499	749	-250	499	
EEC	4,229	-	199	216	+17	4,246	5,855	-48	5,807	-65	6,974	6,974	-65	6,974	
Austria	240	+1	1	14	+13	252	300	-	300	-	326	326	-	326	
Denmark	662	+2	498	-	-498	166	849	-673	176	-738	919	919	-738	919	
Finland	67	-	1	1	-	67	82	-	82	-	94	94	-	94	
Ireland	111	-	46	-	-46	65	148	-61	87	-80	193	193	-80	193	
Norway	55	-	-	2	+2	57	70	+3	73	+3	84	84	+3	84	
Sweden	214	-1	30	5	-25	190	238	-21	217	-24	260	260	-24	260	
Switzerland	134	-	-	15	+15	149	189	+10	199	+12	227	227	+12	227	
United Kingdom	791	-	7	513	+506	1,297	1,051	+548	1,599	+552	1,269	1,269	+552	1,269	
W. Europe	2,274	-2	583	550	-33	2,243	2,927	-194	2,733	-275	3,372	3,372	-275	3,372	
Greece	35	-	-	2	+2	37	55	-	55	-	67	67	-	67	
Portugal	50	-	-	-	-	50	72	-	72	-	85	85	-	85	
Spain	132	-	-	9	+9	141	237	-	237	-	300	300	-	300	
Turkey	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Yugoslavia	251	-4	48	11	-37	218	389	-35	354	-21	446	446	-21	446	
S. Europe	468	-4	48	22	-26	446	753	-35	718	-21	898	898	-21	898	
Europe	6,971	-6	830	788	-42	6,935	9,535	-277	9,258	-361	11,244	11,244	-361	11,244	
Japan	279	-	-	3	+3	282	908	-	908	-	1,528	1,528	-	1,528	
OECD	13,095	+11	1,023	911	-112	12,972	17,077	-277	16,800	-361	20,339	20,339	-361	20,339	
Australia	117	-	-	2	+2	119	214	-	214	-	312	312	-	312	
New Zealand	41	+1	3	-	-3	37	49	-	49	-	63	63	-	63	
Total	13,253	+12	1,026	913	-113	13,128	17,340	-277	17,063	-361	20,714	20,714	-361	20,714	

Source: OECD Agricultural Projections

POULTRY MEAT (Thous. Met. Tons)

	1961-1963				1975				1985			
	Production	Stocks	Exports	Imports	Trade (Net) Imp. + Exp. -	Availabi- lities	Production	Balance	Utili- zation	Production	Balance	Utili- zation
Canada	263	+1	1	5	+ 4	266	440	-	440	606	-	606
USA	3,311	+9	181	-	-181	3,121	4,573	-180	4,393	5,697	-180	5,517
N. America	3,574	+10	182	5	-177	3,387	5,013	-180	4,833	6,303	-180	6,123
Belgium-Lux	87	-	7	-	- 7	80	130	- 22	108	160	- 27	133
France	471	-	18	1	- 17	454	733	- 35	698	912	- 43	869
Germany	120	-	1	197	+196	316	285	+240	525	427	+275	702
Italy	252	-	1	7	+ 6	258	565	-	565	760	-	760
Netherlands	97	-1	67	1	- 66	32	194	-100	94	269	-130	139
EEC	1,027	-1	94	206	+112	1,140	1,907	+ 83	1,990	2,528	+ 75	2,603
Austria	21	-	-	9	+ 9	30	63	+ 7	70	83	+ 9	92
Denmark	81	-	62	-	- 62	19	85	- 53	32	94	- 53	41
Finland	2	-	-	-	-	2	16	-	16	25	-	25
Ireland	18	-	2	-	- 2	16	46	- 15	31	60	- 20	40
Norway	3	-	-	-	-	3	6	-	6	9	-	9
Sweden	15	-	-	-	-	15	38	-	38	58	-	58
Switzerland	7	-	-	20	+ 20	27	21	+ 26	47	32	+ 32	64
United Kingdom	356	-1	2	15	+13	370	615	-	615	775	-	775
N.W. Europe	503	-1	66	44	- 22	482	890	- 35	855	1,136	- 32	1,104
Greece	22	-	-	3	+ 3	25	66	-	66	92	-	92
Portugal	11	-	-	-	-	11	22	-	22	30	-	30
Spain	119	-	-	-	-	119	289	-	289	396	-	396
Turkey	48	-	-	-	-	48	160	-	160	404	-	404
Yugoslavia	66	-	4	-	- 4	62	139	- 7	132	188	- 9	179
S. Europe	266	-	4	3	- 1	265	676	- 7	669	1,110	- 9	1,101
Europe	1,796	- 2	164	253	+ 89	1,887	3,473	+ 41	3,514	4,774	+ 34	4,808
Japan	120	-	-	2	+ 2	122	533	-	533	851	-	851
OECD	5,490	+ 8	346	260	- 86	5,396	9,019	-139	8,880	11,928	-146	11,782
Australia	48	-	-	-	-	48	127	-	127	201	-	201
New Zealand	6	-	1	-	- 1	5	16	-	16	27	-	27
Total	5,544	+ 8	347	260	- 87	5,449	9,162	-139	9,023	12,156	-146	12,010

Source: OECD Agricultural Projections

**PRICES FOR CATTLE OR BEEF IN SELECTED EUROPEAN COUNTRIES**  
(unweighted arithmetic averages)

Country	Unit	Year	Quarter			
			I	II	III	IV
Belgium	B.Fr./100 kg. live weight	1969	3,658	4,115	3,674	3,457
		1970	3,689	4,075	3,934	3,287
		1971	3,474	3,889	3,798	3,542
Federal Republic of Germany	1. DM/100 kg. live weight	1969	258.5	260.0	257.0	246.4
		1970	238.9	246.5	247.5	231.6
		1971	235.3	248.5	247.9	247.2
	2.	1969	416.8	404.6	409.0	413.5
		1970	407.8	399.9	377.7	399.4
		1971	421.2	407.1	377.0	429.6
France	F.Fr./100 kg live weight	1969	351.3	370.7	361.9	359.3
		1970	422.0	427.0	421.0	420.7
		1971	462.0	468.7	276.0	480.0
Italy	Lit./100 kg. live weight	1969	45,822	46,279	46,927	47,424
		1970	48,734	49,029	49,187	49,770
		1971	49,301	50,232	50,807	50,789
Netherlands	Fl./100 kg. live weight	1969	303.7	314.8	293.1	282.1
		1970	257.5	265.1	256.1	245.9
		1971	262.1	283.1	279.1	...
Austria	Sch./kg. live weight	1969	13.14	13.84	14.59	15.10
		1970	15.06	14.96	15.15	15.30
		1971	15.08	15.24	15.35	15.06
Denmark	1. Ore/kg. live weight	1969	322	344	373	367
		1970	366	373	399	385
		1971	390	395	412	...
	2.	1969	384	392	393	371
		1970	382	427	442	409
		1971	429	446	430	...
Finland	F.Mk./kg. slaughter weight	1969	4.96	4.88	4.96	4.83
		1970	5.03	5.58	6.07	5.85
		1971	5.97	5.86	6.02	6.13
Ireland	£ per live cwt.	1969	9.56	10.43	9.50	8.90
		1970	10.23	11.02	10.10	9.71
		1971	11.51	12.43	11.22	10.82
Norway	Nkr./kg. slaughter weight	1969	9.66	9.25	9.36	9.73
		1970	9.45	9.16	9.99	10.07
		1971	9.78	9.54	10.26	...
Sweden	Ore/kg. slaughter weight	1969	695	695	655	654
		1970	675	708	717	654
		1971	728	750	746	...
Switzerland	Index (1948=100)	1969	136.6	137.7	139.2	142.2
		1970	139.3	137.7	142.6	144.9
		1971	144.6	148.3	155.1	160.6
United Kingdom	1. £ per live cwt.	1969	10.66	11.33	10.64	10.82
		1970	11.03	11.56	11.03	11.42
		1971	12.50	13.08	12.14	11.91
	2.	1969	10.06	10.28	9.91	9.08
		1970	9.70	10.37	10.66	9.56
		1971	11.51	12.95	12.07	11.69



PRICES FOR CATTLE OR BEEF IN SELECTED EUROPEAN COUNTRIES

(unweighted arithmetic averages)

(continued)

Country	Unit	Year	Q u a r t e r			
			I	II	III	IV
Greece	Drachma/kg. slaughter weight	1969	22.26	22.52	23.01	23.24
		1970	24.46	27.55	27.43	28.72
		1971	30.03	30.00	...	...
Portugal	Escudos/kg. live weight	1969	19.17	18.67	16.83	17.17
		1970	20.17	16.61	16.77	17.47
		1971	18.66	20.28	20.55	...
Spain	1. Pesetas/kg. live weight	1969	36.02	33.80	34.27	34.31
		1970	33.95	32.47	31.92	31.02
		1971	32.54	33.32	34.17	...
	2.	1969	56.56	58.18	61.14	62.16
		1970	57.36	54.20	54.59	53.82
		1971	52.90	55.70	57.59	...
Turkey	Kurus/kg. live weight	1969	...	449.2	387.8	399.8
		1970	423.1	473.3	474.1	510.7
		1971	...	...	...	...
Yugoslavia	Index (1969=100)	1970	119	133	135	140
		1971	150	159	167	...
Hungary	Forints/kg.	1969	19.60	19.60	19.53	20.13
		1970	23.60	24.43	25.13	26.00
		1971	23.83	24.87	25.50	25.87
Poland	1. Zloty/kg.	1969	11.34	12.91	12.66	10.70
		1970	11.58	12.83	12.65	10.67
		1971	11.38	14.06	13.93	...
	2.	1969	12.69	12.21	13.66	13.13
		1970	12.42	11.74	13.17	12.98
		1971	12.27	12.81	14.14	...

Source: UN Report No. ST/ECE/AGRI/43-1972

regulated meat supply and a "poverty cycle" along the whole chain. Despite over 50% of the cattle being of the pure Busha breed, only 5% of the marketed cattle are of this breed. The farmers continue to keep this cattle, without an effort to improve them, except in a few selected areas (Bosanska-Dubica and others) where organized efforts at contract-breeding have been started, with the attendant organization of financial and inputs help to the farmers, veterinary services, and an effort to improve the stock systematically.

It should be pointed out here that in other countries very good results have been obtained in crossing Busha and Simmenthal cattle. Thus the solution proposed by some persons in BK to start completely new herds only, of Simmenthal and equal races, with all the investment that would be involved, does not seem to be necessary in its entirety, since the Busha could be upgraded by determined region wide action, with the accompanying organizational and incentive measures.

A more specific discussion of these matters is included in another section of this chapter. Regarding pigbreeding, which is mainly in the private sector as well, the main reason for the underdevelopment of good meat supply to the processing industry, and therefore no growth yet of this industry, is similar to that for cattle. The farmers keep a local breed of black pig, giving small carcass weight and containing much fat and bones.

Poultrybreeding has just started and the situation is somewhat better than in cattle and pigs.

All this results in a vicious circle - as municipal slaughterhouses in the region buy outside the region, farmers have no market, do not improve their stocks, and thus the slaughterhouses buy outside the region.

Thus there is presently not even enough suitable meat for the local slaughterhouses which have been built for local radius supply only. Cattle and meat are brought from distant areas such as Vojvodina.

Also, there is presently no enterprise, local, regional or republic organization whose defined task it is to organize and develop the larger supply of livestock for slaughtering and further processing.

The Bosanske-Gradiske slaughterhouse buys 30% only of its cattle from the project area, the Prijedor slaughterhouse 10% only (1) and that from Bosanska-Dubica which is practically the only area where, as mentioned before, livestock improvement measures have been undertaken.

### C. Problems and Weaknesses of the BK Slaughterhouses

- In the whole project area only 3 abattoirs can be called industrial or semi-industrial. In addition, there are 10-20 small communal abattoirs. Their total capacity is small.

Their production was as follows:

	<u>1969</u>	<u>1970</u>	<u>1971</u>
Fresh meat	4916 t	5510 t	5750 t
Sausages + smoked meat	603 t	884 t	950 t

- 2 abattoirs are being re-built at Banja Luka and Bosanska-Gradiska. Their projected output is low, and their functional design poor.
- The above table shows that only a small quantity of meat is further processed. There is no production of preserved, semi-preserved meat, frozen or quick frozen products, or others.

The existing range is small, with no plans for a wider range. The largest firms in Yugoslavia make 50 types of sausages (some West European manufactures produce 500) while for the existing factories in the project area the figure is 10.

- The existing plants lack basic and wide technical knowhow in processing and marketing. Preparation and packaging are not developed - no vacuum packing or modern eye catching retail packaging.
- The existing abattoirs lack good transport access. In some cases (e.g. Prijedor) production is limited by environmental factors.

#### D. Economic Problems

A price freeze on meat has critically affected the area's abattoirs, as livestock prices, which have a guaranteed minimum, are rising. This cost squeeze on profits can lead the smaller plants into losses. Possible solutions are:

1. Production increase to reduce overheads.
2. Manufacture of processed meats and thus upgrading of meats to allow higher selling prices.
3. Carrying on to the final price the result of low economy scale, low utilization factor of production facilities and low range of upgrading.

#### E. Poultry

The situation needs radical improvement. World and Yugoslav consumption of poultry is increasing sharply, but no industrial scale installations for poultry slaughtering exist in the project area for hens, turkeys and geese. The lack of largescale supply of poultry is connected with this problem.

#### F. Summary

The abattoirs are functionally faulty mainly because of:

1. They do not supply their own livestock, and lack control over incoming material.
2. Co-ordination is lacking inside the abattoirs or between each other.
3. Work layout is faulty in all abattoirs, including the 2 being built.
4. Automatic equipment is missing to replace manual operation.
5. Minimal production only of sausages + preserves

6. By-products are not utilized.
7. Only one abattoir (Prijeđor) does some exporting.
8. No slaughtering facilities for poultry exist.
9. Marketing is unorganized, even for the now planned production
10. The abattoirs compete instead of specializing.
11. In comparison to the situation in Yugoslavia as a whole, and abroad, the situation can be described as requiring radical improvement - and no new plans can be conceived on the existing structure.

\* \* \* \*

## 5. DESCRIPTION OF THE EXISTING STATE

### A. Forward

Industrial meat slaughtering in the project area is done in 3 communes only. Marginal further processing is done by the abattoirs.

The project area also contains 10 small abattoirs in villages, which serve local needs only.

The 3 larger abattoirs are:

<u>Name and Location</u>	<u>Belongs to Kombinat</u>
1. Banja Luka	Agroexport
2. Bosanska-Gradiska	M. Stojanovic
3. Prijeđor & Bugojno	Union Impex

The abattoirs in Banja Luka and Bosanska-Gradiska are being rebuilt to modernize and increase production.

### B. Banja Luka

#### 1. The Old Abattoir

The old abattoir continues operating, pending completion of the new one. As it is located in the town center, it could not be expanded. The building was erected in 1880, it disposes of a small area and lacks even basic facilities. Usage is mainly for pigs. There are no machines or proper facilities for any stage of work. The abattoir fails also on hygienic and veterinary grounds.

#### 2. The New Abattoir

This should have started operating in October 1972. Design was by the Beograd Engineering Co., in cooperation with the Meat Institute in Beograd.

Total built area will be	1400 M <sup>2</sup>
Of this - slaughtering will be	400 M <sup>2</sup>
Sausage production	140 M <sup>2</sup>

Cutting area	100 M <sup>2</sup>
Offices	80M <sup>2</sup>
Capacity of cold storage	50 tons

Animal pens to hold 2 days supply will cover 650 m<sup>2</sup>, where provision is made for watering only.

The abattoir design has faults - considerable difficulties will arise when attempts are made to operate at full capacity.

Faults are evident in design, building and equipment purchasing.

The functional layout of the abattoir is faulty because:

- The slaughtering hall is too small for the number of separate production lines (to meet requirements of Moslem law, pigs are separated from sheep and cattle). Therefore there will soon be a need to expand this hall.
- Production lines are not continuous, e.g. the line from cold storage to despatch or further processing.
- The cutting rooms are so small as to hamper work.
- Some production lines are needlessly long.
- Processing would be easier had processing room and cold storage been relocated and better planned.
- There are a number of superfluous small rooms.
- There are superfluous corridors.

Generally there is an excess of manual work and lack of essential machinery. The sausage production shops are unsuitable and too small for their purpose. At the time of the visit no assessment could be made of the sausage machinery which was not yet in place.

Smoking will be done in obsolete type ovens. Modern ovens have controls for the complete process. Even these obsolete type ovens are not well designed and serious trouble can be expected from the chimneys.

In the new abattoir the planned daily input will be:

60 Heads of Cattle and Heifers  
20 Pigs  
200 Sheep

All lines will work at full capacity, one shift.

Initial output of sausage will be 1 ton/day increasing eventually to 3 tons, - though this will be, in our view, very difficult due to the unsuitable sausage production area. The abattoir will buy its livestock on the Banja Luka market. The required quantities are not assured, even less so the quality. The abattoir lacks its own livestock farm, and/or has no supply agreements with producers.

### C. The New Abattoir in Bosanska-Gradiska

This abattoir was designed by the Meat Technology Institute in NoviSad. It is due to start production in a few months. The two main sections are the abattoir and cold storage facility. The cold storage will also serve the quickfrozen products plant being erected in the same compound, as well as the storage of eggs, vegetables, fats, etc.

**Capacity:****Cold Storage Capacity:**

-40°C	30 ton per 8 hours
-20°	1200 ton
0°	400 ton
0°	600 ton
Controlled atmosphere	2000 ton

Intended input of the slaughterhouse - head per year:-

60,000 pigs  
40,000 cattle  
20,000 lambs and sheep

Generally, the abattoir is well designed, though some operations are not well positioned and the type and quality of the building is not optimal.

The functional layout of the production lines is generally satisfactory, though insufficient.

The spice room is incorrectly sited - it should be by the main production hall.

Also, a rinsing room is missing near the sausage production shop. The faults in layout will cause unnecessary running around. The dispatch ramps of the plant are far away from any cold storage, except the one for sausages. Generally, a picture image of the present layout would have been better, with the sausage shop changing places with the offices. Some of the rooms are too small for the intended work, and there is too much manual labor needed. As the factory is just being set up, it was hard to assess details of any process mechanization.

**D. Abattoir in Prijedor**

This abattoir occupies a small old building by the railway track.

Daily input is:

100 head cattle  
300 pigs  
500 sheep

1 ton/day sausages are produced in small rooms on obsolete machinery.

The cold storage facility is insufficiently arranged for storage handling. Design is outdated, doors hard to open. Some rooms lack storage facilities, e.g. rails, pallets, etc., causing the piling up of carcasses in heaps.

No expansion of the small areas is possible due to the track and surrounding buildings. Main faults are:

- rooms are too small
- slaughtering room unsuitable
- cutting and work rooms are small
- equipment is old, inefficient and insufficient

\* \* \* \*

## 6. POSSIBLE SOLUTIONS

To put the meat production and processing industry on its feet in Bosanska Krajina, and bring it to the North Yugoslav or international standard, basic reorganization is needed. Radical solutions are unfeasible under present conditions which limit development of the industry, and allow stop-gap measures only, until basic solutions can be applied.

### - Stop-gap measures.

Some changes of operating procedures would allow better profits from the existing plants. These would not require changes of equipment or installations but be based on coordination and management decisions until long term solutions can be applied.

- Long term solution. Setting up a modern meat-processing industry with higher output. This would take around 5 years from decision to operation, though some benefits would appear earlier.

The two types of solution are treated separately in the following pages.

### A. Stop-gap measures

The new abattoir at Banja Luka is conceptually similar to the new plant at Bos. Gradiska.

Expected capacity, head per year:-

	<u>Cattle</u>	<u>Pigs</u>	<u>Sheep &amp; Lambs</u>
Banja Luka	13500	6000	60000
Bos. Gradiska	40000	60000	20000

These plants are fairly similar in lines of production, further processing, market areas and radii. Distance between the plants is 50 km. They draw livestock from the same areas. This difference between them is output volume.

It is possible, feasible and desirable to bring these two plants into cooperation from start (purchasing) to finish (marketing).

The projected advantages would be: Better purchasing system, higher outputs, less marketing competition.

Row k). Spinach is mainly grown and as well recommended for the private sector. Nevertheless there are special varieties which permit, with special equipment, full mechanization. Using these varieties and the special equipment may include spinach growing within the social sector - particularly since spinach should be given priority for processing by deep freezing.

Row l). Green pepper is recommended primarily for the private sector. Green pepper requires larger amounts of labour during a prolonged period. The crop also demands a certain degree of skill, especially in combatting diseases and insects. Harvesting can be mechanized to a certain extent, hence also the social sector is recommended. Introduction of plastic sheets can advance harvest time by one full month.

Row m). Strawberries. Cultivated strawberries could be a crop ideally suited for the private sector. There is need for a lot of labour which can be supplied by all members of the family, including even small children and elders. The children and elders can help for a few hours per day in picking and weeding (if no herbicides are applied). Apart from these types of labour, skilled labour is required if regular supply is expected according to a supply program. Picking can start earlier if nurseries and/or growing under plastics are used. This could enable the start of picking some two to three weeks earlier.

Pest and disease problems and especially nematode infestation have to be considered.

Row n). Other Berries. A special report on berries was prepared by Mr. F. A. Roach, who was on a FAO mission in the region in August 1972. Detailed recommendations are in the abovementioned report and here are given some special points only.

Apart from strawberries which are referred to in row m), the production of raspberries, blackcurrants and highbush blueberries can be considered.

1. Raspberries are recommended for the private sector in the hilly areas of the region, for climatical and meteorological reasons. Although there is no culture of cultivated raspberries in the region, there are large areas in the Cecak (Serbia) region, with good results. New varieties have been formed at the Fruit Institute in Cecak and they introduced British varieties. These varieties are able to reduce labour in picking by up to 50% and therefore are able to increase the hectareage, as labour, apart from investment, is the limiting factor in raspberries. Raspberries can be marketed fresh or frozen and plants in the Cecak region have experience in such production. Export of frozen raspberries can be considered and is executed from the Cecak region. High quality jam producers prefer usually frozen raspberries to pulped ones.

Mechanical picking is under advanced investigation, and in the near future harvesting machines should be available (for special varieties for processing).

2. Blackcurrant. For climatical conditions blackcurrants would give better results in higher altitudes of the region. A small amount is grown in the region and marketed to Vitaminke in Banja Luka. The main market, for either frozen or processed blackcurrants, is West Germany. There are considerable fluctuations in the market, depending especially on the weather in Poland. The crop is recommended for both sectors. The social sector could specialize in larger scale, harvest mechanized for processing, fields, while the private sector would produce for the fresh market and small amounts for processing. When introducing this crop to the region special attention should be given to stocks free of virus infections.
3. Highbush Blueberries. This, as a cultivated crop, is a new crop in Europe and has still a wide open market. They can be recommended like blackcurrants to both sectors. Mechanical harvesting is available. A big advantage of this berry is that its shelf life as fresh fruit is much longer.



The suggested implementation scheme is as follows:

1. Setting up the beginnings of a meat development enterprise - controlled by the M. Stojanovic Kombinat because it:
  - Should be the carrier for the large meat development plan (see later).
  - Has plans for cattle farming and operates pig-fattening.
  - Has facilities for increasing the feedmix plant.
  - Has affiliated cooperatives.
  - Has marketing facilities for other products.
2. Use production lines to supplement, not to compete.
 

Suggested split up: - Banja Luka - sheep, lambs, some cattle  
 - Bos. Gradiske - pigs and cattle
3. Livestock purchasing to be done by the same meat development organization. This should improve the chances of controlling quantity and quality. Other advantages:
  - improved credit facilities
  - farmers' faith in purchaser will be improved
  - reduced competition
4. The Banja Luka plant would serve an area beyond its own town, with improved economics.
5. Minor changes only in both plants are needed to specialize the production lines.
6. Meat processing would be split up:
  - Banja Luka - Mainly preserves, for the local market
  - Bos. Gradiske - Cattle & pig products in increased volume
7. Increased marketing facilities would be justified. Competition between the shops would be reduced. A larger marketing radius would be feasible, of more and more varied products.

Such an organization would decisively affect the local market, and instead of local competition between the abattoirs, would jointly enable to compete in more distant markets, including initial exports.

The above suggestions would be the foundation for the long-range proposals, which would use the co-operative purchasing and marketing facilities and centers (properly equipped, cold storage, transport) in distant sea ports, Sarajevo and Zagreb.

#### B. Long Term Solutions.

On a long term basis, it is proposed to consider a major project of creating, stage-wise, but according to a clearly phased plan for which financing and decisions will have to be assured, a meat production and processing complex in BK.

The primary purpose of this project would not be - as distinct from the short term measures - the solution of the processed meat needs of the local population in BK. The project would not be designed to serve the BK market but parts of the domestic Yugoslav market plus considerable exports. Its main purpose would be to constitute an effort and a breakthrough in the economic development of the region - to increase by a significant percentage the real income of the region and disperse

1

this income over a wide sector of the BK population.

This solution is proposed since large scale meat production and processing is seen as one of the relatively quickest, safest and least expensive ways to achieve this aim. Organizationally, it is suggested that the Stojanovic Kombinat be charged with the execution of the scheme. It will need considerable managerial strengthening, and re-organization, probably by founding a separate Meat Development Division which would have two departments - organization of livestock supply and developing and managing the meat-processing plants. (If and when the scheme is started, this would need strong concentration of the Kombinat's managerial resources in this direction and consequently it is proposed that responsibility of the specialized vegetable/fruit quickfreezing processing and marketing of such products be turned over to Vitaminke, as proposed elsewhere in this report).

The following plants are proposed, in view of expected meat consumption developments in Yugoslavia and the type of expected meat/meat products imports development in the West European and USA markets. The plants as described here would include a full range of modern equipment, enabling the efficient and hygienic production of high-quality meat products to meet the foreseeable international requirements by quality, type of meat, cut, etc. The investments described in the following chapters on these plants took into account production at the level demanded by the import regulations of the German, British, Italian and USA Governments.

These plants will be:

1. Abattoir and meat processing plant for 150,000 - 200,000 head of cattle and steers, 200,000 - 250,000 pigs and small amount of sheep.  
Output will be meat quarters and halves - fresh, chilled and frozen - as well as processed end products. Both types will be marketed on the expanding domestic market (including tourists) as well as serve for exports.  
Alternatively, this plant can be divided into two integrated ones; one a meat oriented plant, while the other will specialize in meat products.
2. Abattoir for 7 million broilers plus Processing Plant for 2,000 t/yr. poultry meat products, mainly for the domestic market (partly includes the Kombinat project for poultry slaughtering)
3. A rendering (meat industry by-products utilization) plant which would receive its input from the above plants as well as from the existing regional slaughter-houses.

The Meat Development Division would organize the livestock supply for these plants. It would offer the farmers credit, feed, veterinary control, guidance, while the farmers will be able to improve their livestock since they will have security via being assured of a large scale buyer. This would break the vicious circle mentioned earlier and would also have a beneficial effect beyond the region.

The export marketing organization of this enterprise will have to be strong, with commercial links in the buying countries such as the major Yugoslav meatprocessors already have.

The concept of the meatprocessing plants suggested here includes sufficient mechanization so that few skilled meatprocessing plant operators will be needed and the plants can thus give employment to a large number of unskilled people. At the same time the technical and management functions will have to be filled with highly trained and experienced industrial executives, and the size of the operations will be large enough to enable the attraction of such personnel to the plants.

The detailed phasing of the execution of the plan, including the matching of increasing raw material supplies with the construction of the plants, needs specific elaboration after the decision in principle will have been made to go ahead with the plan and to prepare such details.

## 7. ORGANIZATION OF LIVESTOCK SUPPLY FROM THE BK REGION

### A. Summary

The region's historic background should be considered, as it explains various facets of present-day facts. The region was ruled by the Turks for hundreds of years, during which period the population was widely dispersed. The livestock which was kept was suitable for the sparse mountain pasture and was capable of being moved from place to place. Many of the sheep flocks are to this day kept far out in the mountains, moving from place to place. The local "Busha" cattle too are suitable for this nomad existence and able to find their own food even on sparse pasture.

An inevitable result of this nomad pasturing was that no one cared for the land, and the grazing through generations led to land depletion, especially of minerals. The project area presently supports some 240,000 cattle, these being 25% of the cattle of all B&H. B&H in turn holds 20% of the total 5 million head of cattle of Yugoslavia. Thus, BK presently holds about 5% of the cattle of Yugoslavia.

The social sector is getting good results, which might get even better, especially in milk production. This sector is more ready and able to use the artificial insemination service, as well as other modern animal husbandry techniques, this factor being the cause of the increase of their share in production, though presently they are owners of 6% of the cattle only.

The private farms own and will continue to own most of the livestock (94%). For this reason continuous efforts must be made to lead them to improvement of their yields.

Since this report deals to a large degree, in terms of total resources and their impacts, with the possibility of setting up a large modern meatprocessing complex, the salient points concerning the supply from the region of the large amounts of livestock for slaughtering need discussion.

FAO is working on detailed agricultural matters in the project area. Also, in 1972 a special FAO report up to date to late 1971, on livestock in Yugoslavia, was issued. The team obtained a copy of this report in September.

Therefore this section is restricted to factors concerning specific animal husbandry matters of BK, such as breeding problems, extension service, credits and certain technical and economic factors having a bearing on livestock supply for the BK meatprocessing supply as recommended in this project.

In this project both the social and private sectors will be considered as potential suppliers of livestock for meatprocessing. However, the dominant feature would be the organization of the relationship between the social sector as the large-scale processor and as the organizer of its own supplies from the private sector, with dispersed but coordinated and closely controlled private-sector breeding and fattening of cattle.

This would be a major task for the Stojanovic Kombinat for the next years, as an integral part of the proposal that the Kombinat becomes the "Carrier" of the BK meat development plan.

These questions have been discussed at great length by the team with various organizations in Yugoslavia, including the authorities in Sarajevo and Banja Luka, the Kombinat, the veterinary services, and others. Farming areas were visited and many farmers were asked about their views and problems.

The team believes that although the targets may look high in terms of quantities and "developmental jump", and although the liveweight increases recommended would

constitute a sizeable percentage of (former) estimates of Yugoslavia's total liveweight production increase, the plan could be implemented. The quantities involved are not too much on an international scale and in other meatproducing countries such as the USA, Brazil and lately in Africa regional development schemes deal with at least such amounts.

#### B. Cattle Breeding & Production

The dominant race in the area is the "Busha" light cattle. The bulls reach a weight of 340-430 kgs. while the cows reach 230-270 kg. The rate of weight gain is slow. Cows produce 800-1000 liter milk per lactation. Neither the meat nor the milk production can be considered good.

An advantage of the Busha cows is that they can successfully crossbreed with Simmental bulls. There are already some successful smallscale results of this technique near the project area and one of the preconditions for massive improvement would be to apply this practice to the entire Busha stock in the region as rapidly as possible. The same technique was applied in Israel where Busha cows imported from Yugoslavia were crossbred and steers of 460-520 kgs. at 13-15 months are being obtained. Pure Busha cattle in Yugoslavia does not reach such a weight even at the age of 5 years.

The average liveweights of slaughtered cattle appear in the table in the appendix. B&H has presently the lowest results in the Federation but there are no reasons, except race improvement and feeding, that B&H should continue the complete underutilization of cattiebreading potential.

Some important points are mentioned below referring to the problematics of increased meat production in BK as supply to the BK meatprocessing industry.

#### C. Natural Pasture

As mentioned above, the natural pasture has been exploited and depleted uneconomically. Some experiments to improve the natural pasture have already been carried out in Yugoslavia. The results show that with quite conventional methods - such as weed control, fencing, rotative pasturing and land rest - the pasture production can double or treble, thereby the number of cattle maintained on a given area can be increased by the same ratio. Thousands of hectares of natural pasture are presently unexploited - their potential can be readily calculated. Their incorporation in the pasture cycle can increase still more the potential available cattle feeding base. In the chapter on feedstuffs we are reverting to the implications of this problem.

#### D. Livestock Diseases

The veterinary service existing in the area is good, with the result that the few diseases that do occur are not a serious problem. There is a very small number of cases of Tuberculosis, Brucellosis and Anthrax, but these are under constant veterinary supervision. There have been no recent outbreaks of foot-and-mouth disease. Standing procedures exist for control, immunization and slaughter of diseased animals. Babesiosis and venereal Trichomoniasis appear rarely, causing no serious problem. The latter disease can be expected to disappear completely when the practice of artificial insemination becomes widely applied. The present veterinary staff are devoted to their profession, are effective and can be expected to handle any future developments in addition to their present work.

#### E. Artificial Insemination Station at Banja Luka

This station is to play a central part in the area. The number of bulls kept

should be increased from 26 to 60 by the acquisition of more high-quality bulls. Additionally, a Progeny Testing Station should be established in the Mladen Stojanovic Kombinat. All the necessary registrations should be conducted in order to establish the heredity potential in meat and milk production, of each of the bulls kept at the station. Thus this station will serve as a local research center, for establishing the quality of the semen, and supply constantly high-grade semen to various areas thus indirectly encouraging cross-breeding. At the same time the station can serve as a demonstration center to promote and encourage the utilization of artificial insemination as well as conduct courses in preparing technicians for applying artificial insemination.

Full use must be made of scientific and technological know-how in an effort to improve the local livestock. The methods developed should be introduced in the Kombinat's herds, and be transferred parallelly to the private farms. The artificial insemination station should modernize its production of frozen semen and with their cars and containers, ensure supply to nearby and more distant regions. Cross-breeding should be subsidized, and a stable market can be ensured for the increased live weight of the steers by the proposed meat complex.

#### F. Extension Service

The area lacks extension service, whose task would be to explain and demonstrate, and by establishing good personal relations, to overcome the long-standing conservatism of the private farmer. These simple people may have heard something of science and technology, but until they see, feel, and are persuaded, much painstaking work will be needed to break tradition. These advisors should be chosen according to their abilities to guide the farmer. The job could be done by suitable personnel in the framework of planned, organized, extension service, or in conjunction with the artificial insemination station, or alternatively, by a special department of the Ministry of Agriculture and/or the Kombinat. Contracts for calf fattening could be realized between the Kombinat and private farmers with the utilization of their inspection and coordination.

#### G. Pricing

A basic requirement is of course that the farmer finds livestock growing profitable, and therefore the problems of marketing and minimum support prices for meat must be considered. Additionally, livestock prices must be linked to the cost of feedmix concentrate. The combination of obtainable finance linked minimum livestock prices, organized cross-breeding, modern feeding systems and professional extension can be considered to lead to a satisfactory increase in meat production.

#### H. Marketing

One of the main problems if not the basic one, is organized marketing services to the producer. This is of major importance for the private sector, as the social sector together with the cooperants have their established outlets.

If the increase in production will be established, a marketing organization has to be an integral part of this development plan. The meat complex, as recommended in this report will have to prepare a supply schedule together with the marketing organization in order to produce and supply the right animals at the right time, weight and quality. This organization would also be in charge of price structure, in order to encourage the farmer to increase his production in line with a defined production/supply plan.

The marketing organization can be operated/owned by one of the following organizations:

- The meat complex solely
- The Kombinat supply division (together with the organization of supply of other raw materials)
- A cooperative of the producers
- A separate enterprise

This marketing organization should be in charge to channel the credits required for production in order to enforce the execution of the production/supply plan/schedule. Such a procedure would be equally satisfactory to the livestock breeders and to the processors.

#### I. Finance and Credit

A basic requirement for the development of BK livestock breeding are sources of investment funds and credits for working capital. The social sector seems today to be reasonably well financed but better financial arrangements have to be found for the private sector if the necessary expansion of meat production is to be achieved. Despite the existence of some Yugoslav sources of finance, it seems that this is a major problem area (see Appendix No.1 in FAO 1971 Report, on the Problems of Livestock growing in Yugoslavia).

A possible solution suggested would be for a credit plan, whereby private farmers are able to obtain credits from the marketing organization. The plan's main feature would be:

- The private farmer receives semen and other services including extension as well as inputs from the marketing organization, for the purpose of cross-breeding
- The period of the credit would correspond to the time needed to fatten the steers, repayment being made on marketing.
- The loan would be renewable for further such cycles.
- The loan will be given in stages and through inputs with as little as possible in cash.

By following such a plan the following goals will be achieved:

- The farmer will get the finance he needs to produce more meat while these credits could not be utilized for other uses.
- He will be encouraged to cross-breed.
- He will be in close contact with the artificial insemination station, veterinary and extension services, thereby encouraged to use modern techniques
- Marketing will be in organized form and defined planned increase in production will be achieved.
- Loan repayment will be assured through collection from marketing income.

#### J. Slaughter of Young Calves

This wasteful practice must be eliminated as utilization of existing stock should be prior to whatever increase in herds in order to produce more meat.

In Yugoslavia meat production has been more or less static for 10 years and increased meat production is the order of the day. By-laws exist in Yugoslavia forbidding the slaughter of suckling calves, but they are for some reasons not enforced at present. In BK alone some 30,000 suckling calves are slaughtered yearly. This practice should be stamped out mainly by economic measures, as by-laws alone appear to be ineffective. The following steps are recommended:

- 1) The establishment of minimum support prices for livestock, linked to feed concentrate costs, calculated in order to encourage the farmer to raise the calves instead of slaughtering them young.
- 2) Baby beef, from steers up to 420 kg weight, should be supplied to meet the local demand for a delicacy, this through incentive prices.
- 3) The by-laws forbidding the slaughter of suckling calves should be administratively enforced.
- 4) Discourage slaughterhouses to slaughter young calves.

#### K. Supply of the required cattle to the meat complex from the BK region

The supply of cattle, as envisaged for the meat complex, cannot be achieved under prevailing conditions and rearing system. On the other hand, the potential of the region is big enough to supply the meat complex, the existing slaughterhouses and even more. This can only be done by implementing a large-scale development program. In order to accelerate cattle supply the phasing should be as follows:

- Stopping slaughtering of young calves
- Remodeling of feeding systems together with
- increasing the percentage of fertility and
- Encouraging cross-breeding and artificial insemination
- Maintaining more heads per land unit (green fodder/meadow/pasture)

The actual cattle population of 240,000 heads of cattle cannot, even by applying the above recommendations, supply the 54,000 annual tons for the meat complex alone without changing the structure of the herds.

If an annual meat production per cow of 180 kg is taken as a basis, 300,000 cows are needed to supply the meat complex only. By quicker fattening (13-18 months) and more "in-stable" feeding, together with improvement of yields of fodder/meadows/pastures this cattle population can be maintained within the project area. The investment in cattle breeding to produce this amount of meat is estimated at 300-400 million N.Dinars. In addition there will be a requirement for 200-250 million N.Dinars as circulating working capital. This investment appears in the "Income to the regional economy from the BK meat complex" section further on.

#### L. Finishing system

Two alternatives of finishing system should be considered:

- The finishing is done at the same place where the calf is raised.
- The finishing is done in feed lots located near the slaughterhouse and under the supervision of the abattoir personnel.

Intensive or semi intensive fattening has to be based on much tighter planning and control of feeding since growing and fattening of the animal go in conjunction one with the other.

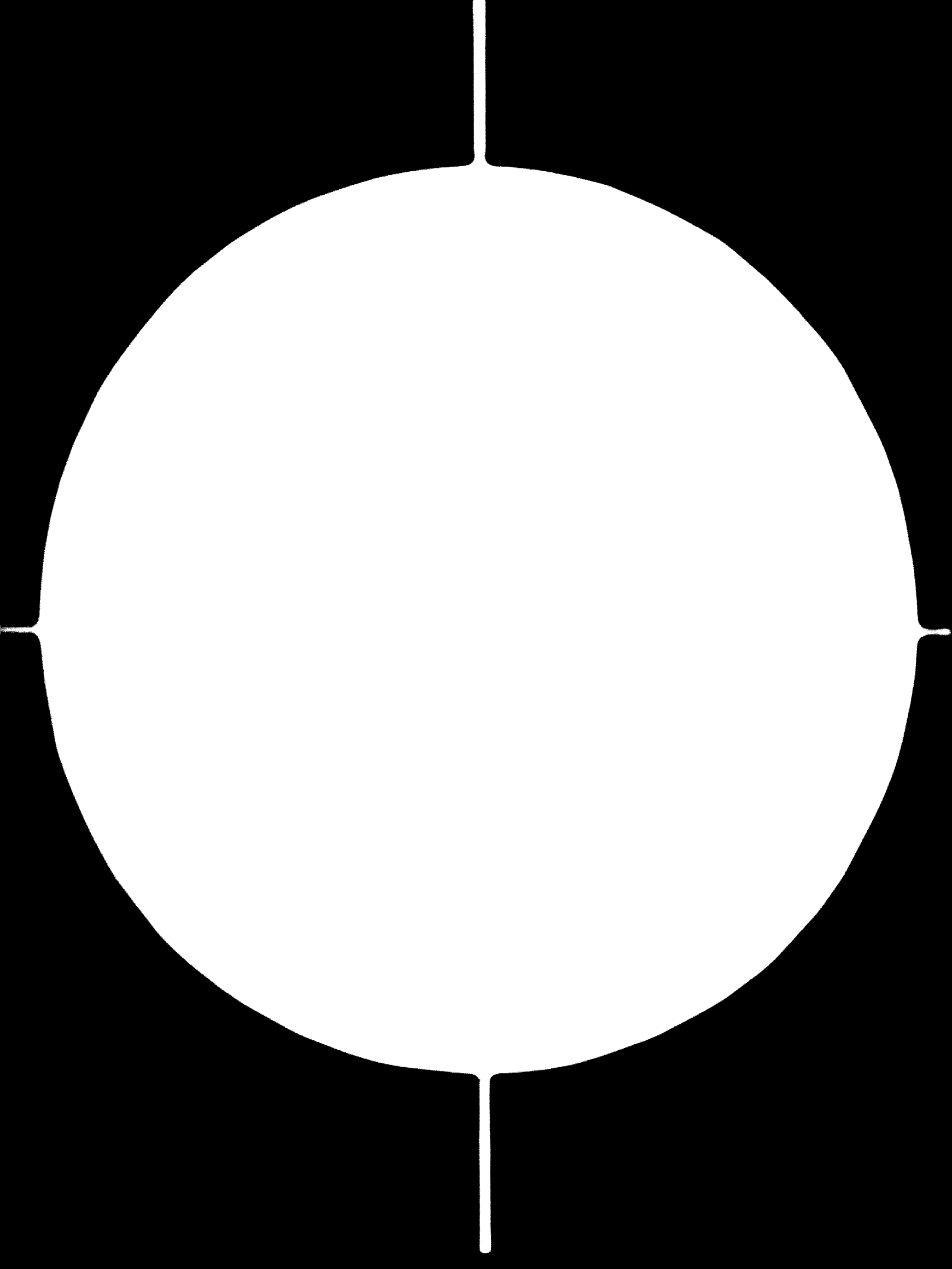
A trade off has to be done between the advantages and disadvantages of both

**G - 562**



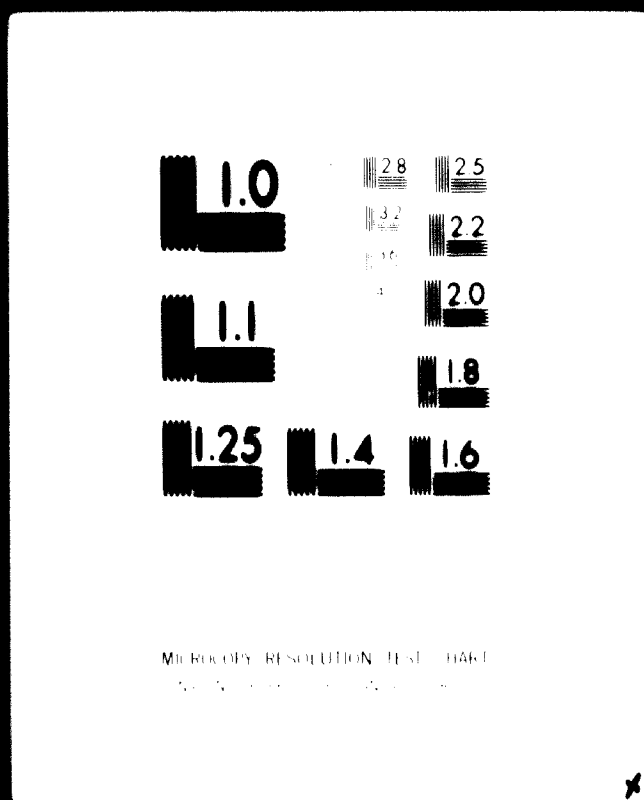
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#### 4. Canned and semi-preserved canned products

Luncheon meat	Pork loaf
Ham	Beef loaf
Chopped ham	Sliced bacon
Chili con carne	Sausages
Corned beef (mutton)	Meat balls
Beef hash	Corned meat loaf
Potted meat	Bologna
Goulash	Soups
Sandwich spread	Pork hash
Roast meat	Tongues in jelly
Jellied products	Boiled meat

#### 5. S a u s a g e s

- a. Fresh and frozen sausages, such as: Fresh sausages, country style  
Fresh pork sausage;
- b. Various types of link sausage, as : Frankfurters, Wieners, Cocktail, skinless;
- c. Smoked sausages and meat: Smoked country style  
(Pork) sausage; Mettwurst, Kielbase, Italian Pork sausage, ham, Canadian bacon, Blerwurst, meat roll, Bologna, Coppa, picnics, pork jowls, beef-shoulder, beef & pork roll.
- d. Cooked sausages: Luncheon loaf, selami loaf, liver sausage, liver spread, liver loaf, Braunschweiger, Bretwurst, Thuringer, rolls, Potted head, boiled ham, headcheese, corned loaf.
- e. Dry and semi-dry sausages: Salami, Cervelat, Holsteiner, Thuringer, Goethinger, Goather, Aarles, Landwurst, Lioner, Mortadella, Capicola, Pepperony, Frizzes
- f. Smoked and cooked sausages: Berliner, ham style, Knackwurst, Pariser, Teewurst.

This list is far from exclusive. From loaves (cooked sausages, or fresh loaves) alone, tens of variations are possible. The plant will produce a number of basic types and use the local varieties, and with new types of sausages and other products penetrate the local market like beef roll. The plant will also base its production on export demand (mainly canned). As there are so many varieties, production will be listed further on according to main classes, only. In the economic analysis, based on maximum utilization of input meat, the average price (after counterbalancing) of products will be considered.

The plant initial production will be for meat and popular well accepted products. Sophisticated new products will follow - e.g. beef hash, fresh sausages, beef roll and others which are well established elsewhere, though not yet in Yugoslavia. If these products will be decided on by the time the plant starts production, their introduction can be included with the initial products and thus marketed in early stages.

First production stages should include at least:

Fresh meat :	Beef quarters and pork halves
Canned meat:	Ham, Luncheon Meat, Spreads, Goulash stews.
Sausages:	Link sausages, popular Salami, high-grade Salami, Blood sausage, Mortadella, Schinkenwurst.
Frozen Products:	Hamburger, Cevapcici
Frozen, ready-to-eat:	Beef Goulash, Roasted beef, Roasted bacon, Roulades in jelly.

It is of importance to correlate the products according to the relative usage of their ingredients and the raw material available. In this way there will be a maximum utilization of the meat raw material component which is the most expensive one of the final product.

Therefore the selected products, from the detailed list above, will have to be categorized according to percentage of each ingredient.

For example, the following table shows different possible compositions of meat products:

<u>Category</u>	<u>Ingredients in %</u>					
	<u>Prime cuts</u>	<u>Fat meat</u>	<u>Trimmings</u>	<u>Fat</u>	<u>Necks</u>	<u>Non-meat ingredients</u>
A	50					50
B	12	50		33		5
C	20	20	30	30		
D	12	25			30	33
E				33	33	34

These are only examples. The list of ingredients is much wider and has as well to be multiplied by the different kinds of meat used.

#### D. Location of Plant and Construction Area

The plant should be located according to the following criteria:

- In the centre of the cattle/pig production area.
- Near a main road
- Near a population centre
- On land which will not require a more than usual investment in site preparation. The area required is 10 - 12 ha
- Near a water resource.

We recommend to locate the slaughterhouse in the vicinity of the town of Benja Luke or Bosanska Gradiska .

#### E. Building areas

	<u>m<sup>2</sup></u>
Slaughter and dressing halls (incl. ramps & reception rooms)	2800
Deboning, cutting, grading and primary processing	1400
Sausage production including cooking & smoking	800
Cooking area and canned meat production	1400

	<u>M<sup>2</sup></u>
Production of frozen and ready-to-eat products	800
Further processing including drying	1300
Refrigeration (4000 tons)	5000
Storage rooms, inputs (other than livestock) and outputs	2000
Offices	500
Services (steam, workshops, etc.)	<u>2000</u>
Total built areas	18000 -----
Holding Pen Area Incl. feeding and drinking facilities	6000

The slaughterhouse will have to be designed in functional aspects allowing for line processing (dressing, deboning, cutting and grading) by "CAN PAK" system. Cold storage will be between the slaughtering and processing areas in order to permit dispatch to market and/or further processing.

Site, buildings and equipment will meet all local standards, as well as those in prospective export markets, particularly USA, West Germany and UK.

The building should have a minimum height of 3.5 m. concrete covered, with minimum pillars and edges. Floors and walls should have rounded connections, etc., all these to improve sanitary conditions. To ease construction and save costs, part of plant will be 2 storeys (further processing area mainly). Good sewage and by-products collection have to be considered.

## F. Equipment and Utilities

### 1. Slaughtering & Dressing Equipment

a. Equipment will suit consecutive operation according to mass production line method. The main equipment will include general purpose and specific items:

- Automatic screw and belt conveyors, for material handling, which will extend to offal sections, hydraulic platforms, pneumatic cutters, etc.
- Extensive machinery for stunning of pigs, hide pulling, tail removing, etc.
- Drainage facilities for blood and other remnant collection.

b. The slaughtering line will be continuous. Maximum cutting will be done on the line. This line should also include equipment to deal with meat-parts and by-products.

Plant will be laid out in functional units. Parallel slaughter, dressing and cutting lines will be the start - from there meat will move, first to initial processing and then to other sections according to the specific processing requirements for the final product. Such division will allow maximum flexibility in production, with easy interchanges of production line or product.

### 2. Processing Equipment

- Injection devices
- Mincers
- Cutters, Colloid Mill (including vacuum cutters, vacuum blender)
- Mixers, tumbler (vacuum)

- Meat conveyors (screw, belt, etc.)
- Sausage-stuffers (continuous)
- Clippers
- Patties forming machines
- Cooking and smoking ovens
- Steam jacketed cookers
- Live-steam cookers
- Continuous line to produce frozen food (including frying pan, steam cooking, grill, oven, etc., slicing, filling)
- Equipment to clean containers (tins, forms, etc.)
- Fillers for liquids (soups, gravies), fillers for tins, fillers for pastes
- Exhausters
- Closing machines (for forms + tins + cartons)
- Autoclaves (Rotating, Vertical and Horizontal)
- Slicing machines
- Boning machine
- Aux. equipment (tables, weighers, trolleys, ice maker, steam guns, disinfectant equipment)
- Laboratory equipment
- Miscellaneous

### 3. Utilities

#### a. Refrigeration

- Blast freezer tunnels with 10 tons/hour output
- Total 1200 ton - 20°C deep freeze rooms (4 chambers)
- Total 2800 tons 0°C cold rooms for meat (5 chambers)
- Total 120 HP ice flakes machines (2)

#### b. Air-conditioning

10 sections would require air-conditioning with a total volume of 10000 m<sup>3</sup>

#### c. Steam

Steam is needed for autoclaves, cookers, ready-to-eat meal equipment and cleaning equipment.

5000 - 6000 kg/hour at 10 atm. are required in order to allow simultaneous use in all the above mentioned.

In order to receive continuous steam service, several steam kettles should be installed with a total capacity of 3000 - 3500 kg/hr. These would require a fuel-oil consumption of 800 - 1000 tons/year.

#### d. Annual electric power requirements:

- For refrigeration	6 x 10 <sup>6</sup> Kwh
- For air-conditioning	1.2 x 10 <sup>6</sup> Kwh
- For production equipment	6.8 x 10 <sup>6</sup> Kwh
Total	<hr/> 14 x 10 <sup>6</sup> Kwh

A standby generator would be feasible.

e. Water -

An annual consumption of 250,000 m<sup>3</sup> will be required

f. Manpower estimate	<u>Man</u>
- Direct labor (slaughterhouse) - one shift	190 (including 100 butchers)
- Direct labor (processing departments) - 3 shifts	700 (including 100 butchers)
- Maintenance	80
- Administration	100
- Services	30
- Technologists, veterinaries, lab. workers	80
- Others	<u>40</u>
	1300

This manpower does not include staff in charge of livestock supply and marketing of produce. This staff would belong to the central office of the organization.

g. Fixed Investment

	<u>Estimate in Thous. U. Dinar (1972 value)</u>
1. Site preparation and development	4,000
2. Pans	2,000
3. Buildings	64,000
4. Refrigeration (equipment and installation, incl. chambers)	40,000
5. Plant equipment (including installation)	120,000
6. Services and piping	20,000
7. Engineering and design	15,000
8. Product development (know-how)	15,000
9. Market development	20,000
10. Running-in	10,000
11. Contingencies 5%	<u>15,000</u>
Total	<u>325,000</u> .....

Out of the fixed investment 75% of equipment and engineering will be in hard currency, i.e. approx \$ 8,000,000

## H. Proforma Profit &amp; Loss Account

Thous. of Dinars

<u>1. Direct Production Costs</u>		
e. Raw Materials		
- cattle (350 kg./ av. weight)	410,000	
x 125,000 x 9 din./kg.		
- calves (180 kg./ av. weight)	162,000	
x 50,000 x 18 din./kg.		
- pigs (100 kg./ av. weight)	<u>230,000</u>	
x 230,000 x 10 din/kg.		
	Total Raw Material	802,000
b. Additives and packaging materials	54,000	
c. Direct labour (including direct services)	48,000	
d. Operation costs (elec. power, fuel, water, maintenance)	7,000	
e. Clothing, sanitation, tools, aux. materials	6,000	
f. Contingencies (5%)	<u>45,000</u>	
	Direct Production Expenses - Total	962,000
<u>2. Indirect Production Costs</u>		
a. Supervision (consultancy, veterinary)	10,000	
b. Administration (office costs, wages, travel, accountancy)	20,000	
c. Insurance & Taxes	7,000	
d. Depreciation: a. 5% on investments para. G.1,2,3,7	4,000	
b. 14% on investments para. G.4,5,6	25,000	
c. 20% on investments para. G.8,9,10,11	12,000	
e. Advertising and marketing	<u>40,000</u>	
	Total Indirect Costs	118,000
	Total Production Costs	1,080,000
<u>3. Income</u>		-----
a. Beef 18,000 tons x 19,000 din./ ton (ave.)	342,000	
b. Veal 4,300 tons x 28,000 din./ton (ave.)	120,000	
c. Pork 3,700 tons x 20,000 din/ton (ave.)	74,000	
d. Frozen & fresh products - 1,000,000 kg. x 25 dinars (ave.)	25,000	
e. Frozen, ready-to-eat products (parts of meals or dishes as well as cuts precooked or prepared slices) 1,300,000 x 30 dinars (average)	39,000	
f. Canned & partly preserved canned products		
9,000,000 kg. x 30 dinars (ave.)	270,000	
g. Preserved & partly preserved sausages		
10,000,000 kg. x 23 dinars (ave.)	230,000	
h. Edible offal in excess of marketability in processed form	130,000	
i. By-products	<u>60,000</u>	
	Total Income	1,290,000
	Production Costs	<u>1,080,000</u>
	Surplus	210,000
		-----

This surplus - shown here as an indication only - will serve for payment of interest on the basic capital and working capital of credit funds put at the disposition of the enterprise, as well as for the surplus accumulation fund



MEAT SLAUGHTERING AND PROCESSING PLANTSENSITIVITY OF TOTAL COSTS TO CHANGE IN MAIN COST ITEMS

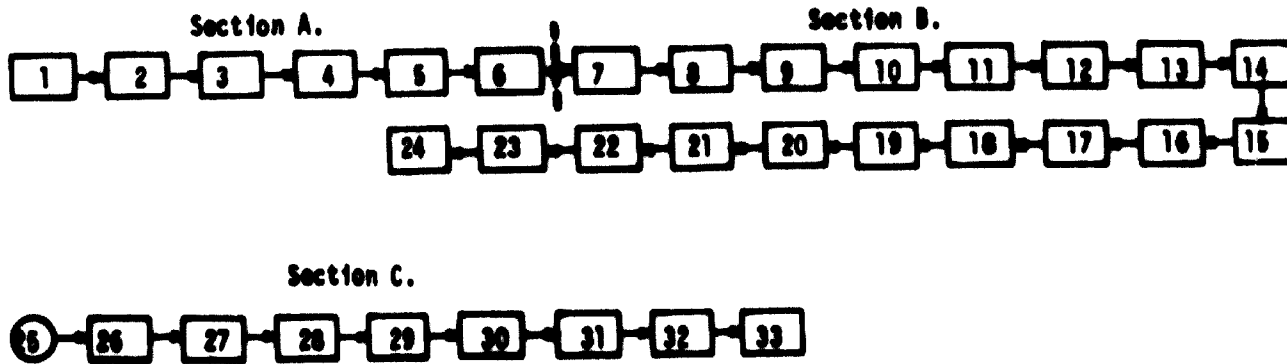
ITEM	CHANGE IN ITEM ( $\pm\%$ )				
	$\pm 10$	$\pm 20$	$\pm 30$	$\pm 40$	$\pm 50$
	LEADS TO CHANGE IN TOTAL PRODUCTION COSTS ( $\pm\%$ )				
Raw Materials Total	<u>7.4</u>	<u>14.8</u>	<u>22.2</u>	<u>29.8</u>	<u>37.0</u>
- Cattle	3.8	7.6	11.4	15.3	19.0
- Calves	1.5	3.0	4.5	6.0	7.5
- Pigs	2.1	4.2	6.3	8.5	10.5
Additives & Packing	0.5	1.0	1.5	2.0	2.5
Direct Labor	0.4	0.9	1.3	1.8	2.2
Overheads <sup>(1)</sup>	0.3	0.7	1.0	1.4	1.7
Depreciation <sup>(2)</sup>	0.4	0.8	1.1	1.5	1.9

(1) Including Items M.2a, b and c but not d or e.

(2) Total of Item M.2d.

**CATTLE SLAUGHTERING BY THE ON-THE-RAIL CAN-PAK METHOD**

**CONSOLIDATED PROCESS SHEET**



**PROCESS NOTES**

**Section A.  
RECEIVING &  
SLAUGHTERING**

- 1. Receiving
- 2. Weighing
- 3. Storing
- 4. Putting into Pen
- 5. Stunning
- 6. Bleeding

- 3. The delay of cattle in the pens should be for a defined period. A stock for one week slaughtering is desirable. The pens have to be equipped with feeding and drinking installations.
- 4. From the pens the cattle will move along a fenced lane to a special pen where they will be stunned.
- 5. The stunning will be done by a stunning pistol.
- 6. From the special pen for stunning the cattle will be hoisted to the rail.

**Section B.  
CARCASS  
DRESSING**

- 7. Skinning Hind Leg
- 8. Removing Leg
- 9. Autom.Transfer by Hanging of Hind Leg
- 10. Skinning Hind Leg
- 11. Removing Leg
- 12. Udders Dropping
- 13. Body Splitting
- 14. Skinning Front Feet
- 15. Removing Feet
- 16. Pulling Lungs
- 17. Pulling Tails
- 18. Pulling Hides
- 19. Sawing
- 20. Eviscerating
- 21. Trimming
- 22. Weighing
- 23. Chilling
- 24. Storage

- 7-21. All operations will be by butchers standing on the floor or on hydraulic platforms. The carcass moves on an overhead conveyor and each butcher performs one or maximum two operations. The butchers will use specific tools such as: hide puller, tail puller, etc.

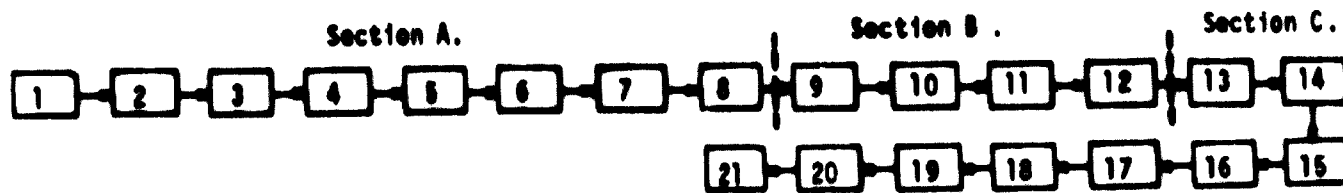
**Section C.  
HEAD  
DRESSING**

- 25. Head
- 26. Head Skinning
- 27. Head Dropping
- 28. Inspector
- 29. Tongue Pulling
- 30. Jaw Pulling
- 31. Headmeat Removing
- 32. Brain Removing
- 33. Dehorning

- 26-27. The head will be separated from the carcass, if at all at a later stage, after the hind leg, and will be moved by a table conveyor to another section for further treatment.

**PIG SLAUGHTERING**

**CONSOLIDATED PROCESS SHEET**

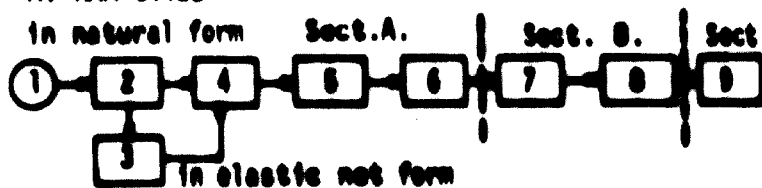


**PROCESS NOTES**

- |  |   |  |
|--|---|--|
| <p><b>Section A.</b><br/><b>RECEIVING &amp; SLAUGHTERING</b></p> | <p>1. Receiving<br/>2. Weighing<br/>3. Storing<br/>4. Putting into Pen<br/>5. Stunning<br/>6. Hoisting<br/>7. Sticking<br/>8. Bleeding</p>  | <p>1) Delay of pigs in pens should be for minimal time. From the pens the pigs will pass to moving pens - one for each pig.<br/>2) Stunning will be in a CO<sub>2</sub> tunnel (Stunning Chamber).<br/>3) The stunned pigs will be hoisted by special hoists to shackles on an overhead conveyor.</p>  |
| <p><b>Section B.</b><br/><b>DEHAIRING</b></p>                    | <p>9. Dropping<br/>10. Scalding<br/>11. Dehairing<br/>12. Shaving</p>   | <p>9-12) From the overhead conveyor the pigs will be dropped automatically into a scalding tank. From the scalding tank they will move on a conveyor to dehairing machines. From there to singeing machines where the remaining hair will be burnt.</p>  |
| <p><b>Section C.</b><br/><b>DRESSING</b></p>                     | <p>13. Head Dropping<br/>14. Belly Opening<br/>15. Breastbone Splitting<br/>16. Evisceration<br/>17. Backbone Splitting<br/>18. Washing<br/>19. Trimming<br/>20. Weighing<br/>21. To Chilling</p> | <p>13-17) After final dehairing the pigs will be hoisted to an overhead conveyor and moved to the dressing department. In this department the butchers will stand on platforms while the pigs advance on the overhead conveyor. The butchers will use different tools like: snout puller, jaw puller, skull splitter etc. The viscera will be sorted and selected on a special bench.<br/><br/>18) Rinsing will be by different hoses, for different parts, like hog neck washer. If necessary a tripe scalding tank can also be used.</p> |

SMOKED MEAT PRODUCTIONPROCESS DESCRIPTION**A. HAM STYLE**

in natural form      Sect. A.      Sect. B.      Sect. C.

**B. MEAT ROLLS STYLE****A. HAM STYLE**

- |  |    |                     |
|--|----|---------------------|
| <b>Section A.</b>                                  | 1. | Meat                |
| <b>PRELIMINARY<br/>PROCESSING<br/>&amp; CURING</b> | 2. | Trimming            |
|  | 3. | Stuffing in Net     |
|  | 4. | Injection (Pumping) |
|  | 5. | Maturing            |
|  | 6. | Hanging             |
| <b>Section B.</b>                                  | 7. | Smoking & Cooking   |
| <b>PROCESSING</b>                                  | 8. | Chilling            |
| <b>Section C.</b>                                  | 9. | Packaging           |
| <b>PACKAGING</b>                                   |    |                     |

**B. MEAT ROLLS STYLE**

- |                   |     |   |
|-------------------|-----|---|
| <b>Section A.</b> | 1.  | Meat  |
| <b>CURING</b>     | 2.  | Meighing                                    |
|                   | 3.  | Mixing with Emulsifying<br>and Curing Salts |
|                   | 4.  | Maturing                                    |
| <b>Section B.</b> | 5.  | Tumbling                                    |
| <b>PROCESSING</b> | 6.  | Stuffing                                    |
|                   | 7.  | Clipping                                    |
|                   | 8.  | Holding (Optional)                          |
|                   | 9.  | Maturing                                    |
| <b>Section C.</b> | 10. | Smoking (Optional)                          |
| <b>COOKING</b>    | 11. | Cooking                                     |
|                   | 12. | Cooling                                     |
|                   | 13. | Storing                                     |
| <b>Section D.</b> | 14. | Slicing                                     |
| <b>PACKAGING</b>  | 15. | Vacuum Packaging                            |

finishing systems in accordance with the goals to be achieved and the resources available.

1. Advantages of concentrated finishing:

- Finishing is done under direct supervision of technical staff of the slaughterhouse and good conversion ratios can be expected
- Large quantities of feed mix, which are required in this stage, will be transported to lesser distances. Smaller liveweight of steers have to be transported from the farms to surroundings of the slaughterhouse
- The "operational storage" of steers for slaughtering is much easier handled, as the abattoir is not dependent on daily supply from distant farms.
- Correct scheduling can lead to maximum utilization of the fattening installations.

2. Disadvantages of concentrated finishing:

- The added value of the finishing stage is taken from the farmer, thus reducing his income per steer.
- Concentrated finishing, being a large scale operation, requires overhead expenses, while on the farm these do not exist.
- Concentrated finishing requires investments in installations, while the farmer utilizes "non-budgeted" facilities.
- Transfer of the steers from the farms to the concentrated fattening installations and possible sudden changes in feeding rations will stop for a few days their fattening or even lead to temporary weight loss.
- Concentration of animals from different sources/areas can result in epidemics.

M. Pigs

The deciding factor in the expansion of local pig growing will be the continuing replacement of stock from the local black fat pigs to the "Landrace" race. Pigs will play an increasingly important part in local meat growing. Pork and pork products will be supplied locally, and the latter for export as well. Contrary to cattle production, pig growing in B&H is much better off.

The low average weight of the whole pig populations at slaughter time demonstrates the high percentage of piglets slaughtered.

Like with calves this tendency has to be changed and much more pork can be produced out of the same number of pigs.

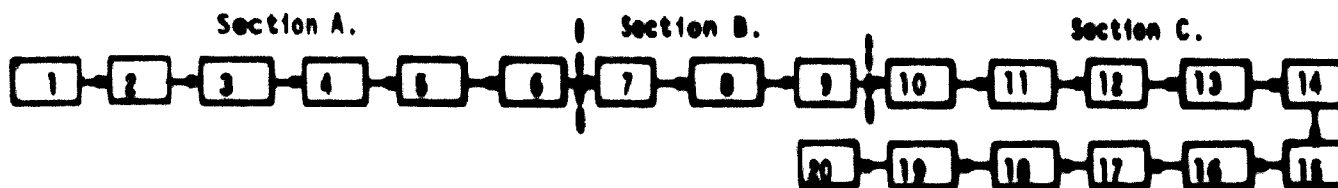
Pig farming has to be increased in order to meet the demands of the meat complex. An investment of 75-100 million ND is estimated as necessary, out of which only a small amount in hard currency for importing pure race boars, as well as 40 million dinars as working capital. This investment is included in the "Income to the regional economy from the BK Meat Complex" section further on.

\* \* \* \*

B. BROILER PRODUCTION IN THE PROJECT REGION

A. Industrially produced poultry has to be uniform according to standards, mainly for weight, form and color. Supply, quantity and schedule have to be sharply coordinated between the producers and the processing plant. In order to achieve the lowest purchasing price for the processing plant, and at the

PROCESS DESCRIPTION

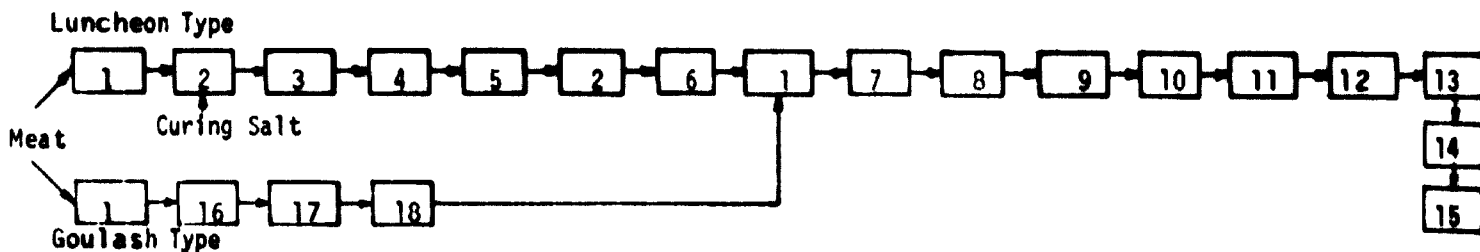


- |   |   |
|---|---|
| Section A.<br>PRELIMINARY<br>PROCESSING<br>AND CURING | 1. Deboning<br>2. Grading<br>3. Trimming<br>4. Weighing<br>5. Mixing Curing Salts<br>6. Curing  |
| Section B.<br>PROCESSING                              | 7. Mincing<br>8. Chopping<br>9. Mixing with Additives & Fat   |
| Section C.<br>CANNING                                 | 10. Stuffing<br>11. Weighing<br>12. Exhausting<br>13. Sealing<br>14. Sterilization<br>15. Washing<br>16. Drying<br>17. Labelling<br>18. Cartoning<br>19. Palletizing<br>20. Storage |

MAIN EQUIPMENT

- Deboning Rail
- Deboning Machine (Screw Press Type)
- Scales
- Mixer
- Mincer
- Bowl Chopper (Vacuum Cutter)
- Vacuum Mixer
- Piston Filling Machine
- Automatic on the Line Scales (with Aut. Rejector)
- Steam Exhauster
- Sealing Machine (continuous)
- Automatic Cage Loader
- Washing and Drying Tunnel
- Labelling Machine
- Automatic Carton Loader
- Palletizer

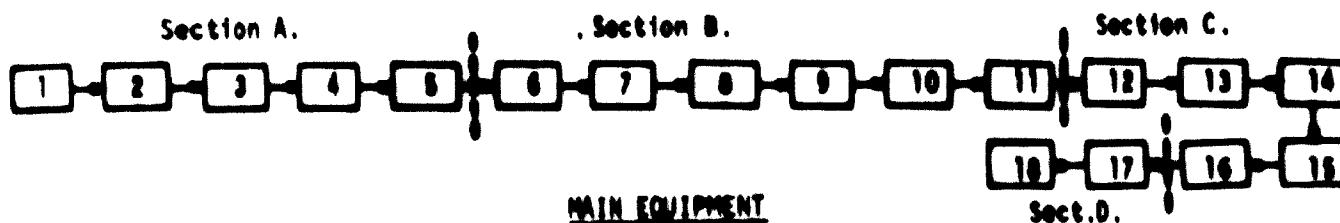
DIAGRAMMATIC FLOWSHEET:



- |                   |                                  |
|-------------------|----------------------------------|
| 1 Scale           | 10 Autoclave                     |
| 2 Mixer           | 11 Can Washing and Drying Tunnel |
| 3 Chilling Room   | 12 Labelling Machine             |
| 4 Mincer          | 13 Automatic Carton Loader       |
| 5 Cutter          | 14 Palletizer                    |
| 6 Stuffer         | 15 To Storage                    |
| 7 Rejector        | 16 Dicer                         |
| 8 Exhauster       | 17 Filling Machine               |
| 9 Sealing Machine | 18 Broth Filler                  |

SAUSAGE PRODUCTION

PROCESS FLOWSHEET:



Section A. 1. Boning  
 CURING 2. Trimming  
 3. Weighing  
 4. Curing  
 5. Keeping in Chillers

Section B. 6. Mincing  
 PROCESSING 7. Mixing  
 8. Stuffing  
 9. Clipping  
 10. Hanging  
 11. Maturing

Section C. 12. Drying  
 COOKING & 13. Smoking  
 SMOKING 14. Cooking  
 15. Chilling  
 16. Storing

Section D. 17. Slicing  
 PACKAGING 18. Vacuum Packaging

MAIN EQUIPMENT

Curing Tanks

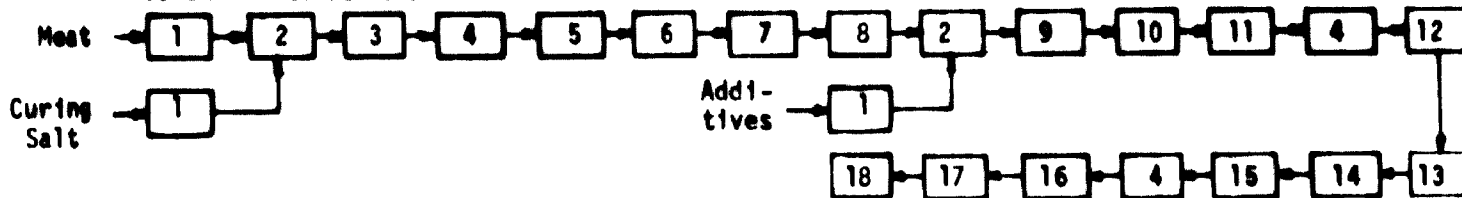
Mincer, Cutter, Colloid-Mill, Mixer, Tumbler,  
 Continuous Stuffer (Robot Type), Extruder,  
 Piston Stuffer, Twister, Linker, Dipper

Smoking-Ovens  
 Cooking Tanks  
 Chillers

Slicing Machine  
 Automatic Scale, Continuous Vacuum Sealer

SAUSAGE PRODUCTION - VACUUM PACKAGING (MORTADELA TYPE AS SAMPLE)

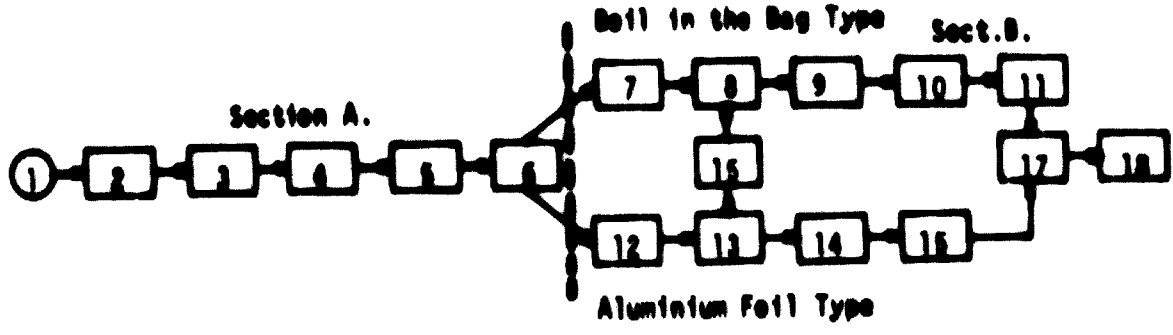
DIAGRAMMATIC FLOWSHEET



- |                         |                       |
|-------------------------|-----------------------|
| 1 Scale                 | 10 Twister            |
| 2 Mixer                 | 11 Clipper            |
| 3 Curing Tanks          | 12 Air Dryer          |
| 4 Chilling Rooms        | 13 Smoke Chamber      |
| 5 Mincer (Wolf)         | 14 Steam Chamber      |
| 6 Cutter (Bowl Chopper) | 15 Chilling Cabinet   |
| 7 Colloid-Mill          | 16 Slicer             |
| 8 Screw Conveyor        | 17 Scales (Automatic) |
| 9 Stuffer               | 18 Vacuum Sealer      |

**FROZEN READY-TO-EAT MEAL**  
 (Roast Meat Type as Sample)

**PROCESS DESCRIPTION**



- Section A.**  
**PREPARATION**
1. Meat
  2. Grading
  3. Trimming
  4. Cutting
  5. Roasting
  6. Slicing
- Section B.**  
**FILLING & FREEZING**
7. Weighing
  8. Filling
  9. Exhausting

- Section B.**  
**(contd.)**
10. Sealing
  11. Chilling
  12. Weighing
  13. Filling
  14. Chilling
  15. Closing
  16. Gravy
  17. Quick Freezing
  18. Storage



### I. Product Mix

It should be noted that the above profit and loss account is a minimalistic one. The same slaughterhouse with the mentioned equipment, production systems and personnel can under a different scheme than the one stated in the income calculations, produce much more higher income/surplus products. This by upgrading and marketing deboned, cut and cooked meat. Thereby the average price of each income component (beef, veal, pork) will receive a higher average price.

Regarding product mix assumed for the processed products, it should be understood that several alternatives of product mix were taken into account and the mix used represents an average. Different mixes - still containing all products envisaged - would result in variations of income.

Other components of ready-to-eat dishes and other meat products, like vegetables, were not included costwise, since it is assumed that their price will reflect in the full sales price of the product at least equal to their total raw material plus quick freezing costs.

### J. Marketing of Meat

The marketing mode will be (fresh, chilled or frozen):

- a. Halves (pork and veal), quarters (beef) and carcasses of mutton
- b. Purposewise (for roasting, goulash)
- c. Cuts (shoulder, neck, etc.)
- d. Special cuts (e.g. Milanese for Italy)

The more advanced the primary processing, in the slaughterhouse, will be, the more economic benefits will be created and penetration into the local market will be easier as these products will encounter less competition in it.

Marketing should be based on existing facilities, including distribution centers in the urban centres of the region and outside it (including tourist areas).

For marketing abroad the slaughterhouse will have to be granted an export license based on meeting international standards of meat trade including demands of the Food and Drugs Administration of the USA. It is assumed that for export abroad, veal and beef only can be considered, while the pork will be destined for the domestic and tourism markets.

\* \* \* \*

## 12. POULTRY SLAUGHTERING AND PROCESSING PLANT

### A. General

The increasing demand for poultry justifies the rapid development of this industry in the project region. Since this branch is only in preliminary development in the region, all outputs are assumed to be marketed within Yugoslavia, including the tourism market. The market outlets are fresh and frozen poultry, and poultry processed products. The slaughterhouse needs a very rigid cooperation, through planning and scheduling, with the broiler producers as deviation from optimum slaughter time can be the economic make or break for both the slaughterhouse and the producer.

The input of the plants will be:

- 7,000,000 broilers x 1.70 kg = approx 12,000 tons liveweight
- 350,000 layers from the reproduction flock, the Kombinat's egg farm and others
- 100,000 turkeys, geese, ducks (according to availability)

The layers, turkey, geese and duck are solely for further processing.

On a 250 day per annum production, this will be an average slaughtering of 28,000 broilers per day. Considering fluctuations of  $\pm$  10% the capacity of the plant should be 30,000 broilers per day.

Slaughtering of layers and other birds being mostly seasonal, will be done by overtime.

The output of the plant will be:

1. 8250 tons of broiler poultry meat out of which 2500 tons will be deboned and further processed (para. 6)
2. 240 tons of poultry liver
3. 480 tons of poultry giblets
4. 1000 tons of poultry necks and legs
5. 1800 tons of processable waste
6. 2000 tons of processed products

#### B. Product classification

- According to raw material: Broilers, hens, turkeys, geese, duck.
- According to products: fresh and frozen products, frozen ready-to-eat products, canned products, smoked products, waste for rendering - feathers, heads, viscera, blood, bones.
- According to destination: Domestic consumption - retail and institutional, hard currency earning - tourist market, industry - rendering, pharmaceutical.

With increase of standard of living, demand for poultry products is rising - these being categorized as high quality and luxurious items.

#### C. Product list (of processed products)

The plant will produce a wide range of processed products which have an increasing demand on the market.

Selection from the following list is recommended. The definite products list will depend on their suitability for the domestic and tourist market.

##### 1. F r e s h o r F r o z e n P r o d u c t s

Broilers	Turkey Roulade
Liver	Hamburgers of young turkey
Giblets	Cevapcici of young turkey
Necks and legs	Minced turkey meat
Hen Schnitzel	Minced chicken meat
Hen Roulade	Goose liver
Turkey Schnitzel	

## 2. Frozen Ready-to-eat Products

Fried Schnitzel	Roasted Turkey
Fried chicken parts	Turkey Goulash
Roasted chicken	Corned Turkey
Cooked deboned poultry meat	Rouledes in jelly
Cooked poultry parts	

## 3. Canned Products

Fowl Ham	Corned loeves
Soups	Liver peste
Loeves	Canned chicken

## 4. Smoked Products

Chicken breest	Turkey white meat roll
Smoked chicken	Rouledes
Turkey breest	Seusage
Turkey derk meet roll	Link seuseges

This list is far from exclusive and intends to indicate main products only. Generally, the following composition of inputs/outputs for the processing plant can be considered as reasonable.

<u>Inputs</u>	<u>Outputs</u>
Broilers 60% - 75%	Frozen reedy-to-eat 25%
Turkeys 20% - 25%	Canned products 25%
Leyers 15% - 20%	Smoked products 50%
	- Additional 50% of this output has to be added as non-edible offal (feathers, heads, bones, etc) for rendering.

## D. Location of Plant

The plants should be located according to the following criterie:

1. The slaughterhouse and processing plant should be loceted edjacent and therefore seen as one plant.
2. Enough lend should be in reserve at the same site as with increasing demand the recommended plant will have to be enlarged.
3. The plent should be near the broiler farming area, but far enough from the chicken house for senitary isolation reasons.
4. Neer e main road.
5. Neer e population center
6. On land which will not require a more then usuel investment in site preperetions.

The aree required (without reserve for future expansion) 3-4 he.

<u>E. Building Areas</u>	<u>m<sup>2</sup></u>
Slaughtering halls, de-feathering floor, ramps	1,000
Deboning, cutting, grading area	350
Processing	1,300
Packing area	500
Refrigeration - 800 tons	1,000
Stores (for inputs and outputs)	650
Services	750
Office space	<u>450</u>
Total built area	6,000
Open storage for cages	300

Site, building and equipment will have to meet Yugoslavian standards.

## F. Equipment and Utilities

### 1. Slaughtering and Processing Equipment

The slaughtering line will be continuous. Killing, defeathering, evisceration, cleaning and rinsing should be in line. Sorting and pecking of fresh meat should be on conveyors.

Collection of blood and waste should be by channels and conveyors to operational storage to be sent to the rendering plant.

Plant will be laid out in functional units.

### 2. Utilities.

#### a. Refrigeration

1. Tunnel blast freezer with 2 tons/hour capacity
2. Total 500 tons deep freeze chambers (2)
3. Total 300 tons cold rooms (2)
4. Total 150 HP ice flakes machines (2)

#### b. Air-conditioning

2 sections require air-conditioning with a total volume of 3200 m<sup>3</sup>.

#### c. Steam

In order to allow simultaneous operation, hot water for rinsing, steam guns, scaldar, cooking etc., 500 kg/hour of steam is required. In order to assure continuous operation at least two kettles are needed with a capacity of 750 kg/hour. Fuel oil consumption is 45 kg/hour.

d. Electric power	
1. For refrigeration	- $1.5 \times 10^6$ kWh
2. For air-conditioning	- $0.25 \times 10^6$ kWh
3. For production	- $0.25 \times 10^6$ kWh
Total	$2 \times 10^6$ kWh

e. Water  
Requirement of 40-50,000 m<sup>3</sup>/year

f. Manpower	<u>Man</u>
a. Direct labour (slaughterhouse)	130
b. Direct labour (processing)	125
c. Maintenance	25
d. Administration	35
e. Services	30
f. Technologist, veterinaries, Lab. staff	20
g. Others	<u>25</u>
	390
	-----

This manpower does not include staff in charge of livestock supply and marketing of produce. This staff would belong to the central office of the organization.

g. <u>Fixed Investment</u>	<u>Estimates in Thou. RD. (1972 value)</u>
1. Site preparation and development	700
2. Buildings	18,000
3. Refrigeration (including installation and chamber)	11,500
4. Production equipment (including installation)	19,000
5. Services and Piping	6,500
6. Engineering design	3,000
7. Product development	3,000
8. Market development	2,000
9. Running-in	800
10. Cages	1,000
11. Contingencies 5%	<u>3,500</u>
Total	<u>69,000</u>
	-----

Out of the fixed investment approximately the equivalent of \$1,500,000 will be in hard currency.

**W. Prepare Profit and Loss Account****Thous. of Dinars****1. Direct Production Costs****a. Raw material**

- 7,000,000 broilers x 1.7 kg x NO 8.-	95,000
- 300,000 layers x 2.5 kg x NO 5.-	4,500
- 100,000 turkey, geese x 11 kg (average) x NO 11.50	12,500

Raw Material Total	112,000
--------------------	---------

b. Additives and Packaging material	10,000
-------------------------------------	--------

c. Direct labour (including direct services)	10,000
--	--------

d. Operating expenses	1,500
-----------------------	-------

e. Clothing, sanitation, aux. materials, tools, etc	1,000
---	-------

f. Contingencies \$	7,000
---------------------	-------

Total Direct Production Costs	142,000
-------------------------------	---------

**2. Indirect Costs**

a. Supervision (consultancy, veterinary)	1,000
--	-------

b. Administration (office, travel, inspection)	2,500
--	-------

c. Taxes and insurance	2,500
------------------------	-------

d. Depreciation \$ of investment para 1,2,6.	1,250
--	-------

14% of investment para 3,4,5	4,250
------------------------------	-------

20% of investment para 7,8,9,11	1,250
---------------------------------	-------

33% of investment para 10	250
---------------------------	-----

e. Advertisement and marketing (promotion expenses)	5,000
---	-------

Total Production Cost	160,000
-----------------------	---------

**3. Income**

- Broiler poultry meat 5750 tons x 15,000 NO	86,500
--	--------

- Poultry liver 240 tons x 20,000 NO	4,800
--------------------------------------	-------

- Poultry giblets 480 tons x 11,000 NO	5,200
--	-------

- Poultry necks and legs 1000 tons x 1,500 NO	1,500
---	-------

- Poultry processed products 2000 tons x 32,000 NO (ave)	64,000
--	--------

- Processable waste 1800 tons x 1000 NO	18,000
---	--------

Total Income	180,000
--------------	---------

Surplus	20,000
---------	--------

This surplus - shown here as an indication only - will serve for payment of interest on the basic capital and working capital of credit funds put at the disposition of the enterprise, as well as for the surplus accumulation fund.

POULTRY SLAUGHTERING AND PROCESSING PLANTSENSITIVITY OF TOTAL PRODUCTION COSTS TO CHANGE IN MAIN COST ITEMS

ITEM	CHANGE IN ITEM ( $\pm$ %)				
	$\pm$ 10%	$\pm$ 20%	$\pm$ 30%	$\pm$ 40%	$\pm$ 50%
LEADS TO CHANGE IN TOTAL PRODUCTION COSTS ( $\pm$ %)					
Raw Materials	<u>7.0</u>	<u>14.0</u>	<u>21.0</u>	<u>28.0</u>	<u>35.0</u>
- Broilers	5.9	11.9	17.8	23.7	29.7
- Layers	0.3	0.6	0.9	1.2	1.5
- Turkey, Geese	0.8	1.5	2.4	3.1	3.8
Additives and Packing	0.6	1.3	1.9	2.5	3.1
Direct Labor	0.6	1.3	1.9	2.5	3.1
Overheads (1)	0.4	0.8	1.1	1.5	1.9
Depreciation (2)	0.4	0.9	1.3	1.8	2.2

1) Includes items M.2 a, b and c.

2) Item M.2 d total

same time not to discourage the producer, exact scheduling is needed in order that the producer can produce according to the lowest feed/meat conversion ratio. The fowl is marketed at the optimum period and a delay even of two, three days will worsen that ratio thus increasing the production cost per kg meat.

- B. In order to accomplish the a/mentioned, the producer has to conform to the processing plant requirement and concept whereby he has to adjust his production cycle accordingly. All this leads to large production units, modern poultry houses with up-to-date equipment. This will enable increased yield per sq.m. by more birds and weight and therefore will bring a large turnover and income with minimum manpower, good feeding facilities, good disease control, ventilation, early marketing and low feed conversion ratios.
- C. Poultry management according to such criteria is a modern operation, requiring skill and high investment. Therefore the personnel running the broiler operation has to be carefully chosen, well trained and to be in constant contact with extension services and up-to-date technical information.
- D. One of the most important factors in a broiler project is the feedmix concentrate plant from which it buys. Standardization, quality and prices of the feed is the make or break of the whole project, as the feed component composes 60-65% of the variable cost.
- E. Another important factor is the hatchery supplying the day old chicks. Good hybrids, freedom from diseases and again exact scheduling have a high influence on production costs.
- F. There are two different operation schemes suggested for the broiler production required in order to supply the chicken slaughterhouse with 7,000,000 broilers, equally dispersed the year around.
  1. Contracting out, i.e. production by cooperants.
  2. Centralized production, i.e. production by the Kombinet.

In the first scheme the candidates have to be carefully selected according to their ability and the accessibility (for transport) to their holdings. Applying modern technology, a run of 15,000 broilers, 5 times a year, should be recommended. In order to supply the capacity of the processing plant this scheme would require 100 growers supplying 140,000 broilers per week.

In the second scheme the same operation will be under one administrative roof.

#### Advantages of scheme 1

- a. Spreading of the risk
- b. Sanitation by isolation
- c. New income opportunity

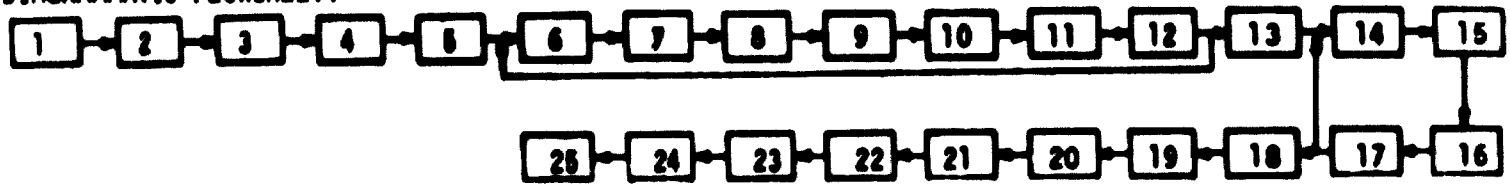
#### Disadvantages of scheme:

- a. 15,000 broilers per run is still a small operation
- b. training of at least 100 individual growers
- c. Difficulties in controlling the growing and marketing process

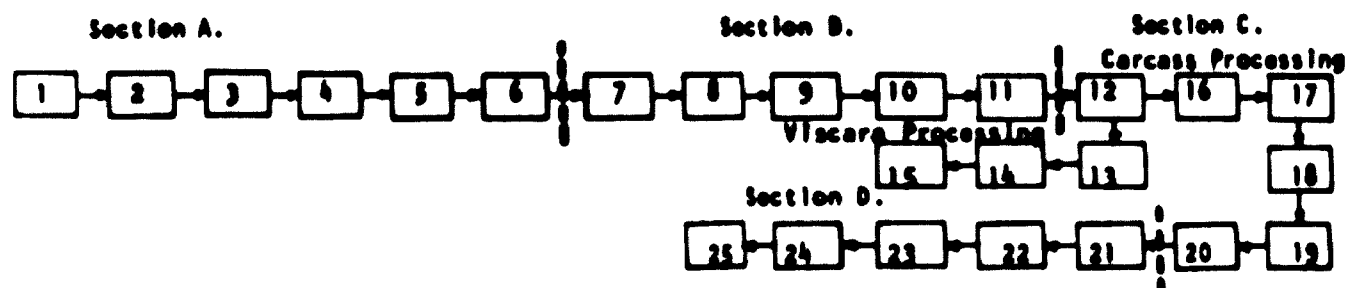


POULTRY SLAUGHTERING

## DIAGRAMMATIC FLOWSHEET:



- |                                  |                                 |
|----------------------------------|---------------------------------|
| 1 Truck                          | 14 Eviscerating Machine         |
| 2 Cages                          | 15 Vacuum Lung Remover          |
| 3 Roller Conveyor                | 16 Decapitator                  |
| 4 Scale                          | 17 Legs Saw                     |
| 5 Defeathering Conveyor          | 18 Parallel Flow Tumble Chiller |
| 6 Electric Stunner               | 19 Counter Flow Tumble Chiller  |
| 7 Scald                          | 20 Rail Sorter                  |
| 8 Primary Feather Picker         | 21 Inspection & Packaging Table |
| 9 Rubber Fingered Feather Picker | 22 Vacuum Packed                |
| 10) Finisher                     | 23 Clipper                      |
| 11) Flame Heads                  | 24 Shrinkage Tunnel             |
| 12) Shower                       | 25 Freezing Tunnel              |
| 13) Evisceration Conveyor        |                                 |

POULTRY SLAUGHTERINGCONSOLIDATED PROCESS SHEET**Section A.****SLAUGHTERING**

1. Receiving
2. Weighing
3. Hanging
4. Stunning
5. Sticking
6. Bleeding

**PROCESS NOTES**

1. Receipts of coops will be by unloading them from the truck to a roller conveyor.
2. The roller conveyor should include a scale weighing each coop. It is possible to use special trucks with fixed coops which can be weighed on a weigh-bridge.
3. From the coops the broilers are hoisted and hung on shackles of an overhead conveyor which leads up to the defeathering section.
4. Stunning is done by the touch of the head by a high voltage plate. If Yugoslav regulations permit this step should be skipped.
5. Slaughtering is recommended to be done by sticking. This is performed by cutting the jugular vein below the jaw without touching the vent pipe. In this manner 50% of deblooding is achieved instead of 35% by decapitating.
6. Will be done on the rail in a special room.

**Section B.****DEFEATHERING**

7. Scalding
8. Defeathering
9. Singeing
10. Trimming
11. Washing

7. By soaking in a scaldar at 48-55°C. The conveyor rail will lower the broiler into the scaldar.
8. By moving the broiler through rubber fingered feather pickers. There are required: 2 pickers which rotate the rubbered fingers parallel to the movement of the broiler and 2 pickers where the fingers rotate vertical to the broiler movement. Between the two types of pickers the broiler will be turned upside down on the shackle.
- 9-10. Small feathers will be singed and the trimming will be done manually with scissors and knives.
11. By moving through showers.

**Section C.****EVISCERATION**

12. Opening of Body Cavity & Evisceration
13. Washing & Inspect. of Viscera
14. Trimming
15. Packaging
16. Inspection
17. Lungs Pulling
18. Head Pulling
19. Neck Trimming
20. Legs Dropping

12. Opening of the body cavity will be done manually by knife. Evisceration will be mechanical with a stork type machine.
17. Lungs will be removed by a vacuum remover
20. Legs will be cut by a saw above a spin chiller

**Section D.****CHILLING  
PACKAGING  
FREEZING**

21. Chilling
22. Dripping
23. Grading
24. Packaging
25. Freezing

21. In two baths. One a parallel flow and the other a counter flow tumble chiller.
23. Grading according to size will be done by rail sorter, rail scale and dropper.
24. In vacuum. Shrinking bags will be soaked in hot water.
25. On a conveyor moving through a freezing tunnel. Leaving the tunnel the broilers will be cased in cartons on pellets for storage.

### 13. RENDERING PLANT

#### A. General

The profitability and added value of the meat complex can be increased by a rendering plant integrated in it.

Rendering facilities in BK have not yet been developed for the absorption and treatment of the products of the existing slaughtering facilities.

This plant, apart from adding products, would solve certain pollution problems which will aggravate as slaughter facilities and livestock production are going to grow manifold in the area.

The burial of the by-products, instead of processing them in the rendering plant, creates foul smells and spread of rot. If in addition, the disposal costs are calculated, it can be considered that not only is there a loss of produce, but the starting point of production in this plant - the raw material - has an initial negative value.

This plant should serve not only the new slaughterhouses recommended in this project, but all existing facilities as well.

The plant - which in its initial stages also appears in the Kombinat development plan - should therefore have a priority within the meat complex as it can start to produce, with reduced equipment, before the full implementation of the project - based on supply from existing slaughtering facilities and other sources - producing among others import substituting products such as blood meal, meat meal, etc.

#### B. The input of the plant will be:

Bones, blood, hoofs, viscera and their contents, rejected animals, carcasses and meat, non-saleable glands, pig hides in excess of tannery requirements, fat for processing into edible (lard) and non-edible (tallow) products, feathers, chicken heads and legs, manure, brewery waste, etc.

The sources of inputs are:

Slaughterhouses, meat processing plants, livestock farms, butcher shops, breweries.

The output is a wide range of products which will have to be studied in detail. Some products of the rendering plant are fed to animals as high protein components in the feedmix. Experience and comparison with other similar meat complexes in the world indicate the economic feasibility of such a plant.

#### C. Location of plant(s)

Whether one or several plants should be erected depends on the location of the other plants within the meat complex (centralized or dispersed).

The by-products which will be available from the meat complex as well as from existing sources will supply inputs for more than one economic-size plant.

#### D. Investment and Turnover

As stated before this plant needs a special study to define the range of products. However, it is recommended that a plant starting with a 30 ton/day throughput, which will later increase, should use, apart from

conventional methods, continuous and low temperature systems. Equipment should include, inter alia, hashers, shredders, screw and belt conveyors, screw and bucket lifts, cookers and presses fed by blow systems, pneumatic systems, surge tanks and pumps for fat handling, fat separators and purifiers, sludge tanks.

The investment is estimated to be 40 - 50 million Dinars, out of which the equivalent of \$1 million will be in hard currency.

The expected turnover is assumed to be ND 160 million. Half of the inputs will come from the meat complex while the rest will be supplied from existing supply sources and the increased livestock breeding.

\* \* \* \*

#### 14. INCOME TO THE REGIONAL ECONOMY FROM THE BK MEAT COMPLEX

The following table shows estimates of the total financial requirements to establish an integrated agroindustrial meat complex in BK, as well as the potential financial results - all based on the autumn 1972 and international price levels.

The capital investments are based on the assumption of a set of decisions by the authorities to use a modern feeding system all over - which determines the size of investments in livestock breeding and feeding as well as in all other phases.

Most of the working capital requirements are in dinars while the basic investment is shown in its diner and hard currency parts. It should be remembered that the working capital items cannot be added up since they represent to a large extent the same funds which are wandering from stage to stage during the crop planting, growing, harvesting, processing cycle, respectively the livestock breeding-processing cycle.

The data - all of which are based on checked experience calculations for each type of investment - show that in order to achieve the complete program, the following fixed investments will be required:

	Total \$ mill.	Hard currency - part \$ mill.
Feed Crops and Forage Production	1.5	0
Soybean Processing	5.5	3.5
Feedmix Production	22.0	10.0
Livestock Production	31.2	1.5
Meat Production	<u>25.6</u>	<u>10.5</u>
Total Fixed Investments	<u>85.8</u> *****	<u>25.5</u> *****

The income to industry and agriculture in the area from the total operation would be \$109.4 million annually, of which \$79 million would be "remaining in the area", and constitute a direct net addition to the area income, i.e. about \$100 annually increased real per caput income, calculated at minimal interpretation of this concept. This net income would be after deductions of all purchases outside the project area, amortization, etc.

\$69.5 million out of the \$109.4 million would be hard currency earned by the region's agroindustries meat complex from direct and indirect exports and direct substitution of hard currency imports.

It ought to be stressed that the above calculations consider each input component once only. In "national product" accounting the inputs are calculated repeatedly, at each transfer stage. Therefore the net added value of 79 million dollars is a minimum concept and represents the net real increase (from this part of the BK project) of disposable incomes by individuals and enterprises in the project area (Note: Federal taxes were accounted in the part of the 103 million dollars going outside the area). By standard "national product accounting" the "project area added product" would be a multiple of this sum - perhaps about 2.5 times the sum.

The above calculation does not take into account the additional benefits from those wholesale or retail trading turnover, transport and other service activities in the region which would be generated by the phases of the project.

Of the \$60 million dinars-component of fixed investments a large part will actually be paid out initially within the region for wages, services and materials included in the basic investment.

It is seen clearly from the investment table that the major part of the total basic investments will be in the intensification of livestock breeding, i.e. in cattle-breeding facilities at the farm and in feed-mix plants. These investments could be somewhat decreased but this would have an immediate effect on the whole meat production cycle, i.e. less investment would mean less overall efficiency, less quality, less turnover and therefore less income and profits. A rough calculation shows that even at maximum decrease in investment which would still leave the overall system intact, the investment savings would be "eaten up" in 2.5 to 3 years by loss of income and decreased profits. We would emphasize that the investment figures per head of cattle and per feedmix ton were already pared down to basic functional needs only, just sufficient for a fast concentrated fattening cycle under the climatic and environmental conditions in the project area.

Summarizing, the integrated agro-industrial BK meat complex represents a scheme which offers an opportunity of practical stagewise execution. By organizing, intensifying and upgrading local resources a large increase of regional percaput income can be achieved within a few years. The scheme deals with fairly assured markets, known resources and technologies. Investments, procedures, timetables, expectations are based on Yugoslav and international figures and performance experience. The individual agricultural and industrial units can be profitable, assuming they are set up and operated within the whole agro-industrial chain - if one part of the chain will be left regressive, the other parts will pay the direct and indirect penalty of the regressivity.

The "system profit", i.e. the added net disposable income generated - representing the net value of all work and surpluses along the chain - will be about 79 million dollars per year after the system operates fully.

The amount of work estimated along the chain will be about 50 million hours annually, of which 5 million will be in the industrial (meat processing, soybean processing and feedmix production) phases and 45 million in the agricultural crop production and livestock breeding phases - since 20,000 agricultural full time workers plus 2,000 industrial workers will be needed for the productive cycle (Transport, trading and other services are separate). These 50 million hours will generate \$109.4 million, total ex-factory sales, i.e. about 2.20 dollars per hour worked, of which about \$1.60 per hour worked will be net income remaining in the region.

BK ANIMAL PROTEIN PRODUCTION/PROCESSING COMPLEX  
ECONOMIC DATA OF AGROINDUSTRIAL CHAIN

Note: Income counted once only - no vertical transfer accounts included.

Project	Fixed Investment		Working Capital	Yugoslav Consumption for Dinars		Expert for Hard Currency (Imports = "-")		System Added Value
	Total	Of Which Foreign Currency		Total	to meat production	Foreign Tourists	Abroad	
<b>SECTION 1</b>								
1. Feed production/supply								
1.a. Meadows/pastures improvement	0.5	-	0.5	to meat production				11.5
1.b. Additional maize/sorghum grain production	1.0	-	5.0	to feedmix to plant				
1.c. Soybean processing			10.0	to process to plant				13.0
Alt.A.1. Soybean production			10.0	to feedmix to plant				
2. Processing plant	5.5	3.5	10.0	sales of oil & meal				2.5
							70,000 t meal in region	7.0
							55,000 t meal out of region	5.5
							30,000 t oil	8.5
Alt.B.1. Soybean imports			5.0					
2. Processing plant	5.5	3.5	10.0	to feedmix to plant				2.5
				sales of oil & meal				
							70,000 t meal in region	7.0
							55,000 t meal out of region	5.5
							30,000 t oil	8.5
Alt.C. Soybean imports			2.0					
<b>SECTION 2</b>								
1.d. Feedmix plant intensive	22.0	10.0	10.0	to meat production				1.0
				(connect. with 1.b. and 1.c.)				
2. Meat production								
2.a. Cattle	20.0		13.5	to meat processing				19.0
2.b. Pigs	5.0	0.2	2.5	to meat processing				
2.c. Broilers	5.0	1.0	0.5	to meat processing				1.3
Alt.B.1. Soybean imports			5.0					
2. Processing plant	5.5	3.5	10.0	to feedmix to plant				2.5
				sales of oil & meal				
							70,000 t meal in region	7.0
							55,000 t meal out of region	5.5
							30,000 t oil	8.5
Alt.C. Soybean imports			2.0					
<b>SECTION 3</b>								
1.d. Feedmix plant intensive	22.0	10.0	10.0	to meat production				1.0
				(connect. with 1.b. and 1.c.)				
2. Meat production								
2.a. Cattle	20.0		13.5	to meat processing				19.0
2.b. Pigs	5.0	0.2	2.5	to meat processing				
2.c. Broilers	5.0	1.0	0.5	to meat processing				1.3
2.d. Hatchery	0.7	0.2	0.2	to broilers				
2.e. Reproduction flock	0.5	0.1	0.1	to hatchery				
3. Meat processing								
3.1. Cattle/pig slaughterhouse & processing plant	19.1	8.0	6-12	72.5 + to rendering plant	17.5		25.0 (beef/veal only)	23.0
3.2. Poultry slaughterhouse & processing plant	4.0	1.5	2-3	9.5 + to rendering plant	4.5			2.5
3.3. Rendering plant	2.5	1.0	1.0	9.5	9.0		0.5	5.2
Total (Alternative 1.C.A)	86.8	25.5	xxx	100.4	61.9	22.0	25.5	79.0

\* to be provided by processing plants.

15. CALCULATION OF THE NETT ADDED VALUE INCOME TO THE PROJECT AREA  
FROM THE MEAT COMPLEX

A. The specific calculation of added value for each agroindustrial activity phase is given below. The results for each phase are included in the right column of the table.

1. The value of agricultural products (forage and grains) is estimated at 50% of the purchase price by industry, for cattle and pigs and 70% for broilers.

Purchase price of cattle/pigs = 807,000,000 ND x 50% =	ND 403,500,000
Purchase price of broilers = 112,000,000 ND x 70% =	<u>78,500,000</u>
Total purchase price of animals	ND 482,000,000

Assuming that 60% of the value of the agricultural products is labor, surplus and other inputs from the region, the regional added value is:

ND 482,000,000 x 60%	ND 290,000,000
----------------------	----------------

(The other 40% are fertilizers, seeds, chemical and machine use costs which are assumed to go outside the project area - but almost all still within Yugoslavia)

2. In order to supply the soybean processing plant with 500 tons per day for 330 days a year, 165,000 tons are required. The feedmix for the meat production referred to in para.1. above, on the basis of 20% soymeal, requires 55,000 tons of soymeal which are extracted from 70,000 tons of soybeans. The added value of these 70,000 tons was calculated in para.1. Assuming the price of ND 2.20 per kg. of soybeans, the remaining 95,000 tons of soybeans will provide the region an added value of :

95,000 tons x ND 2,200/ton x 60% (similar to para.1.)	ND 125,000,000
--	----------------

3. The nett added value of soybean processing is assumed to be two thirds of the total added value of 62 million ND
- |  |               |
|--|---------------|
|  | ND 41,000,000 |
|--|---------------|

4. The added value in the feedmix plant is assumed to be:
- |                                     |               |
|-------------------------------------|---------------|
| ND 60.-/ton; 273,000 tons x ND 60.- | ND 16,000,000 |
|-------------------------------------|---------------|

5. In meat production it is assumed that 30% for cattle/pigs and 10% for broilers of the purchase price by industry is the remuneration for labor and surplus earned by the producer. Another 10% of the purchase price is the value of the calf/piglet/day-old chick

ND 807,000,000 value of cattle/pigs (para.1.) x 40%	ND 323,000,000
--	----------------

ND 112,000 value of broilers (para.1.) x 20%	<u>ND 22,000,000</u>
---	----------------------

Carried forward	ND 817,000,000
-----------------	----------------

Brought forward	ND 817,000,000
6. Added value in the meat complex (slaughterhouse, meat processing plant, poultry slaughterhouse and processing plant) is calculated for labor, surplus and different percentages for other production costs (not including purchase of raw material)	ND 433,000,000
7. Added value at the rendering plant is estimated at 22% of ND 160,000,000 turnover (for similar items as para.6) + 33% which is 50% of inputs coming from sources which up till now threw them away	ND 88,000,000
Total regional added value	ND 1,338,000,000
	\$ 79,000,000
	*****

#### B. Value of Meat/Soybean Complex Production

1. Slaughterhouse and meat processing plant ND 1290,000,000 - ND 60,000,000 sold to rendering plant	ND 1,230,000,000
2. Poultry slaughterhouse and poultry processed products plant: ND 180,000,000 - ND 18,000,000 sold to rendering plant	ND 162,000,000
3. Rendering plant	ND 160,000,000
4. Soyoil 30,000 tons x ND 5,000	ND 150,000,000
5. Soymeal in addition to the amount required to produce the meat (para 1-3): 70,000 tons x ND 2 20	ND 154,000,000
Total value of meat/soya complex production (ex-factory prices)	ND 1,856,000,000
	\$ 109,400,000
	*****

Percentage of regional added value:

ND 1,338,000,000 out of ND 1,856,000,000 72.1%

\* \*



16. RECOMMENDATIONS

A. Short term

- Encourage crossbreeding (Bosho-Simmenthal) in order to obtain higher liveweight.
- Eliminate the slaughtering of young calves and piglets.
- Facilitate credits, extension service and supply and marketing organization to the cattle farmers.
- Establish cooperation and coordination between the new abattoirs of Benja Luka and Bosanska Gradiska.

B. Long term (5 years)

- Modernize and enlarge slaughtering and meat processing facilities in BK.
- Widen the range of processed products.
- Establishment of a modern, large scale, meat complex integrating raw material production with meat processing.
- Increase broiler production and processing, together with own supply of fertile eggs and hatchery services.

\* \* \* \*

**Volume II**

**02348**  
(2 of 2)

**Foodprocessing Industry Development Plan  
for Bosanska-Krajina Region  
YUGOSLAVIA**

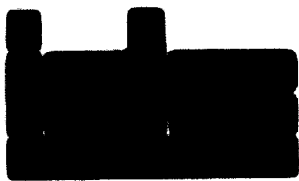
**Final Report**

**Submitted to UNIDO**

**The United Nations Industrial Development Organization**

**UNDER CONTRACT 72/20-DU/YUG/71/514**

**by**



**INDUSTRIES DEVELOPMENT CORP. (International Services) CO. LTD.**

**ISRAEL**

**June 1973**

#### Advantages of scheme 2:

- a. Economy of scale in investment, production costs and organization
- b. A well designed "meat city" can be run by a fraction of the total of family operators involved in the same amount of production. A team of about 20 - 30 should be able to do the job.
- c. Maximization of mechanization, which is technically feasible and economically profitable.
- d. Less, and therefore more rapid training time for the operators.
- e. Quicker and more reliable "transformation of information" from various sources.
- f. Optimum location according to the road net and the location of the slaughterhouse.

#### Disadvantages of scheme 2:

- a. Higher risk in case of epidemics.
- b. Highly tight in scheduling.
- c. High management requirements.

6. A growing cycle of 70 days is recommended out of which 56 days are for actual growing and 14 days are for disinfection, cleaning and "resting" of the poultry houses.

The average broiler should weigh 1,65 - 1,75 kg for marketing and a conversion ratio of 2,5 should be achieved. Average mortality should be not more than 4,5%. The suggested system for raising is on a deep litter floor in closed climate controlled buildings. Bird population should be 12 - 14 per sq m.

#### M. Inputs-Outputs

1. Hatching requirements - 140,000 per week net x 52 weeks x 95.5% = 7,000,000.
2. Feed requirement - 12,000 tons x conversion ratio 2,5 = 30,000 t
3. Production - 7,000,000 broilers x 1.7 kg = 12,000 tons.

#### I. Fixed Investment

For 1,500,000 broilers per run a built area of about 125,000 sq.m. will be required. On the basis of ND 700 per sq.m. (including equipment) an investment of ND 87,500,000 should be assumed.

### 9. HATCHERY

The establishment of a regional modern hatchery, serving the area by supplying dayold chicks of quality, is of paramount importance to the poultry branch as a whole and in order to supply the recommended broiler operation in particular.

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Detailed List of the Graphs and Maps of the Appendix is given at the beginning of the Appendix - Volume II Section 6.

\* \* \* \*

## 10. PRODUCTION OF ANIMAL FEEDSTUFFS AS A BASIS FOR INCREASED MEAT PRODUCTION

### 1. THE GENERAL POSITION IN BK

If there will be a decision to expand the regional meat production sizeably - according to the recommendations in this report or according to a different priority schedule - large amounts of animal feed will be required. These requirements will be partly diffused over the region, wherever cattle or pigs or broilers will be contract-fattened, and partly at central points such as large pigfarms and cattlefarms and broilerfarms.

The Kombinat has today a feedmix plant in operation in Nova Topola, centrally located in the plains at the main road near its fields and pig and cattlefarms, whose capacity has been increased from 15,000 to 30,000 annual tons feedmix concentrate with initial provisions for later doubling. Its output is partly consumed by the Kombinat, partly by private cooperants and partly marketed to other private farmers. As far as we could ascertain by visits and formulae examination the Kombinat is efficiently employing feedmix in its own operations to the best of its present knowledge. However, due to the rapid changes and constant progress in this field in many countries it might be useful if the Kombinat staff dealing with this working branch were strengthened by effecting closer cooperation with other agroindustrial Kombinats in Yugoslavia and neighboring countries, with the regional and other agricultural institutes, with the KRMIVA feedstuff association, with the CENTROPROM oilmeal import organization, and with other various bodies abroad from which specialized information and advice can be had continuously, often on an information-exchange basis without payment. Considering the increasing and critical importance of this branch to the whole of the meat economy it would be advisable to establish a special permanent workinggroup to deal with these matters, including a multilingual technical assistant for correspondence and liaison work, and library upkeep.

It is perhaps not sufficiently realized yet on all levels of planning and decision in BK that the massive and quick improvement of animal feeding throughout the region is a "conditio sine qua non" for the realization of increased and continuous meat exports. The feedstuff problematics are treble:

- 1) Efficient utilization of available land resources so as to increase productivity and maximize income (including the foreign currency component of income) - i.e. producing a feedunit at lowest dinar and dollar cost;
- 2) Assuring the best quality of final product so as to compete on the quality market abroad, by scientific regulation of feedmix, adapting to special market needs and diffusing this knowledge (and its application) to all producers of the region;
- 3) Optimizing on self-cost by regulating feedmix and feeding/fattening schedules, i.e. optimizing the amount of feedunits given by manipulating between time, mix, etc.

Much progress has been made in these directions in BK in pig fattening but in the other main branches (cattle and poultry) a coordinated effort will be required to improve the overall standards.

The price, choice and acceptability of beef on the Westeuropean and other beef import markets is being more and more determined on the basis of standard qualities achieved in these countries by their own cattle, or by the best imports they can buy. These qualities are achieved by constantly improving feeding methods.

\* \* \* \*

### 2. THE ANIMAL FEEDSTUFF POSITION IN YUGOSLAVIA AND ITS IMPLICATIONS FOR BK

Like other branches of BK food/feedprocessing activities the development of feed has to be seen within the context of Yugoslavia as a whole.

Due to the diffused geographical pattern and the widely varying practices little centralized correlated information is readily available and it was required to collate sources and data from various regions in order to present conclusions which have validity for the project area and which could lead to execution decisions.



a) Practices

The social sector uses maize-intensive feeding systems with concentrates for pigs and poultry and also for cattle, with highest use on the babybeef exported to Italy, and high use on the centralized pigfarms. The private sector uses some concentrates (industrial feedmix or locally prepared) in the more developed regions of the Federation and particularly so whenever contract-fattening takes place between agroindustrial Kombinats and private cooperants. Thus the use of feedmix concentrates by the private farmer is - within the overall ever-existing simplified shortterm price calculations that he makes - a function of the environment in which he raises his livestock, and of the market end-use (delivery to organized market, or random peasant market sale or home use).

Most of the livestock raised by the private sector - which produces the majority of the livestock as can be seen from various statistics in this report - is fed partly on/from unimproved pastures and meadows/grazing plus hays supplemented by grains (mainly maize) without balanced or precalculated feeding, and influenced heavily by strong fluctuations of the freemarket prices for grains. The authorities are aware of the situation and wherever organized development conglomerations exist (Kombinats, effective communal leadership, coordinated work of institutes, etc.) budgets are sooner or later found to gradually improve matters. These improvements are carried out mainly on specific local areas, due to the decentralized decision-making structure.

b) The Present Market and Use Pattern

There are about 80 feedmix concentrate plants in the Federation with a total rated capacity of about 1.2 million tons and estimated 1971 production of about 1.5 million tons (of which about 80,000 t in B&H). 7 plants are large, 15 medium-size, the rest small. In addition there are about 250 small farmoperated home-mixing installations which buy oilmeal/fishmeal protein concentrates and use them as additives to their grains.

There are some trade estimates of higher capacity. These are mainly due to the various definitions current in Yugoslavia of feedmix concentrate or compound feeds.

Mix end uses in 1969 were in percent of total sales:

Pigfeed	44	
Cattlefeed	29	(Mainly for calves and "babybeef" - small quantities for dairy cattle, mainly at PİK Beograd)
Poultryfeed	25	
Other	2	

There is evidence that due to the continuous expansion of the poultry branch the share of poultryfeed is becoming larger

80% of feedmix concentrates are being used by the social sector. The majority of animals are in the private sector so that despite higher meat output per animal the social sector produced about 20% only of the total meat (1971 total meat production was 922,000 tons). This shows determinatively the underexploitation of the economic advantages that modern feedmix technology and organization could give in increasing meat production for competitive exports, and to lower prices on the internal market. Also, by using accepted "conversion ratios" of feedmix units per kg. of meat production, and applying them to the amounts of total meat produced, it is seen that much more feedmix concentrate than 1.6 million tons should have been used. Also, discussions with KRMIVA and others have shown that there is awareness on this central matter, that the bottleneck is not so much in the capacities or in a lack of decisions to increase those capacities. The bottleneck is rather in the too low use of high grade protein components by the total livestock economy. This is caused by insufficient allocation of foreign currency, since most of these components - mainly soybeanmeal - have to be imported against hard currency. It is considered by the feedstuff association and others that the required annual quantities of highgrade protein (expressed in soybean meal tonnage) are today between 400,000 and 500,000 tons.

Actually, soybeanmeal Imports were:

1966	67,	68	69	70	71	72	
145,000	104,000	130,000	153,000	150,000	About	120,000 per year	USA Data. Accdg. Yug. Data 157,000. Diferencia probably due to stocks.

This means a hardcurrency allocation, up to 1972, of 16 to 18 million dollars for this protein component which is the critical one (see section on soybeans in this chapter). In addition, small amounts of protein are imported in the form of peanut meal from India, fishmeal from Peru, and some meat meal.

Considering that there was and is open export demand for Yugoslav beef which could not be met, it could be shown that for each dollar additional protein component import - OR by supply of such from internal production by planting soya - about \$ 4 hardcurrency could be created by additional meat exports. These considerations held till autumn 1972 and are much stronger since the drastic recent rises in soybean and meat prices.

It is not within the scope or intention of this report to deal with the whole Yugoslav feedstuff economy or to question the governmental considerations on priorities of hardcurrency allocations. The data and evaluations are presented only as an aid for decisions towards possible feedstuff projects - industrial and agricultural - in the BK project area, both towards a high increase of regional meat output and as an economically viable project by itself.

The facts are that many years ago when world feedstuff patterns were different Yugoslavia was a granary and exported feeds. Today Yugoslavia is self sufficient in almost all the cereal grain components but has to import almost all of the protein components it uses - and, as said before, this leads to severe underuse of highgrade protein feed. Any larger longterm development project in the BK region in the meat and feedstuff branches should in our view take these factors into account in its major decision. The problem is formulated here in this manner since in the team's discussions, plus evaluations of development programs submitted by the Kombinat (and other agroindustrial Kombinats), it was clearly seen that their forecasts of feasibilities and profitabilities of expansion projects - although made in great detail - were essentially based on the concepts of:

- The present use pattern, production pattern and marketing pattern - with a generalized statement that a part was to be exported.
- A price pattern which reflects the internal price structure for inputs and outputs without the alternative of presenting to the financing institutions and the authorities a hardcurrency balance - even at a fixed dinar conversion rate - achievable through changed production patterns
- Seeing their specific project isolated from the vertical economy of the region and isolated from the same branch of activities in other parts of the country. This may be correct in a rigorous examination of proving self-profitability but it was agreed during roundtable meetings held with the managements concerned that better and faster development can be achieved by seeing each project in its wider aspects and creating the mechanisms now that can lead to simultaneous coordinated development of all the production factors of importance to the project.

### c) The Market Forecast

Various forecasts in Yugoslavia speak about 1975 consumption of 3.2 million tons industrial feedmix concentrate (compared with 1971 consumption of about 1.5 million tons). Total mixed feeds (including simple home mixes) consumption - estimated at 6.8 million tons in 1970, is expected to go up to 8.5 million tons. This would mean an increase in the percentage of industrial feedmix concentrate use, out of total mixed feed use, from 21% in 1970 to 37% in 1975. Overall quantitywise these data correlate (1970 meat production - 850,000 tons, 1975 forecast - 1,150,000 tons) and the economics as well as exportability will depend heavily on upping the percentage of feedmix concentrate, and the full use of the best protein components in these concentrates.

This problem has recently been recognized on a national scale in various East European socialist economies within their meat production and meat export policies. Poland and Hungary have strongly increased their imports of soybean meal - 110,000 and 156,000 tons in 1970 - although Yugoslavia still is the largest single socialist importing country. Rumania has today above 120,000 hectares under soybean cultivation (1966 - 18,000 hect.) and is increasing its hectarage, with present production of about 200,000 tons soybeans. Thus it can be seen that in its meat export drive Yugoslavia will soon be faced not only with the market impact of quality-feeding livestock inside the importing countries but also with the competitive effects of other meat exporters adopting the methods demanded by the import market pattern.

In the social sector of meat production in Yugoslavia soybean meal is today used at the following rates:

	% soybean meal
<b>Pigfeeding</b>	
Starter feeds	20
Grower feeds	10-15
Finishing	20-30
<b>Poultry</b>	
Broilers	16-25
Layers	8-15
<b>Dairy Cattle</b>	10-17

Meatcattle - as far as one can distinguish specific meatcattle production from dairy cattle since presently dualpurpose cattle raising is the rule - are mainly produced by the private sector and, apart from some cooperation contract-fattening, the use of proteinmeal is very erratic, and in the poorer regions almost non-existent.

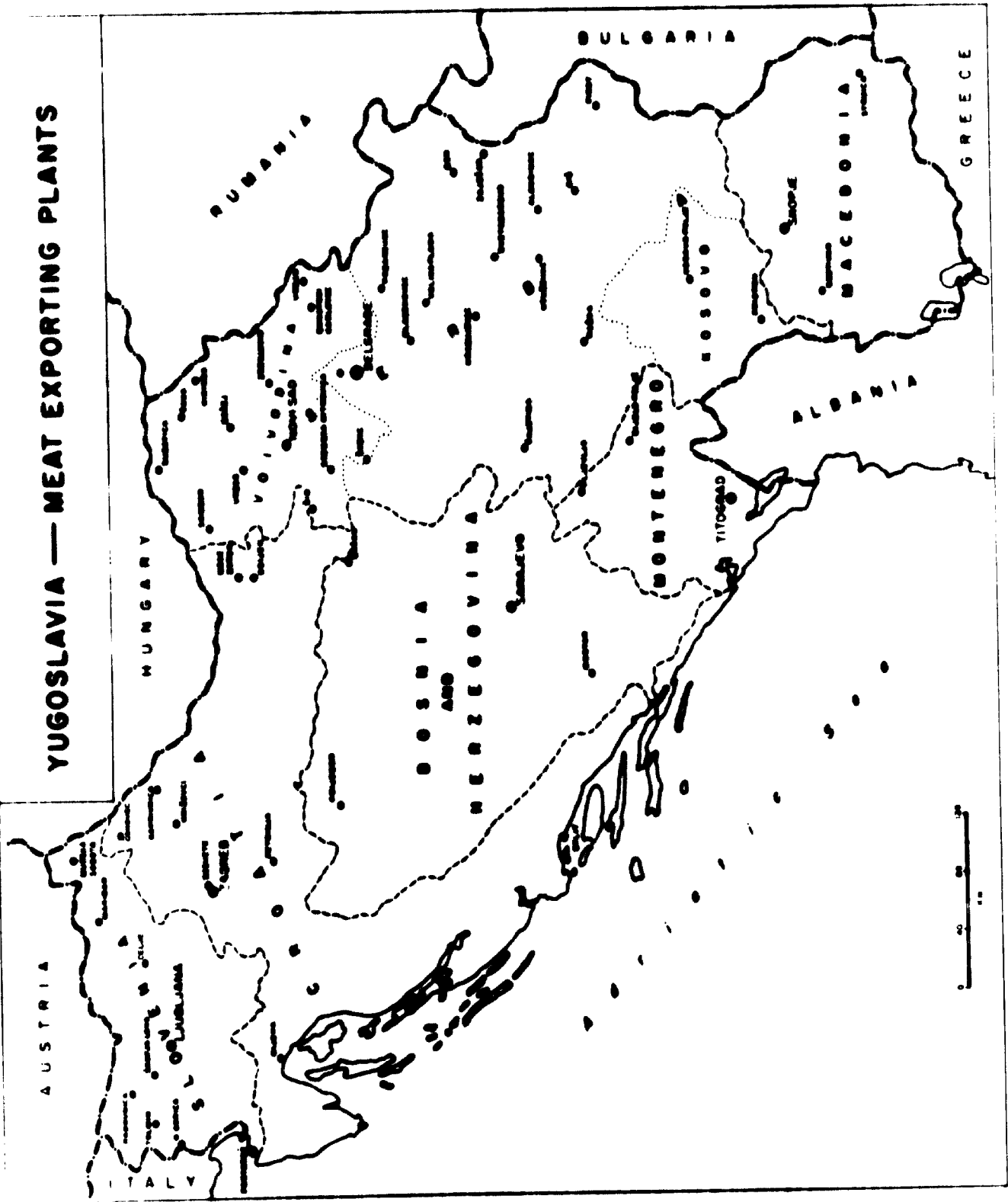
The above data are given here, rather than in the section on soybeans, to show that the increase of meat exports, expected to come from the private sector in the BK project area like in other areas of the Federation, will require as a basis the supply to the private sector of highgrade protein components at least at the rate of present use in the social sector, if significant results are to be achieved economically, or at all. Also, all directions of the forecast show that highgrade feedstuff and/or its components will have a growing and good market in the region and outside it. The project area is fairly centrally located, supplywise and transportwise, in relation to the meat exporting plants in Yugoslavia (see FAO map overpage), and would therefore qualify, also on national account, as one of the optimum areas in the Federation to develop a strong feedstuff industry base.

d) Present Domestic Production of Animal Feedstuff Components

From the Federal Statistics the following data are extracted for domestic production of animal feedstuff components in 1971 ('000 tons):

<u>Forage Crops</u>	<u>Yugoslavia</u>	<u>B &amp; H</u>
Lucerne	1,892	117
Clover	992	107
Vetch	61	0
Cow Peas	11	0
Meadows	3,321	366
Pastures	1,533	N.A.
Forage Beet	<u>670</u>	<u>0</u>
Total	8,480	590
	-----	----

# YUGOSLAVIA — MEAT EXPORTING PLANTS



<u>Cereals</u>	<u>Yugoslavia</u>	<u>B &amp; M</u>
Maize	7,443	465
Barley	464	74
Oats	312	95
Sorghum	<u>11</u>	<u>0</u>
Total	8,230 =====	634 ===

Crops, parts of which can be used as feedstuffs after processing separation:

Oilseeds

Sunflower Seeds	347	0
Soybeans	4	0.5
Sugarbeet	2,961	21
Synthetic Components		
Urea	Some (N.A.)	0

Minerals/Vitamins: Sufficient production  
by pharm. enterprises

Certain quantities of maize and sunflowerseeds are exported, depending on international prices and individual arrangements of exporters.

Regarding feedmix concentrate production, 1971 production was distributed approximately as shown below:

1971 Feedmix Concentrate Production in Yugoslavia, by plant  
size grouping and by republics (in '000 tons)

	<u>Up to 20,000 t</u>	<u>20-50,000 t</u>	<u>50,000 t and More</u>	<u>Total</u>
Bosna i Hercegovina	-	20	65	85
Crna Gora	15	-	-	15
Hrvatska	50	190	330	570
Makedonija	30	-	-	30
Slovenija	75	100	-	175
Srbija	<u>50</u>	<u>270</u>	<u>305</u>	<u>625</u>
Total	220	580	700	1,500

The hatchery is a 'must' to assure the stability of the broiler processing industry, and to control the quality of the final product. The hatchery can serve also as an instrument to organizational and financial supervision of the cooperants linked with the broiler operation. This by controlling the start of the growers' production cycle, and on the other hand by providing the grower with approved stock at a reasonable credit line as the cost of the dayold chick composes 30-35% of the variable costs of broiler production.

It is advisable, and even imperative to link a reproduction unit to the hatchery. This reproduction unit supplies the fertilized eggs to the hatchery and thereby constitutes an integral part of it. In fact these two operations have to be run as one entity. The location of both units and the distances from each other as well as from the broiler growers is of great importance. Although the laying houses should be apart from the hatchery they can be in a radius of a few kilometers. But both should be quite far from the growers and the slaughterhouse for reasons of essential isolation to ensure maximum sanitation. Each housed laying-hen should produce 110 - 130 fertilized hatchable eggs per year. This figure is the average expected nowadays from a first class heavy meat type hen. In the hatchery 72% of A grade dayold chicks should be expected.

In order to supply weekly 140,000 dayold chicks to the broiler growers, a hatchery, for this operation only, will require approximately 200,000 eggs weekly. Since the incubation time is 21 days and an additional week is necessary for cleaning and disinfection, the hatchery has to have a capacity of minimum 800,000 eggs. In addition it is customary to consider a safety margin of 10% for mechanical breakdowns. Therefore, including some sales apart from supplying the broiler operation, a hatchery of 1,000,000 eggs should be envisaged. Accordingly the reproduction unit should have theoretical capacity of 75,000 - 100,000 laying hens. For climatcal reasons there are fluctuations in the production during the production cycle of the laying hens. Therefore in order to assure a constant and minimum oscillation in supply to the processing plant an increase of 15 - 20% of the reproductive flock should be considered. It is assumed that both operations, the reproduction and hatchery, will not be established in one phase. Therefore the correct ratios will have to be computed in accordance with local results.

It is not advisable to link at this stage to this operation a master breeding line of "grandparent stock". This would be a big operation entailing a lot of experience, expert knowledge and financial resources. It would be much easier and cheaper in the short and medium run to use the stock of existing large enterprises of international reputation, like Hubbard and others.

The recommended size of the hatchery, i.e. 1,000,000, is by itself a large operation with many built-in possible pitfalls. Before embarking on any enlargement project, all phases of the operation have to be thoroughly mastered. However, when designing these operations it should be done in such a way as to facilitate the enlargement of both the hatchery and the reproduction facilities in the future, be it for increasing the broiler operation, the egg production of the region or marketing dayold chicks outside the region. The planning of the enterprise as a whole has to be coordinated with itself, as well as with the training of personnel, in order to avoid mistakes which might prove costly.

## 10. BASIS OF FEASIBILITY EVALUATIONS FOR THE BK MEAT INDUSTRY COMPLEX

- A. The plants as shown here are based on the state of technology and economy of scale of today but with emphasis on product lines envisaged as market requirements - domestic and export - for the period from 1975/76 onward.
- B. It was assumed - for presentation purposes here only - that several critical procedures would not be changed, and feasibility data were based on that assumption. The main procedures involved are:

e) Forage Crops

The total forage crop production, shown in subsection (d) before, is insufficient for a large increase in livestock production. Increased production of forage crops would seem to be of critical importance, just like the solution of the protein component on the other end of the spectrum of the feed problem. Also, increased forage crop production can to a certain extent compensate for the deficiency in total consumption of protein concentrates, particularly if feeding, too, is modernized such as organized production and supply of lucerne flour. Also, the quality of the voluminous parts of the roughage in forage, particularly hay, contributes to the quality of livestock produced and thus the problem is not only of increasing the productivity of the areas under forage crops but also their quality regulation.

This problem is very acute in B&H and in BK. In BK a good part of the hectareage reserves which can be productivized are pasture and meadow areas in the hilly region which must be taken into account as production potential for any large increase in livestock production, and there is also some arable land in the region under forage crops, particularly in the lowlands in the Bosanska Gradiska part of the project area.

Some investigation has been started in Serbia, Croatia and Slovenia for increasing livestock production from pastures. First results indicate that dry matter yield per hectare (present Federation average 2 t/ha) could be doubled or trebled by simple systematic techniques for meadow improvement, such as fertilizer application and weed control. Also, the intensification of pasture output - again by 200-300% - can be achieved on natural meadows in the hills by seeding, fencing and other agrotechnical procedures.

Comments on this problem have been made by FAO and it is beyond the scope of this report to go into details, except to show this problem to be a strong limiting factor on the one hand but opening up a large potential as a solution to part of the feed problem, on the other hand. It should be borne in mind that very large improvement can be achieved in a short time in this branch by (1) dinar resources - no foreign currency is needed, (2) local scientific manpower resources of the republic - by directing the personnel of the agricultural stations and institutes in the republic to solve this problem quickly and stagewise, with agrotechnical knowhow which they have or can get without payment from sister-stations in the Federation or abroad. As a first stage technoeconomic studies and specific proposals should be done on:-

- The choice of the 2-3 "reasonably-optimal" agrotechnical ways to be used in parallel in pilot meadows/pastures of the project area - partly on land where the agricultural stations are active and partly on private land in the hills
- Substitutability coefficients should be developed between meadow/pasture feeding and grain feeding - within their respective limitations - as a useful decision instrument for increasing livestock rearing and fattening activities and as an aid towards the intensification of cooperants' contract-fattening in the hilly areas
- The foreign exchange earning plus import substitution balance should be calculated for the hard currency that can be earned/saved per dinar invested in meadows/pastures improvement. We feel that such a set of data, even if approximate, will justify decisions on quick action by the Republic Government in allocating resources and issuing directives.

These studies could be done within a few weeks by a Yugoslav team of one field crops agronomist, one livestock feeding expert and one practical economist. It is important that the calculations should be made as much as possible based on real inputs/outputs and related to feed-units, weight-gain, etc. and on dollar earning/saving, and NOT via the calculating mechanism of present dinar prices (buying-up or freemarket), since many of these dinar prices do not reflect the real value of a changing economic activity to the national economy.

f) Economic Conversion Factors of Feedstuff into Meat

The feedmix industry in Yugoslavia was actually developed over the last decade. It is therefore understandable that only now the importance and implications of full utilization of this agrotechnology, from a technical and economic point of view, are being realized in all their aspects by the decision-makers. Such is the case in the national economies of many countries in Europe and elsewhere when this change is introduced.

It would therefore be in place here to mention a few key-points for some users of this report.

In order to achieve high productivity in livestock production, concentrated feedstuff has to be used. Assuming that forage fodder (green+dry) supplies the requirements of the animal for maintenance of its weight, the nutrition and energy for high meat/milk/egg production comes from a balanced concentrated mixture of carbohydrates (mainly from cereal grains), proteins (mainly from oilseeds, fishmeal, etc.), plus small amounts of minerals/vitamins.

The various combinations of feed ingredients, the actual raw materials used (some of which are interchangeable to a degree), the physical form in which they are used - singly and/or mixed and in what form mixed (coarse, flour, pellets, etc.) - have been developed scientifically and determine the quality, weight-gain and fattening period of the animal and its utilizable meat. Within these various combinations there is the price factor and availability factor of some interchangeable ingredients.

While it is true that the economics of meat production is mainly determined by the ratio of meat price obtainable to the price of feed and this problem was widely discussed by the team and by an FAO cattle expert with the Kombinet - the Sarajevo governmental specialists, the veterinary services, farmers and others - it was felt that the farmers of the area, and perhaps not only the farmers, were looking at the feedstuff price problem simply through the rule-of-thumb whereby main feed component happened to be cheaper today on the market - maize versus wheat, or sunflower meal versus soybean meal. This basic mistake - historically understandable - on the agricultural level, particularly in the insufficiently guided private sector, is one of the causes for the low productivity and the high cost of meat.

The average conversion factors of feed units per meatweight are 4 for beef, 3.5 for pork, 2.5 for poultry, 0.18 for eggs and 0.33 for milk. Considering these conversion factors it is obvious that the price of feedstuff is a dominant factor in meat production, with feedstuff being more than 70% of total meat production cost. Therefore animal feeding has to have tight cost control over its feedstuffs and maximum utilization of the active components in the feedstuffs has to be planned. Although the animal has to consume a certain weight of feed, the feed composition is determinative. It is well known what the feed requirements are for each animal - and towards each type of meat that one wants to achieve (which is a very important consideration towards future export marketing!) - for weight maintenance and for weight increase, in dry matter, energy, protein and supplementary microelements. The composition of the potential feed components are also well known or can be analyzed. Calculating the formula of the feedstuffs according to actual prices will result in the most economic mix but -

- The formula must be calculated according to prices of active components (calories, digestible protein etc.) and not according to per-ton prices of calorie or protein containing materials such as maize or wheat or protein additive and
- Efforts should be made to determine optimum quality-oriented compositions for the intended development directions of the livestock industry in the project area (which may not be the most "economic" in today's price structure), and then to present these calculations to the authorities responsible for development decisions and coordination, so that via a process of understanding the detailed benefits versus costs it will be possible to influence the choice of feed ingredients for the development (including possibly imports or planting of import-substituting feed ingredients) and to influence the price structure of feed inputs and meat outputs in the project area, so that sufficient incentives for the farmer and for the enterprises for sound agroindustrial development in this branch will be available.



### 3. THE FEEDSTUFF DEVELOPMENT PROGRAM FOR BK.

Whatever the meat development program chosen - the submitted programs of the Banja-Luka Chamber of Commerce and the Kombinat, or those plus a part or the whole of the factories recommended in this report - it is clear that a substantial expansion of feedmix concentrate production in the project area would be required and desirable, for the following reasons:

- The need for more intensive use of feedmix concentrate so as to carry out competitively even the minimum intended meat development programs, and as an absolute precondition for executing the optimum recommended programs.
- The need for very large increase of the feedmix concentrate capacity in the area if and when the recommended expansion will be carried out
- The low feedmix concentrate capacity in B&H altogether, and the combination factors of a large potential internal market in B&H, plus BK being an agricultural reserve for B&H.

1968 data prepared in Banja Luka spoke about plans to have a capacity in Nova Topola of 30,000 annual tons feedmix concentrate, with actual production of 27,000 tons. Later 1970 data (ZEP Food Industry Report) spoke about needs for 50,000 annual tons in the area - either to be fully produced by the expanded Nova Topola feedmix plant or by its partial expansion and by having feedmix production facilities established in Bosanska Dubica and perhaps also in Prnjavor.

Regarding economic sizes and locations of plants our comments are that within the economics of the foreseeable years it should be considered that one plant producing up to 75,000 t./y. should serve a radius of about 150 kms, and should be situated as near its main point of concentr. of consumption as possible (unless one particular input material is centralized in one area, in which case it will dictate the location). Above 75,000 tons the consideration of a second plant comes in.

Regarding the estimated quantities needed whenever the various expansion programs will be operative, the table on the next page shows the minimum quantities that will be required (for servicing the programs applied for) and the optimum quantities (if and when the recommended expansion programs of this report will be executed). In either case it is assumed (in using the conversion factors) that feeding methods will be modernized as recommended in this report. Actual marketable quantities will in our view be above those in either table, since there will be a growing demand outside the project area as well, which could be served competitively if

- Modern facilities will be planned
- Feedmix concentrates with optimum active components will be produced and the necessary user-promotion will be done.

For reference purposes it can be assumed that the fixed investment, 1972 dollars, in a modern large feedmix concentrate plant is about \$ 350,000/10,000 tons output capacity.

It is thus seen that an immediate part of the BK food industry development program would be to plan for the simultaneous development of the feedmix concentrate industry in the area, for the organizational, administrative and educational measures to modernize feeding procedures, and for increasing the accompanying forage production on the natural meadows and pastures.

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**REQUIREMENT OF FEEDMIX CONCENTRATES FOR ADDITIONAL PRODUCTION OF MEAT & EGGS ACCORDING TO DEVELOPMENT PLAN OF THE M.S. KOMBINAT AND THIS REPORT**

Final Product	Conversion Factor Feedunits/Liveweight	According to Development Plan of the Kombinat	Equals Tons of Feed-Mix Concentrates (See Note)	Amount Recommended in this Report, as Addition to Kombinat Develop- ment Plan	Equals Tons of Feed-Mix Concentrates	Total Increase of Requirements Tons
Cattle origin (beef, babybeef and veal)	4	8.000 tons	24.000 2)	54.000 tons	162.000 <sup>2)</sup>	186.000
Pork	3.5	5.600 tons	19.600	24.000 tons	84.000	103.600
Broilers	2.5	$2 \times 10^6 \times 1.1 \text{ kg} =$ 2.200 tons	5.500	$2 \times 10^6 \times 0.6 \text{ kg} = 1200 \text{ tons}^3)$ $5 \times 10^6 \times 1.7 \text{ kg} = 8500 \text{ tons}$	24.750	30.250
Eggs (for consumption)	0.18	$20 \times 10^6$ eggs (100.000 layers) $\downarrow 1.5 \times 10^6$ eggs from reproduction <sup>4)</sup>	3.600	$3.5 \times 10^6$ eggs from reproduction <sup>4)</sup>	700	4.600
Eggs (for reproduction)	0.20	$2.75 \times 10^6$ eggs	550	$7.25 \times 10^6$ eggs	1.450	2.000
Total increase of requirement			53.550		272.900	326.450

- 1) Assuming 1 kg feed-mix concentrate = 1 feed unit. Protein values will have to be according to requirement and formulas.
- 2) 75% of weight gain comes from feed-mix concentrate. The rest from forage crops.
- 3) It is recommended to raise the broilers to 1.7 kg instead of 1.1 kg appearing in the development plan of the Kombinat.
- 4) 1/3 of the eggs produced from reproduction flocks are marketed for consumption.

Note: The tonnage of feed-mix concentrates required according to the development plan of the Kombinat does not coincide with the figures appearing in this plan, as there other conversion factors and feeding systems are assumed.

#### 4. RAW MATERIALS FOR THE ANIMAL FEEDSTUFF INDUSTRY IN BK.

if the principle of improvement of feedstuff composition and if increased use of feedmix concentrate will be accepted and the help of the development authorities be obtained to decide on a price structure conducive to modern competitive development of a BK meat production complex, then a parallel development can be undertaken to create wider and better local production mix for raw material inputs for feedmix concentrates. This would be in addition to the program of the productivization of the meadows and pastures, and connected matters.

##### a) Sorghum

In the agricultural materials section of the report we referred to the advisability to consider introducing sorghum as a preferred substitute for some of the maize grown/fed in the region, especially for meat production because of its higher protein content and potentially lower feed unit cost compared to maize

Sorghum is planted in other regions of Yugoslavia to a small extent and it is recommended to perform intensive feasibility work and field tests to determine the best varieties. Much information on all aspects of sorghum is available from the United States Dept. of Agriculture as well as from other countries.

##### b) Soybeans

The subject of soybeans is being treated in a separate chapter. Soybeans and their main products - the proteinrich animal feed "soybean meal/cake" and the soybean edible oil - have achieved dominating importance in the world animal feed and edible oils economy over the last dozen years. Also, they have high relevance to the success of the project of developing meat production in BK.

The basic points for decisions on soybeans, in connection with BK food/feed industry development, will be:

- Are soybean feedmix components (i.e. soybean meal) of critical importance for the BK meat complex development?
- If so, should soybean meal product be imported or should it be domestically produced by processing soybeans, and if domestically produced, would BK be an appropriate production region?
- If domestically produced in BK, could soybeans be grown locally, and could they be grown at the same price or cheaper than imports - by using comparisons of real import substitution value to the national economy?
- If soybeans were grown locally, what would the additional "plus factors" be - apart from supplying raw material for oilmeal feedmix for BK?

These are central questions. Replies to them, as well as coordination of decisions connected with them, will require centralized action, particularly since the issues involved cannot be seen in regional terms only.

##### c) Other Raw Materials

There are several further proteinrich feedstuff ingredients which could be now or eventually supplied in quantities from local resources.

- "Tankage" (waste-product from slaughterhouses and meatprocessing). This will require organized pretreatment, collection and distribution and it is recommended to have the Kombinet organize this. Technical assistance can be obtained from one of the larger plants in other regions of Yugoslavia.
- Waste products from the enlarged Banja Luka dairy. This should be examined as to quantities once the expansion will be completed. Technical assistance could be obtained partly from other plants in Yugoslavia and partly from abroad

- Poultry waste and feathermeal from the industrial poultry slaughterhouse and processing plant if and when this recommended complex will be started. Technical assistance for implementing such wasteproduct utilization could be obtained from within Yugoslavia.

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## 5. THE INTERNATIONAL ANIMAL FEEDSTUFFS SITUATION AND TRENDS AND THEIR POTENTIAL IMPACT ON THE PRODUCE ECONOMY OF BK.

This is a complex subject with many aspects. In order to simplify the matter, only those aspects are mentioned here which are expected to have a strong influence on the BK meat industry and feedmix industry developments. The subject is treated here because in all decision stages in BK the wider international scene should be taken into account and it appeared during our field work discussion that not enough up-to-date information on international developments was being distributed in the project area by the industry and the institutes to the decision-making bodies. This results in fragmentary projects being presented to the banks and authorities for development approvals and financing; these projects contain much statistical and arithmetical feasibility data but are all based on short-term assumptions restricted to the existing regional use pattern and price structure. Here, too, like in other parts of this chapter, we would suggest that the dissemination of continuous use-technical-price-market information to all concerned be organized.

### a. General Trends

The world animal feed situation is dominated in its dynamic part - i.e. the protein component part as compared to the static aspects of the grains components part - by what is called the 'USA soya complex'. The huge amounts of soybeans produced in the USA (in 1972 - 32 million tons beans valued at 3.5 billion dollars as beans or 4.5 billion dollars as main products of which 17 million tons, beans and/or products, valued together 2 billion dollars, were exported, most of them to Europe, compared to a fraction of this production and trade 15 years ago) determines the use patterns, trade patterns and processing/production patterns of protein feed in the developed countries. More details are given in the chapter on soybeans.

Demand and supply vary mainly according to the cyclical nature of poultry and pig meat production in the USA and Europe, geographical phasing of cattle breeding - on the demand side, and the weather on the supply side. Competitive protein sources (fishmeal, other oilseed meals such as peanut meal, sunflower meal, cottonseed meal) vary in supply and demand but effect the dominating soybean and soybean products use and trade pattern only marginally.

On the other hand, as newly developing centers of modern feeding are entering the world demand pattern - without having simultaneously their own supply to cover this demand - the pressure on protein sources, and particularly on soybeans and their products, increases and so does their price. New demand centers are several East European countries who wish to organize their meat production and exports on modern feeding procedures, and buy soybean meal increasingly, several Latin American countries who need oilmeals (with Brazil coming in as an important new soybean producer and potential world market supplier), and China as well as other East Asian countries becoming important net importers of oilmeals or fishmeal despite China's large self-production of soybeans. The above summary describes the present situation and longterm trends - without referring to such cyclical matters as seasonal fluctuations in demand/supply, speculation on "futures" buying on the Chicago Commodity Exchange, periodical oversupply or shortages due to irregular quantities of peanut meal shipments from West Africa or sudden demands due to recent USA-Soviet trade agreements, or fluctuations of fishmeal production in Peru. These matters, like the aforementioned competitive protein sources, are marginal and may affect prices or availabilities in the short term but BK development programs have to be decided on according to the former longterm trends described.

The table on next page shows the recent world production of the main protein feed components, i.e. oilseed meals and fishmeal.

OILSEED MEAL AND FISHMEAL WORLD PRODUCTION ('000 METRIC TONS)

<u>Oilseed Meals</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>
Soybean Meal	23,715	23,820	25,850	31,165	31,540
Cottonseed Meal	8,300	8,400	9,000	8,730	8,920
Peanut Meal	4,225	4,240	3,830	4,030	4,095
Sunflower Meal (revised)	3,920	3,970	3,980	3,970	3,860
Rapeseed Meal	2,545	2,995	2,820	2,930	3,619
Sesame Meal	610	680	660	680	785
Copra Meal	1,230	1,200	1,150	1,155	1,325
Palm Kernel Meal	400	400	430	455	505
Linseed Meal	<u>1,500</u>	<u>1,420</u>	<u>1,495</u>	<u>1,720</u>	<u>1,870</u>
Total	46,445	47,125	49,215	54,835	56,519
Fish Meal	<u>4,350</u>	<u>5,200</u>	<u>5,000</u>	<u>4,950</u>	<u>5,100</u>
<b><u>GRAND TOTAL</u></b>	<b>50,795</b> *****	<b>52,325</b> *****	<b>54,215</b> *****	<b>59,785</b> *****	<b>61,619</b> *****

In the appendix detailed tabulations are given, for oilseedmeals, of world net exports, trade of world "net exporting" countries, trade of West Europe's "net importing" countries, production in West Europe, and supplies available for home consumption in West Europe, plus fishmeal trade data. These statistics plus those that are given in the appendix referring to the soybean chapter, show clearly the recent developments, the world trade movements, and the consuming and producing countries.

These data, as well as statistics on imports by West Europe of soybeans, for crushing and meal + oil production in processing plants inside West Europe, show the importance and dependence of the modern meat economy on protein feeds and on the real reasons on which a potential meatprocessing and meatexporting region like BK - situated near a large and growing import market for meat which is also the largest present deficit area in commercial terms in the world for protein feeds - should base its major calculations and economic policy decisions regarding feedstuffs use and production.

b) The "Babybeef" Problematics in its Relationship to Feedstuffs

Since the Italian meat import market represents the largest and nearest single export market for Yugoslav cattle and beef/veal, it is understandable that meat export development thinking in BK is strongly based on the historical knowledge of the planners, and their associated trading enterprises, of this market. This came out in all discussions with the Kombinat, with Government experts in Sarajevo and Banja Luka, and with Organizations and Institutes in Meat Technology and meat trading.

It would therefore be important here to summarize some points which emerged clearly during our recent export market survey, relevant to this subject:

1. The Italian economy is very much aware of its beef/veal deficits which are expected to grow by 1974 to 500,000 annual tons and will make Italy Europe's largest meat deficit market.
2. Very strong efforts are being made in Italy to increase self-production of beef/veal, in the first stages - known to Yugoslavia from recent years - by fattening imported calves, and in the next stages also by increased breeding. Due to the recent development of this branch of the Italian economy, modern largescale and highly industrialized methods are being used all along the line - from raw material purchasing, through fattening, processing, till marketing.

3. For these purposes Italy has, inter alia, quadrupled its animal feedmix concentrates production from 900,000 tons in 1961 to 3,630,000 tons in 1970, divided into:

Poultry Feed	1,508,600 tons		
Pigfeed	653,600 "		
Cattlefeed	1,344,900 "	of which for:	
		Large Cattle	976,400
		Calves	368,500
Other feeds	125,400		

In 1961 out of the 900,000 tons total feed 450,000 was for poultry and 225,000 for pigs, and 20,000 tons for "other feeds". This means that only 22% of feeds were for cattle while today 37% of feeds are for cattle. Cattlefeed in 1961 was 205,000 tons (of which 32,000 tons only for calves) whilst in 1970 it was 1.345 million tons, i.e. a sevenfold increase.

Calf feed increased during that period from 32,000 tons to 369,000 tons, i.e. 11.5 times.

70% of this feedmix industry is concentrated in Lombardy and another 11% in Veneto and Trentino - all in the north, where most of the meat and particularly the "babybeef" is consumed.

Close to 200,000 tons milkpowder for calf fattening is imported annually by Italy, mostly from France. To this is added lectoserum in large quantities, partly derived from Italy's large cheese industry, partly imported from Holland and France.

The largest protein component used in Italy's feedmix industry is soybean meal.

The major feedmix plants for calf-feed are Navobi, Wessanen Italia, Denkavit Italiana, Fabolet, who between them produce about 50% of total production, and who are all owned or controlled by Dutch parent firms, who also supply production and application knowhow.

4. Calves for fattening are imported by Italy mainly from West Germany and France. Poland, Rumania, Yugoslavia, Bulgaria and Austria are secondary sources. This indicates how between the developed efficient complementary economies - both due to specialized operations and due to EEC membership - a closed-cycle trade is developed.

In order to enter this trade, it will be necessary to look for much more integration with the producer/consumer needs in Italy and the Italian feeding system profitability will have to be studied in order to see where mutually satisfactory future export marketing can be best effected. If BK could produce feedstuffs which are scarce or ecologically expensive in Italy, this could lead to continuous orders of contract-breeding of "babybeef".

5. "Babybeef" is a term actually applied to young bulis, slaughtered at 13-16 months at 430-560 kg. liveweight - average 210 kg. net meat weight, called "Vitellone" and consumed mainly in Northern Italy. 50% of all available beef/veal in Italy is derived from imports and one third of all available beef/veal in Italy is in the form of Vitelloni produced from imported calves. The one-third meat availability should be seen in comparison with the number of heads imported - which are only about 15% of the number of heads of indigenous Italian cattle.

This indicates that by large scale industrialized application of feeding techniques the Italian economy upgrades feedstuff (partly imported) into preferred meat-cuts (using imported cattle stock).

This market is one of the important present and future export-markets for Yugoslavia. Italy is expected to have a large annual beef/veal deficit, as mentioned before, and is making strenuous efforts to cut down this deficit. It will depend to a large extent on the decisions towards strengthening the feedstuff branch of BK, whether and in what stage of upgrading and what turnover, a BK meat industry can create profitable cooperation with the Italian producer and consumer organizations.

6. Without going into all details here, a summary of the Italian fattening system is given here for reference purposes (Italy buys one-week calves from Germany/France and 160/220 kg. young bulls from East Europe):

Stage	Weight-Gain	Period (days)	Fattening Investment per animal (stabling + silos + home feedmixing + harvesting equipment use)
I	80 - 110	40-50	small
II	110 - 170	60	
III	170 - 450/500	250	

Total 350 \$250

<u>Main Feedstuffs:</u>		
Maizeplant silage	35%	Dry Matter
Maizecobs silage ("Pastone")	70%	"
Dried fruit pulps	95%	"
Barley - maize	90%	"
Protein Concentrate (soybean meal - about 23% of feedmix)	90%	"

Consumption is about 5.8 kg. dry matter /kg. weight gain of which 50% - 68% of dry matter correspond to maizeplant silage. One "Vitellone" consumes 3300 average kg. silage (1160 kg. dry matter) to be fattened from 170 to 470 kg. With silage yield of 45 tons per hectare (irrigated) this gives an output of 13 babybeef bulls per hectare for the final fattening stage.

The average total self-cost of feedstuffs (silage, grains, pulps, protein concentrate) are \$0.50 per kg. weightgain in the first stage and \$0.70/kg. weightgain later. Losses (illness/deaths/rejects) to the Italian importers and fatteners are:

- In transport to the frontier - 4% (debited to importer)
- In transport-frontier to fattening organization - 1-2% (debited to transporter)
- During weaning and first stage - 2% (in case of import of 80 kg. calves)
- During fattening - 2%.

Regarding State aid to the cattle fatterer - credits are available under laws 910 ("Green Plan") 8/14/16 and 615, 404. Under these laws cattle fatteners received about 20% of the total national agricultural credits available under the "Green Plan". The credits were at interest rates of 2% - 3%. Private cattle fatteners can obtain a subsidy of 40%, and cooperative fatteners 50%, towards their basic investment in constructions connected with cattle fattening.

Loan periods under these laws are:

- In purchase of cattle for fattening	2 years
- " " rearing	4 "
- " material	5 "
- " feedstuff	1 "
- For renovation of cultures	5 "
- For construction of stables, storage facilities, etc.	7 "

The Italian frontier tariffs (16% customs, plus other charges) plus transport to fattening installations plus losses come to about \$0.25/kg. liveweight, for a Simmenthal bull of about 220 kg. imported from an Eastern Country, (i.e. from outside the Common Market).

These data on the "economic environment" in which Italian babybeef production takes place, should indicate that the feeding/fattening economy of the primary export meat market for BK export production (cattle and meat) will have to be studied and considered in detail in order to see where long-term export and possibly joint-production arrangements of mutual interest can be effected.

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## 6. SUPPLY OF FEEDSTUFFS FOR THE BK MEAT PRODUCTION COMPLEX

### a. Basic Assumptions and Proposed Solutions

1. Large, profitable meat sales and particularly exports to tomorrow's markets can only be achieved via a rationalized chain of meat production - from the forage/feed crops stage to the final marketing of processed meat.
2. Regarding forage/feed crop production for the additional number of livestock intended and for providing higher quality and weight of animals, the following is proposed:
  - 2.1. Land resources are available that can/must be productivized in order to provide for the feeding of this livestock. This refers particularly, but not solely, to the improvement of meadows and pastures utilization.
  - 2.2. Even so there will be a shortage of arable land in the project area which can be overcome partially by increasing the land utilization factor by:
    - 2.2.1. Multicropping which would be possible for the specific combination of crops available/needed.
 

Soybeans and grain sorghum could be grown as second crops to wheat, barley and oats in the region (not to maize since the periods overlap).
    - 2.2.2. Reducing the percentage of fallow and off-tillage land within the arable lands of the project area.
3. 100% of broiler and hog production and 75% of weightgain of cattle fattening for the additional BK meat production according to this project will be done by using feedmix concentrates - fully balanced industrial premixes if sufficient feedmix concentrate plant capacity will be erected, or partly fully balanced industrial premix and partly homemixed concentrates at farmers' cooperative installations.
 

A special study would be indicated to determine the optimal feedmix contents, given the changing input prices and the various feedvalues needed by the different animals at each stage of their feeding. Admixture of feedgrade urea should also be considered in this connection.



1. Yield of carcass meat per animal

Low figures, like actual present yields, were assumed, as a 'worst-worst' projection. In practice the modernization program should result in higher yields, and also in input-animals of better quality

(Note: High, internationally achieved liveweights and yields were assumed for broilers since this industry would be "started from scratch" in BK)

2. Liveweight and meat prices were considered as at the time of field work in the project area (May-September 1972). Since then high price changes have occurred in the world trade of meat and meat producing inputs (especially soybeans and meal). The reasons for these changes, elevating prices up to prohibitive ones, and the increasing demand for meat, especially beef, and pessimistic forecasts for supplying the 'meat gap', are well known.

These price changes, although including increase of inputs as well, have until now been in favour of cattle farmers and meat processors. Profit margins are increasing even without counting the February 1973 exchange rate changes (Yugoslavia can purchase soymeal for US\$ and sell meat for European currencies). All forecasts prove better than mid 1972 margins although there are differences of opinion how much better they will be in the future.

Basing the calculations on mid 1972 prices is a minimum approach which was considered by us as wise to be followed. Even using these prices, the profitability is acceptable and recommendable for investment in the different projects comprising the meat complex

3. Marketing arrangement will be more or less unchanged and therefore the price paid for product at the factory gate will remain roughly today's price ("today's" since all calculations are done at 1972 costs and prices)

This is also a 'worst-worst' assumption inasmuch as such a large series of plants will have its own central marketing staff and will be able to market directly to large distributors and/or have its own distribution outlets. According to the practice in Yugoslavia today - and this was brought out in many discussions and in annual reports of enterprises - either the method of self distribution or working with a large trading enterprise reduces considerably the distribution cost, when comparing this with sales via a number of small distribution organizations who have to work on a higher middlemen margin.

C. Regarding prices for rawmaterials and products, they are given for those plants/products proposed where a "going price" exists, or can be assumed parallel to today's marketed products. In other sections of this report the processing cost only is given but in the cases considered here it was thought useful to show the total turnover since they will be self contained and entirely new plant units

Although it is impossible today to forecast the relative movement of raw material and final product prices as explained above, the following should be borne in mind:

- 1. If a properly organized livestock breeding program is undertaken, there is every reason to assume that good-quality animals will be supplied to the plant(s) at reasonable prices, still giving a good profit to the farmers and/or Kombinat units who will supply the raw material. This is the case with several similar projects in Croatia (Gavrilovic and others), Slovenia (Emona and others), Vojvodina plants, PIK Beograd, and the initial stages of the Makedonian cattle raising/processing plants

4. If soybean processing in the region is decided upon, a processing plant with an input of 500 daily tons soybeans should be erected (capacity 165,000 tons soybean processing per year - giving 125,000 tons soybean meal and 30,000 tons soybean edible oil). Smaller plants are possible but not advisable for economy-of-scale reasons, and particularly in this specific case since the meal and oil have full import substitution hard currency value to the economy.

(Of the 125,000 tons soybean meal, 55,000 tons only will be required for the meat complex discussed - the rest will have a ready market outside the project area, and partly inside it, for the existing and presently expanded local/regional feeding system).

As to alternatives:

- If all the soybeans required will be imported this will not need any hectareage needs in the project area.
  - a. If the 165,000 tons soybeans required will be supposed to come from gradually introduced local growing, then more hectares will be needed than can be made available even after meadows improvement and substitution and after planting them as a second crop in part of the cereals areas (unless full exploitation of multicropping is made or present crops are exchanged for soybeans). However, from the point of view of the regional economy this would mean that the 70,000 ton surplus soybean meal + the 30,000 tons soybean oil would be processed by the regional industry from soybeans planted outside the project area - either in adjacent areas of B & H, or elsewhere - and this surplus would be sold outside the project area, giving both income and added value by processing to the project area.

(The position regarding the balance of arable land and meadows for soybean and sorghum is given overpage).

- b. As explained above, the subalternative of not supplying the total amount of 165,000 tpe. of soybean from the project area could be resolved by growing soybeans in adjacent areas, under the same agrotechnical and pricing procedures which would be worked out for the project area.

There is therefore no reason to assume the need for imports from abroad - if the alternative of major local soybean production will be decided upon for the project area.

5. All proposals in this scheme contain TECHNOLOGICAL reorganization steps only which appear possible, within the regional economic and agricultural system, the practical possibilities foreseen for incentives, credit and extension-instructional services to farmers, and a reasonable timetable for quick realization.

The proposals do NOT envisage STRUCTURAL reforms of any kind.

b. Land Balance (Arable Land and Meadows) for Feedgrain and Feedprotein Crops in Project Area Required for BK Meat Complex

The following lands in the project area could be considered as a local resource for producing the main required feedmix components for the BK meat complex.

Present Cultivation

	<u>Hectares</u>
Wheat	76,500
Oats	36,500
Barley	4,500
Others	5,000
	<hr/>
Cereals Areas	122,500
Fallow Areas	60,000
Meadows	70,000
Pastures	95,000

Note: 104,000 hectares are under maize and do not enter the accounting here since no second crop can be considered because seasons overlap.

For supplying the necessary grains for the feedmixes needed for the BK meat complex (in excess of the Kombinat development plans for regional meat needs), plus the total soybeans quantity required for a 500 tons per day soybean processing plant - i.e. for a maximum program - the following amounts of crop products are required:

Maize	80,000 tons (30% of 273,000 annual tons)	@ 5 <sup>x</sup> tons/ha = 16.000 ha.
Sorghum	55,000 tons (20% of 273,000 annual tons)	@ 5 tons/ha = 11.000 ha.
Soybeans	165,000 tons (500 tons x 330 days)	@ 2 tons/ha = <u>82.500 ha.</u>
		109.500 ha.
		-----

x)

Possible to achieve also in private sector, with cooperation/extension arrangements.

By improving the meadows and pastures with simple, quickly executable agrotechniques, much more fodder should be available from less land. This fodder area reduction should be concentrated on the meadows, thus increasing the amount of arable land available. This could bring about an increase of arable land of 20,000 - 30,000 hectares.

From part of this additional arable area the additional quantities of maize could be produced, the rest will be under other cereals.

At least 50% of the area under non-maize cereals (65,000 ha. out of 130,000, (122,500 + arable gains from meadows land)) could be under multicropping, i.e. two annual crops as proposed, with soybeans and sorghum being second crops to wheat/oats/barley.

These developments which we consider practically attainable in a short period, assuming the necessary decision-making by the authorities, and suitable agrocredits, would assure - depending on yields - about 70% of the land required for the maximum program. The balance of products will come either from further increases of production from existing areas, from further exchange of meadow areas into arable land, or will have to be purchased from outside the project area. Another possibility would be to reduce the areas of fallow land. On this land soybeans and sorghum can be grown as single crops, at optimum sowing periods; however, the utilization of fallow land would, in our view, take long to introduce effectively because of the traditional crop rotation pattern by the BK farmers - we are therefore not including this source as a definitely expectable one.

On the other hand, it should be borne in mind that with sufficient efforts more than 50% of the area under non-maize cereals could be brought under multicropping with soybeans/sorghum, in which case an amount closer to the total of 165,000 tons soybeans could be grown within the project area.

Regarding the increased demand for fodder, mainly for the additional number of cattle envisaged, this could be covered by the meadows/pasture improvement program, even on the reduced land areas; this particularly since the increase will not be so large since both the BK meat complex project and the present Kombinat development plans for slaughtering for local needs are based on a much higher percentage of feedmix within the total feed supply for the cattle.

\* \* \* \*

## 7. SOYBEANS

### e) Background

A summary is given here on soybeans because of their relevance to the project and because of relatively restricted knowledge in the project area of the facts, of the influence of soybeans on the project end of development possibilities.

Work done in Yugoslavia and specifically in the project area on soybean growing, and its results and conclusions, was reviewed by the team with several institutes, persons, industries and associations in Yugoslavia. The subject was discussed in May, June, July and September at various meetings, with increasing focussing on the possibilities, and on the insufficient efforts and low priorities that had been accorded this subject before. Also, some of the now invalid concepts - such as the background of the earlier viewpoints of the Edible Oils Producers which had at some time influenced agricultural developers - were cleared up and explained.

Prior to, and at the occasion of, the joint September session in Banja Luka of the Yugoslav project area groups with the UNIDO/FAO/IDC representatives, it was agreed that - based on the various arguments brought forward by the team - the project area groups would accept and study for execution a set of recommendations for establishing a BK soya complex as one of the main competitive economic bases for the large increase of BK production.

### b) Introduction

The soybean (= soya bean, soja bean) is an annual, summer leguminous plant, native to Manchuria, used in China for over 4,000 years and still grown there largescale. In 1875 the first systematic experiments for growing outside China were made in the then areas of Austria-Hungary by Haberlendt, and when proved successful were transferred to several other European countries and then to the USA, where soybeans were eventually grown on larger areas and first used as a forage crop and for green manure. However, it was only towards 1938 that, in recognition of modernizing animal feed technology and the potential contribution of soybean protein, hybridization and consequently very largescale growing were started - all in the USA and some in Canada. American annual production increased from 400,000 tons in 1933 to 32 million tons in 1971. USA yields increased during that period from 400 kg/ha to over 2 tons/ha. Recently, Brazil, the Soviet Union and Indonesia also became important growers, but together they produce about 10% of USA production only. India, Romania, Mexico and Korea have also introduced the crop.

Soil/climate (apart from light) requirements for soybeans are similar to those for maize.

The soybean contains a high amount of protein (about 40% of the meal) and a better protein structure than other commercially grown legumes but less oil than other commercially grown oil-seeds (about 18%). Therefore, the soybean can even as a raw plant be regarded as a protein concentrate, and the more so when it is defatted, i.e. when the oil is extracted in a soybean processing plant from the crushed beans and the defatted soybean cake/meal remains as a protein concentrate carrier, containing 44% protein.

c) The Advantages of Soybeans

The main reasons for the phenomenal development of soybean cultivation are the following:

1. Soybeans are a natural protein concentrate, with high protein yields per hectare.

Efficiency of Landuse for Protein Production

<u>Commodity</u>	<u>Aver. Yield, tons per hectare</u>	<u>Protein, kg/hectare</u>
Soybean	1.80	625
Other legumes	1.50	360
Maize	4.50	400
Wheat	1.80	220

2. Soybeans - as distinct from other oilseeds or legumes - contain protein components (aminoacids) which nutritionally resemble the animal proteins, and soybean protein is therefore more digestible, better adapted and more utilized by the animal than other vegetable proteins. Also in digestible energy, soybean meal rates high.

COMPOSITION AND DIGESTIBLE NUTRIENTS IN TYPICAL LIVESTOCK FEEDS

	<u>Dry Matter</u>	<u>Protein</u>	<u>Calcium</u>	<u>Phos- phorous</u>	<u>Digest- ible Protein</u>	<u>Digest- ible Energy Kcal/lb.</u>
	<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>	
<u>Roughages</u>						
Alfalfa Hay	90.5	15.3	1.47	0.24	10.9	1.02
Timothy Hay	89.0	6.6	0.35	0.14	3.0	0.99
Corn Silage	27.6	2.3	0.10	0.07	1.2	0.37
Grass Silage	25.8	3.2	0.32	0.12	1.9	0.31
<u>Concentrates</u>						
Corn Grain	85.0	8.7	0.02	0.27	6.7	1.62
Oats Grain	90.2	12.0	0.09	0.33	9.4	1.42
Soybean Oil Meal	89.3	45.8	0.32	0.67	42.1	1.56
Wheat Bran	89.1	16.0	0.14	1.17	13.0	1.33

Source: NRC Publication 464

3. The production cost per hectare for soybeans is low since standard mechanization only is required. In any case, it is particularly lower than the production cost of maize.
4. Soybeans contain 18% only of oil. The commercial world demand for animal feed protein is much bigger than that for human-edible vegetable oil, and since there are few competitive sources for protein and almost no other vegetative sources for such high-quality protein concentrate, but on the other hand many cheap alternative sources for edible vegetable oil, soybeans are a preferred crop for this economic reason too.

(Note: Yugoslavia is far from self-sufficient in edible oils, and also the per caput edible oil derived from soybean growing/processing in Yugoslavia would have a ready market at full import-substitution price.)

5. The US meat economy and the large meat consuming/producing countries outside the USA, mainly Western Europe, saw in US soybeans and soymeal a safely available bulk supply of this product as a required raw material for meat production.

Also, they knew that quality was uniform and reliable - an important consideration for both the soybean processing industry and the feedmix concentrate industry.

d) The Utilization of Soybeans

The large-tonnage uses of soybeans are in utilizing the protein concentrate soybean meal (about 78% of the soybean weight in modern extraction technology) for animal feed, and the oil (about 18% of the soybean weight) mostly as edible oil. About 5% of the soy-oil produced is today used for non-food products in industry (paints, chemical, cosmetic industries). Recently many growing uses of the protein part of the soybean - starting from the meal - are being developed for human consumption, as additives, meat substitutes and extenders, etc., and for industrial use (glues, textile sizing materials, emulsifiers, etc.). These new uses are increasing and further developments are rapidly appearing on the markets, some of which have strong potential relevance to industrial needs in Yugoslavia, and specifically to the food processing industry, which is already using the newer soy products.

Since, however, soybeans are discussed here in their large-tonnage animal feed aspects, and decisions will have to be made on that basis only, the other aspects will not be detailed here, although some of them - including the production of full-fat soy flour as a basis for babyfoods - might in our view be of immediate interest.

For reference purposes, summarized soybean utilization charts, showing the main uses, are given in the appendix, together with the statistical data on soybeans.

e) World Production and Trade in Soybeans and Soybean Products

In the appendix, statistical tables are given showing the development of soybean production in the USA for a long period, and recent developments in world production and trade for the USA and other countries.

The salient factors are:

1. Soybean meal protein concentrate constituting about 70% of all protein feeds, has become the dominant protein animal feed wherever protein concentrates are used.
2. Soybean oil tonnage is the biggest single edible oil tonnage constituting 25% of world consumption of edible oils. (This is a function of the very large quantities of soybeans required for the soybean meal feed, and has thus been achieved despite the earlier historical predominance of other edible oils in all the countries which do not grow soybeans).
3. Soybeans and soybean meal are exported by the chief present supplier, USA, mainly to Europe, while soybean oil is exported to the developing countries. The reason is that Western Europe uses industrial feedmix concentrates and also has installed large soybeans processing capacities (crushing and extraction) but needs much more protein than oil. The developing countries, on the other hand, either have no modern feedmix and production systems or cannot spare the hard currency for these commodities.

It should be noted that in Western Europe, too, there are differences of soybean meal consumption habits. In the U.K., Netherlands, Denmark, all meal goes to the animal feedmix industry while in Germany, France and Italy a sizeable part still goes directly to the farmers, (cooperatives or individuals). This is, however, changing rapidly.

f) Mode of Shipping of Soybeans, Meal and Other Protein Feeds

Most soybeans move over the oceans in bulk or large bulk carrier ships. USA and Brazilian shippers ship soybean meal in bulk granulated. Actually most proteins travel in bulk (except French rapeseed meal), including Indian groundnut meal.

Tapioca (manioc) also moves in bulk, but pelletized. Argentinian sunflower meal is also pelletized for shipping.

Pelletization is done partly for easier transport (since there is less weight loss) and partly because the EEC customs duties are (paradoxically) higher for granulated meal than for pellets.

g) Forecast for Soybean Uses

For reasons already explained - increasing world meat demand and modern animal feeding systems - the demand for oilmeal, and particularly of soybean meal, is expected to increase continuously for many years, and more so as the developing countries are moving in both as larger meat consumers and as modern meat producers.

Feeding technology for efficient high-grade meat production via feedmix concentrates can be demonstrated in simple figures below.

Kgs. Protein Fed (in 1972 State of Technology), per Animal Unit (1 Cow or 5 Pigs Or 100 Chickens)

USA	104
West Europe	92
East Europe	43
Developing Countries	nominal amounts

This shows the very large open demand for the future - also where it lies.

Since this means that more and more soybean meal will be required two important trends are forecast by such sources as the USA Dept. of Agriculture, the UK Grain and Feed Trade Association and Unilever:

- a) The soybean meal price will rise constantly.
- b) Groundnut and rapeseed meal will loose out on the world markets since there will be a glut of cheap soybean oil which will push out these oilseeds. Sunflowers will also go down in value.

h) Soybeans and Soybean Products in Yugoslavia

As mentioned before, in the feedstuffs chapter, Yugoslav imports of soybean meal (as meal or as crushed seeds) were:

1966	1967	1968	1969	1970	1971	
145,000	104,000	130,000	153,000	158,000	120,000	tons soybean meal

In addition, in 1970 18,000 tons, and in 1971 120,000 tons of crude soybean oil were imported. Imports in former years were much less.

In the 1971 season about 45,000 tons of soybeans were imported. According to Yugoslav and USA data and statistics there had been no imports of soybean before. It is believed that imports of soybeans were smaller in 1972 due to smaller foreign currency allocation.

The protein component for feeds for cattle, pigs and poultry in Yugoslavia is being supplied by locally produced sunflower meal (estimated about 130,000 annual tons meal), by the soybean meal amounts derived from imports of soybean meals and soybeans as shown above, by imports of small to medium amounts of peanutmeal from India, imports of fishmeal from Peru, and vary small quantities, of the order of 4-5 thousand tons, mainly from one area (Brcko) where some soybeans are grown and processed, together with other oilseeds.

According to the Yugoslav Feedstuff Association, the actual demand for 44% protein feedmix grade soybean meal alone is 400,000 annual tons. We believe that real demand will be much higher in the coming years, due to the rapid increase of modern feeding systems both in the social sector (including cooperation) and in the private sector. This demand will be high and grow, even if total meat production in the Federation will grow at a slower rate, because of the pattern change in feeding systems.

It is thus apparent from the above and from the data in other chapters that:

1. Total Yugoslav supplies of feed protein components are well below needs, even at past/present feeding system patterns.
2. Not only are the tonnages supplied much too low but the type of active protein component in the tonnages is critically sub-optimal. Much too little soy protein is supplied, particularly considering the importance of meat exports to the economy.
3. Import quotas and actual imports are erratic and even minimum demands cannot be met.

On the other hand, the potential supply picture from locally grown soybeans should be seen in the following light:

1. Parts of Yugoslavia belong to the very few regions in Europe where soybeans can be grown. (Only the USSR, Romania and Yugoslavia have ecologically suitable areas)
2. Europe is, apart from the USA, the biggest world market for soybeans and soybean products (11 million tons of soybeans plus 4 million tons of meal are imported by Europe).
3. Local soybean growing in Yugoslavia - which showed good promise - has been throttled by a minimum guaranteed price of ND 1.25 only, while the American farmer receives an average price equivalent to ND 2.00 on the farm (to which transport to Europe has to be added for comparison purposes).

Many valuable discussions held by the team members with various well-informed Yugoslavs in the agricultural, feedstuff, governmental and industry sectors, as well as test results seen, showed convincingly that the only valid reasons for the lack of progress in large scale soybean growing in Yugoslavia are the arbitrary price structure, coupled with insufficient quantitative and qualitative clarity of the implications of severe underuse of soya when considering the national meat export drive which is under way, plus the situation described below in the Yugoslav edible oils industry.

4. There was in the edible oil industry, including its strong national association, an opinion - which the members publicized in various circles - that there is already an excess of oilseed processing capacity in the country, backing up their arguments with the claim of under utilization of existing processing capacity.

The actual situation is as follows:



The main (almost only) oilseed produced in the country is sunflower.  
Production figures are: (on the basis of seeds)

<u>Year</u>	<u>Produced</u>	<u>Processed</u>
69	390,000 t	387,000 t
70	264,000 t	175,300 t
71	347,000 t	342,000 t

The drop in processed quantity in 1970 resulted both from lower production and exports of raw seed.

There are 24 factories, 3 of them produce 70% of the oil. Installed crushing capacity and utilization data are:

<u>Year</u>	<u>Installed Cap. (280 Days Basis)</u>	<u>% Utilization</u>
70	393,000 t	79%
71	413,500 t	43%
72	657,000 t	?

Oil Refining Capacity:

70	173,600 t	84%
71	173,600 t	98%
72	263,500 t	?

Yugoslavia does not produce sufficient quantities for its present consumption of edible oil. 60% of the need comes from abroad (partly as crude soybean oil).

Thus our conclusion is that even from the viewpoint of the edible oil economy only, there is a shortage of oilseeds in the country and not an excess of processing capacity. What the figures show is that there is an excess of sunflower seeds crushing capacity due to the installation of new crushing plants without due consideration of the supply situation of this crop.

5. Soybeans have been considered in Yugoslavia primarily as oilseed, i.e. a supply source of edible oil. Therefore the arguments of the edible oil industry - which was until now opposed to the installation of further oilseed processing capacities as explained above - plus its inability to efficiently handle soybeans (which need solvent extraction processing which is not fully available in the sunflower-processing designed Yugoslav plants) - were a further throttle to the development of domestic soybean growing. There was also no incentive for the authorities to fix a higher minimum price because
  - a) The real protein value was not sufficiently recognized and
  - b) The edible oil industry did not have (overall) the equipment to properly utilize the soybeans and therefore a suitable market price could not be developed.
6. Although soybeans were and are grown in the region successfully, though to a very small extent, and many experimental and production results are available, it cannot be said that serious trials were made to improve yields and production costs by systematic work which should include introducing USA seeds and methods.
7. It is recommended to proceed by allocating high priority to a program to establish an integrated soya complex in the BK project area, with the following targets:
  - a. Seeing the soybeans program primarily in terms of domestic supply of an essential input for modern meat production.  
Decisions on investments, credits, incentives, prices, priorities should be made accordingly.
  - b. Seeing the soybeans program as a protein program, and considering the special nature of the soy protein which puts soymeal in a different category to other vegetable protein feed components.
  - c. Considering the economic importance of each component of the soybean (meal + oil) being a direct hard currency cost to the Yugoslav economy. Therefore local production is a direct and more than full saving of hard currency.

Today Yugoslavia not only imports the proteinic and oil values against hard currency, but imports them separately, (as meal and oil) thus paying the value of the processing/separation and of long transport in hard currency, in addition to the farm value of the agricultural product.

- d. Establishing a soybean processing plant in the project area for processing 500 tons per day (165,000 annual tons) of soybeans, which would produce 125,000 annual tons of soybean meal and 30,000 annual tons of refined edible soybean oil. Such a plant would need a total fixed investment of 5.6 million dollars, of which 3 million dollars in hard currency.

We would like to remark that even at today's average Yugoslav imports of soybean values (meal + oil) these 3 million dollars hard currency could be earned back, as hard currency savings, in less than 2 years by such local processing even of completely imported soybeans.

Regarding location of the plant, a more detailed analysis should be made but the indications are that the placing of this plant in the project region would make sense not only towards the large feedmix requirements if the BK meat project is realized, but also in the wider logistic picture of the Federation needs, since - as has been pointed out in the feedstuffs chapter - the region is a geographical center for feedstuff needs and since (even in using imported soybeans) it is cheaper to transport soybeans overland in bulk than to transport meal or oil overland. Thus a siting in BK looks a priori justified, compared to a seaport location, and definitely so if local soybean growing is considered.

- e. Undertaking immediately a coordinated priority agricultural program for the large scale planting of soybeans in the region, and creating the organizational, technological and financial preconditions for it.

The agricultural program should be based on the proposal to consider soybean growing as a **SECOND** crop in a season, on areas used in the first part of the season for wheat/barley/oats. This would solve to a large degree both the land availability constraint and make the crop more profitable to the farmer and to the region's economy as a whole.

#### 1) Agricultural Aspects of Soybean Growing in the Project Area

1. We believe that experience hitherto in Yugoslavia shows that soybeans can be grown at reasonable yields in the project area - in fact this region is one of the few ecologically suitable regions in Europe
2. Soybeans would compete for land, if planted at optimum time, with other crops. This project recommends a solution whereby in areas which have sufficient rainfall, or where artificial irrigation can be adopted at low cost, soybeans will be planted a little later than at optimum time, as a second crop after wheat/barley/oats. Although yields will be lower the following advantages will offset the loss of income: (The same is valid for a similar recommendation for sorghum).
  - a. By planting two crops per year a higher utilization of land is achieved
  - b. Mechanization, especially harvesting combines, will be used more hours the year around. (Soybean harvesting requires the same equipment as wheat harvesting; thus equipment of the required type is already available in the area - in the Kombinat and for the farmers).
  - c. Dispersion of grain harvesting will reduce the volume of storage facilities required.
3. Since the area required to feed the soyprocessing plant with a capacity of 500 tons/day cannot be prepared in one step, partial imports of soybeans for a few years will have to be considered. During these years a definite decision will have to be taken if the plant will be fed wholly by local soybeans or partially and if a part of imports will be permanent. (See section on BK land balance in feedstuffs chapter for details).
4. Soybeans, being a legume, will improve the soil structure and fertility, thereby producing indirect benefits to the farmer. Soybean growing might replace also partially the loss of productivity by fallow land which occupies about 17% of the arable land in the region.

5. The introduction of wide areas of soybeans in the region will require promotion, incentives and instructional extension service. Knowhow resources are available - in the region, in other places in Yugoslavia and abroad, including FAO who could enable to apply modern agrotechniques so as to obtain high and economic yields from the beginning
6. The main decision to be taken is about price policy. The present price structure where soybeans have a minimum price of ND 1.25 versus ND 1.10/kg for maize is no incentive for the farmer to grow soybeans. Under similar conditions maize yields between twice to thrice. Considering that costs of production of soybeans are lower than those of maize, and following the pattern suggested in para 2 above, a higher price simplified so as to be acceptable to farmers' calculations and expectations but in principle pegged to the fluctuating world price of soybeans (and connected to yield improvement measures) - would be a sufficient incentive for the farmers. This would also create reasonable pricing arrangements between the crop farmers, the feedmix plants and the meat processing industry who will have to finance the feedmixes for the cattle breeder; the reason being that the international meat price movements are closely linked to fluctuations in soybean prices.

#### J. Soybean Processing Plant

As mentioned before it is recommended to install a soybeans processing plant in the region, to process 500 dally tons of soybeans.

The plant should be located near the feedmix concentrate plant(s) which means in effect either in the Nova Topole/Bosanske Gradiska area; or in another area where the major part of the feedmix expansion will be located

The plant should be equipped with up-to-date soybean-processing oriented solvent extraction equipment

Annual output of the plant will be 125,000 tons soybean meal plus 30,000 refined edible soybean oil.

The meal will be sold partly to the regional feedmix plants and partly to the feedmix industry outside the region. The oil will be sold to the enterprises which retail edible oil products, or an integrative production of final retail-bottled edible oil products can be done in combination with such enterprises. The whole quantity of 30,000 tons will actually replace edible oil imports, in terms of marketing, prices and hard currency aspects and as far as the consumers and price levels are concerned no change need be introduced

The feasibility data in the ensuing pages show the components of investments and of the processing costs for three sizes of modern soybean processing plants

For reasons of a ready market, hard currency earnings via import substitution, and economy of scale, it is recommended to start production with the large size, 500 tpd plant. In fact the plant will be somewhat over designed so that the net output can be as stated above. This capacity is approximately the average capacity of existing USA plants - although the new plants erected in the USA and Brazil are nearer 1,000 tpd, some of them even larger

The annual processing cost (including amortization but excluding interest on basic capital) will be, at present prices in the area; about 34 million dinars, i.e. 0.21 ND/kg. If profit and interest on total (investment and working) capital are assumed at 20% on fixed investment, this would bring total costs to 0.37 ND/kg

This would lead to the following soybean meal price levels, ex-factory, on the assumption of a price of 2.20 ND/kg being paid to the farmer for the soybeans (or importing them which would bring the CIF BK import price to the same figure): All prices refer to mean 1972 costs and prices. Meantime the prices of beans, meal, meat are increasing jointly on the world markets. On the other hand, as huge new plantings of soybeans are undertaken in the USA and in Brazil, a drop in soybean prices from the present overly high levels is forecast. It is therefore considered best to leave the structure of relative prices as presented here for the more stable

2. The product lines proposed for the plants contain mostly high upgrading stages - ranging from packed prime cuts to smoked meats and ready-to-eat meals. This is proposed both to achieve the highest income per animal and per investment, as well as to have most of the products in the uncontrolled selling price category.

Since the product lines are in those directions where the market forecast shows large demand - domestic and exports - within a few years, it can be assumed that the prices obtainable at any time for the products will be in the upper ranges of meat and processed meat prices at any period.

D. Regarding treatment to capital costs the following procedure was adopted:

1. One shift in slaughtering but 3 shifts in further processing were taken into account. This in order to reduce investment, where possible.
2. Depreciation - straight line depreciation was assumed, calculated separately for buildings and equipment. Depreciation rates customary in Yugoslavia for such installations were used; they are not substantially different from those used by the meatprocessing industry in other countries.
3. Interest - the interest on capital (basic investment and working capital) - was purposely not included in the production cost calculations. Interest rates as well as repayment periods are a main regulatory instrument of Yugoslav banks in the development policy of economic branches and/or regions. The criteria to be applied towards these meatprocessing plants by the banks will depend on several decisions in BK, B&H and bank directorates on the national level. Rates might vary from 2.5% to 11%, repayment periods from 5 to 20 years.

Also, as stated earlier in the report, some enterprises consider the annual repayment of capital credits as a part of the production cost, in order to establish annually distributable funds (for profitsharing of employees, welfare activities, expansion reserves, etc.)

It has to be assumed in practice that despite the recent growing insistence of the Yugoslav banks that enterprises finance at least part of new plants and expansion in their control by their own accumulated reserves, the BK industry will not have any selfgenerated funds available to invest in "equity". Therefore the total initial basic and working capital for these developments will have to come from credits from various Yugoslav development and commercial banks. These banks also channel to the enterprises specific credits which may be granted to such a project under special conditions by international lending institutions.

For all these reasons the calculations show depreciation included as a production cost but interest, as well as of course loan capital repayment, are NOT included as part of production costs but should be coverable from gross surplus accumulation (= gross profit).

In summary, the feasibility data - investment and production cost and profitability estimates - are therefore given and calculated on certain assumptions which can be varied by administrative decisions. Also, profitability will change as the ratio of ex-factory price to rawmaterial cost changes, or as the structure of marketing changes.

1972 situation. They do demonstrate the important soybeans/meal/feedstuff relationships and adjustments will have to be made at the time that the project will be considered for implementation.

SALZS PATTERN OF SOYBEAN PROCESSING PLANT

<u>TONS</u>	<u>PRICE ND/ton</u>	<u>TOTAL ND</u>	
165,000 soybeans x 2,200 + 370 = 2,570 input		425,000,000	Annual Total Sales
125,000 soybean output	2,200	275,000	Annual Sales of Soybean Meal
30,000 soybean output	5,000	150,000	Annual Sales of Soybean Edible Oil

The above assumed price of 2,200 ND/ton for soybean meal assumed here should be compared to the cheapest price at which soybean meal was in the reference period sold in Yugoslavia (2,200) and the median price which was between 2,350 and 2,600 ND/t.

The total processing and capital cost of 0.37 ND/kg includes interest on working capital on the assumption that the soybeans processing plant will have to carry the interest on the price paid to the farmers for the whole crop of 165,000 tons at the time of delivery to the plant by the farmers. This is a theoretical minimalist assumption, taken only to demonstrate the general feasibility of the soybean processing operation. In practice the agrocredit system for the complete development project will have the value of the soybean crop rotating between suppliers of inputs-farmers-soybean processing plant - feedmix plant - livestock breeders - processing industry.

\* \* \* \*

- 1) **PROPOSED ENTERPRISE:** SOYBEAN PROCESSING PLANT
- 2) **PROPOSED LOCATION:** See Discussion in Chapter
- 3) a) **PRODUCT LINE:** SOYBEAN MEAL AND SOYBEAN OIL (plus Lecithin by-product)
- b) **VARIETIES:**
- c) **PACKAGING:** Meal in 50 Kg. Sacks, Oil in Plastic Bottles
- 4) **MODE OF PROJECT:** New Plant
- 5) **PLANNED OUTPUT(Alternatives):**

	Beans Input (Tons/year)	Output (Tons nett product/year)	
		Soybean Meal	Soybean Oil
1	66,000	50,000	12,000
2	116,000	88,000	21,000
Recommended Alternative: 3	166,000	126,000	30,000

- 6) **ANNUAL SALES ESTIMATES (Soybean meal + soybean oil):**  
(Assumed ex-factory price obtainable at December 72 Yugoslav price levels)

Alternative	Annual Sales (Mill.MD)
1	166.0
2	288.0
3	416.0*

(\* unrefined by-product Lecithin 100,000 MD - has to be separated for technical reasons).

- 7) **PROCESSING SEASON:**

330 days per year, 3-shift operation

- 8) **FACILITIES - EXISTING AND NEW:**

There are no existing facilities in the project area. This is an entirely new plant.

SOYBEAN PROCESSING PLANT

9. FIXED INVESTMENT ESTIMATE (Mill.ND):

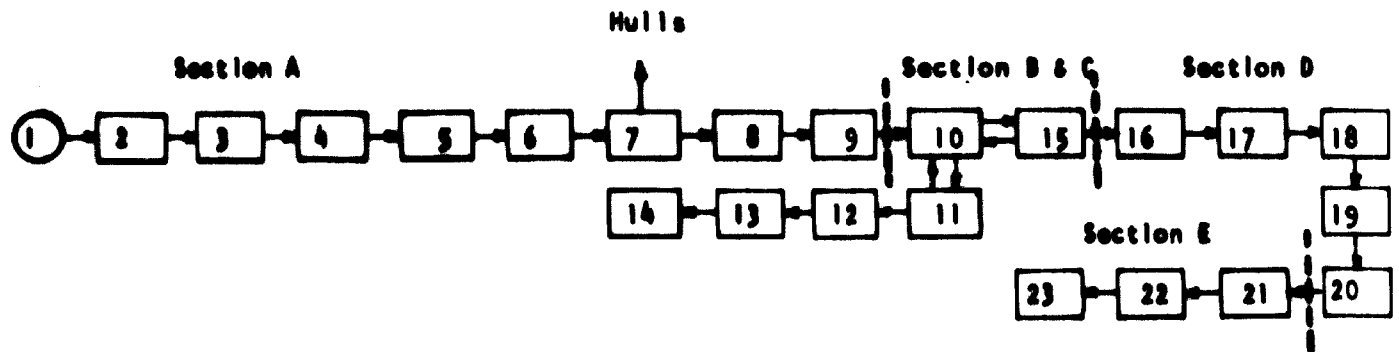
<u>Alternative</u>	<u>1</u>	<u>2*</u>	<u>3*</u>
<b>Equipment</b>			
Unloading and Preparation	2.800	3.400	4.600
Extraction and Solvent Recovery	7.800	10.600	15.400
Meal Processing	2.000	4.200	5.100
Refining and Deodorizing	3.000	7.400	10.200
Filling	1.400	1.400	1.700
<b>Total Equipment, incl. Utilities</b>	17.000	27.000	37.000**
<b>Building</b>	11.000	18.000	25.000
<b>Engineering &amp; Installation</b>	14.000	24.000	31.000
<b>Total Fixed Investment</b>	42.000	69.000	93.000
.....			
<b>Working Capital</b>		See chapter on Soybeans	

\* Cumulative Total

\*\* includes 0.5 million ND for Lecithin separation equipment.

10) PROCESS DESCRIPTION

SOYBEAN PROCESSING PLANT



MAIN EQUIPMENT

**Section A**  
**RAW MATER.**  
**RECEIVING**  
**& PREPAR.**

1. Soybeans
2. Receiving
3. Raw Material Storage
4. Screening
5. Metal Pieces Separat.
6. Cracking
7. Dehulling
8. Storage
9. Flaking

Raw Material Preparation  
 Discharge Bin  
 Screw Conveyors  
 Bucket Elevator  
 Distributing Discharge Heads  
 Vibrating Screen  
 Magnetic Separator  
 Operating Bins & Silos  
 Cracking Rolls  
 Dehuller  
 Flaking Rolls

**Section B & C**  
**EXTRACT.**  
**MEAL**  
**HANDLING**  
**AND**  
**PACKING**

10. Extraction
11. Desolventizing (under vacuum) and Toasting
12. Cooling
13. Grinding
14. Packing
15. Solvent Evaporation

Extraction  
 Feeding Conveyor  
 Extractor  
 Desludge Separator  
 Miscella Tank  
 Miscella Evaporator  
 Solvent Vapor Condensers  
 Solvent Water Separator  
 Absorption System  
 Solvent Storage Tanks  
 Crude Oil Heater  
 Crude Oil Dryer

Meal Handling & Packing  
 Conveyors (Screw & Redler type)  
 Bucket Elevator  
 Desolventizer & Toaster  
 Balance Bins & Silos  
 Hammer Mills  
 Meal Dryer-Cooler  
 Compressor & Cyclones  
 Dust Scrubber  
 Pulverizer  
 Meal Product Storage Silos  
 Filling Hopper Bagging Machine  
 Scales

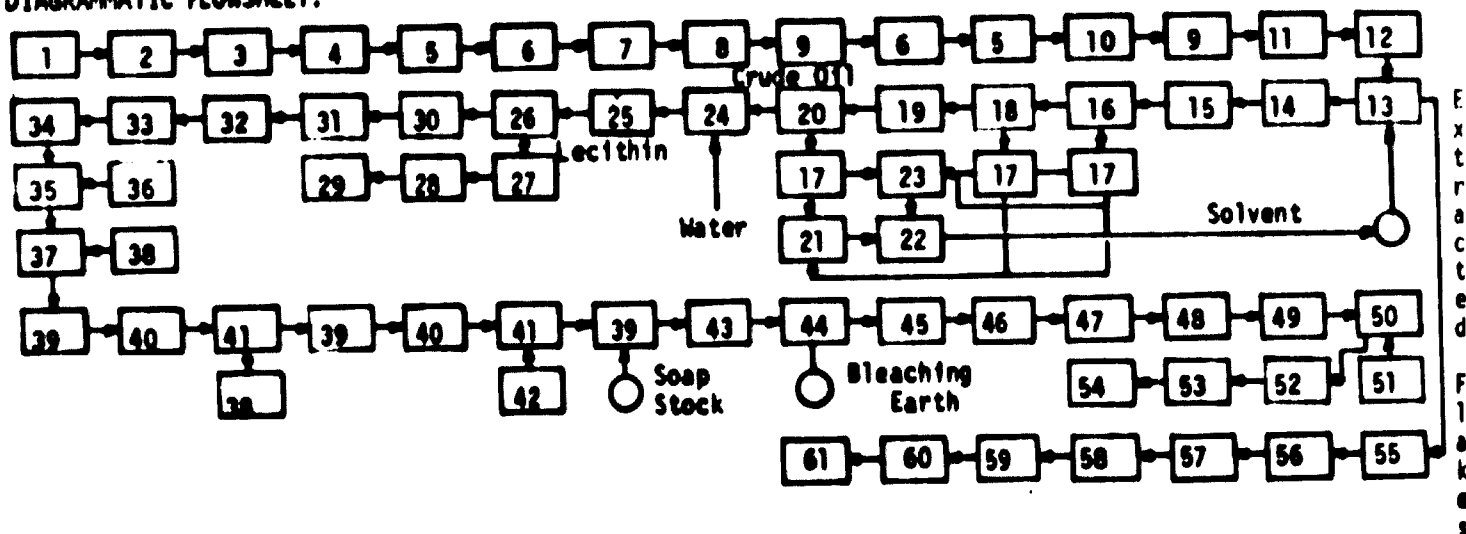


SOYBEAN PROCESSING PLANT (contd.)

		<u>Oil Refining</u>
Section D OIL REFINING	16. Degumming	Hot Water Preparation and Supply System Oil Water Mixer Degumming Tank Lecithine Separator Gum Dryer Lecithine Storage Tanks
	17. Neutralizing	Oil Heater Oil Evaporator Vacuum System Oil Cooler Crude Oil Balance Tanks Crude Oil Heater H <sub>3</sub> PO <sub>4</sub> Storage and Preparation Tanks Oil High Speed Mixer
	18. Bleaching	NaOH Storage and Preparation Tanks NaOH Neutralizing Mixer Stage 1 Refining Separator - Stage 1 Semi-Neutral Oil Heater NaOH Mixer Stage 2 Refining Separator - Stage 2 Water Mixer Soap-Stock Storage Tanks Washing Separator
	19. Filtering	Oil Dryer Neutral Oil Storage Tanks Bleaching Earth Storage Bins & Carts Bleaching Reactor Filter Press Intermediate Oil Storage Tank Polishing Filter
	20. Deodorizing	Oil Cooler Refined Oil Storage Tanks
		<u>Packing</u>
Section E OIL PACKING	21. Filling	Inline Blowmolding Filling
	22. Sealing	Sealing
	23. Packing	Labelling Packing and PE Shrinking

**SOYBEAN PROCESSING PLANT**

11) **DIAGRAMMATIC FLOWSHEET:**



- |                       |                                 |                              |
|-----------------------|---------------------------------|------------------------------|
| 1 Unloading Bin       | 21 Absorption System            | 41 Mixer                     |
| 2 Screw Conveyor      | 22 Recovered Solvent Storage    | 42 Water Tank                |
| 3 Bucket Elevator     | 23 Solvent-Water Separator      | 43 Oil Dryer                 |
| 4 Vibrating Screen    | 24 Hot Water-Crude Oil Mixer    | 44 Bleaching Reactor         |
| 5 Magnetic Separator  | 25 Degumming Tank               | 45 Filter Press              |
| 6 Balance Storage Bin | 26 Lecithin Separator           | 46 Intermediate Storage Tank |
| 7 Cracking Rolls      | 27 Lecithin Dryer               | 47 Deodorizer                |
| 8 Huller              | 28 Lecithin Storage Tank        | 48 Polishing Filter          |
| 9 Elevator            | 29 Lecithin Filling Device      | 49 Refined Oil Storage Tank  |
| 10 Flaking Rolls      | 30 Oil Heater                   | 50 Filling Machine           |
| 11 Flake Bins         | 31 Oil Evaporator               | 51 Inline Blow Molding Unit  |
| 12 Feeding Device     | 32 Oil Cooler                   | 52 Sealer                    |
| 13 Extractor          | 33 Crude Oil Storage Tank       | 53 Labeller                  |
| 14 Separator          | 34 Crude Oil Heater             | 54 PE Shrinking              |
| 15 Miscella Tank      | 35 High Speed Mixer             | 55 Conveyor                  |
| 16 Evaporator Stage 1 | 36 $H_3PO_4$ Storage Tank       | 56 Toaster                   |
| 17 Condenser          | 37 $H_3PO_4$ Neutralizing Mixer | 57 Hammer Mill               |
| 18 Evaporator Stage 2 | 38 NaOH Storage Tank            | 58 Meal Dryer-Cooler         |
| 19 Crude Oil Heater   | 39 Refining Separator           | 59 Pulverizer                |
| 20 Crude Oil Dryer    | 40 Semi-Neutral Oil Heater      | 60 Storage Bins              |
|                       |                                 | 61 Weigher & Bagging Machine |

12) **DIRECT MANPOWER: (for three shifts)**

Alternative	1	2	3
Operators	30	35	42

13) **UTILITIES:**

Alternative	1	2	3
Power (KWh/year)	1,050,000	1,800,000	2,500,000
Water ( $M^3$ /year)	3,200,000	5,500,000	7,500,000
Steam (Tons/year)	9,200	16,000	22,000
Fuel (Tons/year)	600	1,000	1,400

SOYBEAN PROCESSING PLANT

## 14. MATERIALS BALANCE:

For Input of 1 Ton of Beans

Material	Kg.	Kg.Total
<u>Ingredients:</u>		1,000
Good Beans, nett	947	
<u>Wastes and Residues:</u>		53
Rejected Hulls	50	
Soap Stock	3	
<u>Product:</u>		947
Soybean Meal	760	
Edible Oil	187	

## 15. PROCESSING COSTS (Mill.ND/Year):

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Packaging Material	4.500	7.800	11.000
Utilities	6.200	10.900	15.800
Direct Labor	0.900	1.100	1.300
Overhead*	0.500	0.650	0.750
Amortization	2.300	3.700	5.000
Total (Mill.ND/Year)	14.400	24.150	33.850

\* Includes maintenance, administration and transportation

16. PROCESSING COST SENSITIVITY

ITEM(1)	Stage 1		Stage 2		Stage 3	
	ITEM CHANGE (±%)		ITEM CHANGE (±%)		ITEM CHANGE (±%)	
	± 10%	± 20%	± 10%	± 20%	± 10%	± 20%
LEADS TO CHANGE IN PROCESSING COST/UNIT (±%)						
Packing Material	3.1	6.2	3.2	6.5	3.2	6.4
Utilities	4.3	8.6	4.5	9.0	4.7	9.4
Direct Labor	0.6	1.2	0.5	0.9	0.4	0.8
Overhead Share	0.4	0.8	0.3	0.5	0.2	0.4
Amortization	1.6	3.2	1.5	3.1	1.5	3.0

(1)

Changes of different levels in different items may be calculated by addition of the appropriate percentages.

#### 4.D. MILK SUPPLY AND PROCESSING

##### 1. MILK PRODUCTION IN THE BK REGION

###### A. General

The BK region has an annual milk production of about 100 million l., not including milk fed to young calves.

Considering the population of about 715,000 inhabitants, this results in a per capita consumption of about 140 l./year. The real consumption is much lower as a large amount of milk is used for animal feeding, especially in private pig farming. There is no increase in milk production in the region, but to the contrary, an absolute decrease and even a bigger one in per capita consumption - as there is a total population increase. The milk production figures for the years 1969-71 are as follows: (in million ltrs.)

1969	-	103.3
1970	-	102.0
1971	-	98.7

Out of these 100 million l. only about 10 million l. are processed by the BL dairy. The rest is distributed between the following usages:

- Self-consumption by the farmers
- Home cheese production - partially marketed
- Direct supply from dairy farms to consumers
- Fed to animals, especially pig farms

The main reason for such distribution is the lack of marketing outlets for the products, which is partially the result of deficiencies in the infrastructure of the region - roads and electrical power for refrigeration on the farms.

There is a big difference in milk production between summer and winter. It is assumed that in winter the daily regional production is about 55% of the one in summer. The surplus in summer is mainly transformed into hard cheese on the farms, while in winter the BL dairy imports milk from other areas of Yugoslavia.

It is suggested that the development of milk production in the BK region should follow the following stages:

- Wider organization of milk collection from the farms, thereby increasing the amount of milk processed at the BL dairy and reducing the home cheese production and direct supply from dairy farms to urban customers.
- Change in feeding systems on pig farms, substituting the milk component in the feeding by other feeds.
- Smoothing the annual curve of calving thereby permitting a more even supply of milk during the year.
- Increase of milk production by the actual cow population (changes in feeding systems, more disease control, higher percentage of calving, etc.).
- Substitution of the existing cattle by higher milk producing races. Less cows of these new introduced races will produce the same amount of milk. The pastures/meadows/roughage saved thereby can be utilized towards increasing the number of heads of beefcattle.
- Increase of milk production by higher milk production per milk cow (new race) and more milk cattle.

This phasing would give timing preference to rationalized milk supply to the population before high investments in milk farming for improved milk cattle and installation will have to be undertaken.

MILK PRODUCTION PER COW IN B&H - 1968 (According to communes and yields)

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The region does not dispose of unlimited financial investment resources. In the priority scheme beefcattle and other branches should receive priority over increased milk production but without delaying processing improvements. This lower priority should be assigned for the following reasons:

- By rationalization of supply for consumption of existing milk the per capita consumption, although not being high, is acceptable (140 l.).
- Domestic and International market demand for dairy products are less in volume and hard currency than the other agroindustrial products recommended in this project.
- If increase of output of the region is looked upon through agribusiness terms, then achieving regional added value by processing of existing raw material has the same effect as increasing pure agricultural operations (which in this specific case would not be feasible without additional investment in enlarging the dairy facilities).

#### B. Milk Production Patterns in Private Sector of the BK Region

##### Problematist

The most significant figure in milk production for BK is the milk production per cow per year. It would be difficult to arrive at this figure for the following reasons:

- Most milk, over 95%, is produced in the private sector. It can be assumed that this trend will continue.
- The private sector maintains its cattle population as a dual purpose - milk and meat - operation. There are near to none pure milk cows in the region.
- Most private farmers do not maintain an organized registration system.

Statistically the average is about 800-1000 l./year/cow.

This figure compares to similar ones in the following table, although for milk purpose herds shows the backwardness of the milk production in the private farms in BK.

ANNUAL AVERAGE MILK PRODUCTION/COW IN SELECTED AREAS OF THE WORLD

	<u>1962</u> <u>l./year</u>	<u>1971</u> <u>l./year</u>	<u>Increase</u> <u>1962-1971</u>
BK (Private Sector)		± 800	
Yugoslavia (Social Sector)		above 4000	
Yugoslavia (Total)		1159	
France	3540	3639	99
Great Britain	3976	4172	196
Italy	4227	4338	111
W. Germany	4047	4397	350
Holland	4375	4445	70
Denmark	4310	4675	365
Finland	3881	4660	779
Sweden	4571	5165	594
Israel	5446	6300	854

## 11. CATTLE/PIG SLAUGHTERING AND PROCESSING

### A. General

A modern slaughterhouse and processing plant is recommended which will supply veal/beef/pork/mutton as well as their products to the project area, other parts of Yugoslavia, and export to markets abroad as well as for tourists within Yugoslavia.

The slaughterhouse should be equipped with modern equipment for slaughtering and dressing by "CAN-PAK" method "on the rail"

The Can-Pak system, as the original on-the-rail beef dressing system is termed, permits cattle to be dressed in one continuous operation from bleeding (after sticking) to the point where the sides enter the cooler. It incorporates throughout the principle of bringing the labor to the butcher in such a manner that all his work is productive and can be carried out from a comfortable position. The system utilizes one or more overhead chain conveyors, that span all operations, and many mechanical devices. While still all butcher operations associated with previous systems must be performed, work allocation is different. Beds, as well as half-hoist and full hoist work positions of the carcass are eliminated. As a result, much non-productive work and waiting time is eliminated, and the productivity per butcher and square foot of area is increased considerably. Thus skilled labor and constructed area are decreased.

Key to this system is a mechanical hide puller with which a good portion of the hide can be removed from the carcass in one swift operation, as well as other mechanical devices. Using this system up to 150 heads per hour can be dressed.

The input of the plant will be:

- 175,000 steers, calves and cows
- 240,000 pigs
- small amount of sheep (not referred to further on)

The output of the plant will be about 25,000 tons of meat, 21,000 tons of processed meats + edible offal and by-products distributed as follows:

- About 16,500 tons of beef (baby beef)
- About 5,000 tons of veal
- About 4,000 tons of pork
- 1,000 tons frozen and fresh "primary-processed" products for final preparation by users
- 1,300 tons ready-to-eat products (meat component only of meals or dishes and precooked or prepared cuts/slices)
- 2,500 tons semi-preserved canned products
- 6,500 tons canned meat
- 10,000 tons preserved and partly preserved sausages.
- 130 million Dinar worth of edible offal which are in excess of marketing capacity for marketing in processed form
- 60 million Dinar worth of by-products (hides, glands, bones, blood, rejected meat, etc.)

The plant should be highly flexible in order to adopt itself to the domestic and international market fluctuations in demand for type and quality

This table shows the difference in milk per cow production in BK private sector, compared with the rest of Yugoslavia and other countries, some of which have similar conditions.

The reasons for this large difference are: (regarding the private sector)

- There is no breeding of dairy cattle.
- The reproduction is mostly by self-owned bulls and only little artificial insemination is applied.
- There is only a limited collection system for milk, therefore most of the farmers have to use the milk produced on their farm or in their near vicinity. Much milk goes in such a system to pig feeding, where the remuneration for the milk consumed is estimated to be about one third of the potential price to be paid by a dairy.
- Owing to the previous reason there is no incentive to the farmer to produce more milk, for in such case he will encounter only a larger marketing problem.
- Feeding systems are inadequate. If marketing problems are solved, a more "in-stable" rearing system, incorporated with "bringing the feed to the cow" instead of grazing, and rational utilization of higher nutrition valued feeds - improved pastures, meadows cut, forage crops and last but not least concentrated feedmix - will soar production similar to other dairy farming areas in the world. It can be noted from the table above that production can increase even in high yielding herds. It is obvious that the same increase (relative or absolute) can be achieved much easier from a low producing cow than from a high yielding one.
- Calving is today according to nature and seasons. This too can be changed by a different feeding system. If such techniques are applied the result will be a more even supply of milk during the year. An incentive price at off-season for some years will encourage farmers to follow such trend.

### C. Recommended Solutions

In order to overcome the constraints in the private sector the following actions should be taken:

- 1) Defining farmers who are dairy oriented and who will be incorporated in a regional scheme for organization of milk production. Efforts should be concentrated in selected communes, in areas which dispose of adequate infrastructure, in order to use most of the limiting resources (manpower, knowhow, financial, breeding stock, etc.).
- 2) The milk flow has to be along infrastructure and collection centers - existing or to be developed.
- 3) In the selected areas the dairy farmers will have to bring their milk twice daily to local collection centers where a 500-2000 l. lactofreezer will be stationed.

In certain areas, where the road network and distances permit, collection vans can circulate along the farms. From the local collection center the milk will be transported, everyday or second day, by tankers (10,000 l. and up capacity) serving one or more communes to the dairy in BL or to the proposed cheese factories.

There are already about 60 such collection centers in the region which are run by the BL dairy, cooperatives and the veterinary services. In addition, it is understood that the Chamber of Commerce of BL is already implementing the installation of many additional lactofreezers all over the region.

The location of the collection centers will depend on the concentration of dairy farmers, the road network and power supply for refrigeration. (The latter can be overcome by not using electric power lines as primary power for cooling generation.

The farmer, in most cases where no transit roads exist, will have to bring his milk by his own means to the collecting station. Therefore, the distance cannot be more than a few Km. It should be considered that the quality of milk depends on the quick cooling of it, and, if the milk will not arrive within two hours after milking at the lactofreezer, many benefits of the whole operation are lost already at its start.



At delivery to the lactofreezer the farmer will be credited according to volume/weight of the milk - as well as according to platform tests (fat contents and acidity, antibiotics and M.B. tests).

At the local collection center there should be additional facilities like a room for consultation, for the farmers between them and with technical staff, market news exposures, artificial insemination, requests and messages for registration and follow-up, production registration, can rinsing equipment, etc.

Dispersed among the local collection centers there should be regional dairy centers (one for every 15-25 local collection centers). Such regional center apart from being a local collection center for its immediate surroundings will serve the dairy farmers within its influence area, by having the following services additional to the local collection centers:

- Constant veterinary service and drug supply.
- Extension service regional center.
- Warehouse for feedmix supply.
- Administration and accountancy of milk collection.
- Market news distribution.

The same staff stationed at these centers will visit periodically the local collection centers as well as the farmers, according to fixed schedules and in emergency cases.

Farmers will have to go daily to the local collection centers and 2-4 times a month to the regional dairy center.

- 4) Artificial insemination, veterinary services and extension services will be brought down to the farmers by supplying them on the farm, at the local collection center and at the regional dairy center.

The farmer in turn will receive his supplies of feedmix, veterinary drugs and market information at the local collection center and regional dairy center.

- 5) The main items for realization of the above are credit and organization.

- The farmers need the credit in order to supply milk for processing on a continuous basis. By granting controlled credit an incentive is created for applying more modern techniques than the ones presently used.
- Controlled credit should be understood as a system in which extension, veterinary and artificial insemination services as well as input supply and output marketing are all integrated and backed up by planning, scheduling and credit supply.

All of these should be organized and administered by one organization.

- Credit will be applied mainly by inputs and services and only on a minimal basis of cash. Deductions will be made from milk supply according to criteria to be established.
- All this "organized production" will be channelled to the dairy in DL. It is recommended that the responsibility for organization of production for processing for the whole region, including all the above mentioned should be in the hands of a special unit of the Kombinat in close cooperation with the dairy in DL.

It is believed that such an organization, in coordination with federal, republic and local institutions and agencies will be able to realize the first three stages mentioned in the section A. of this chapter. Furthermore, by collecting the milk via milk collection centers the dairy farmer will be free to produce milk and not be occupied with milk-marketing/delivery (commercial) activities, in which some of them spend a part of their time thus reducing their productivity.

It should be noted that some of the above mentioned recommendations are already partially followed in the region. The expansion of the dairy in DL being already in execution requires organized milk production as a must in order to supply it to its capacity. Therefore immediate action should be taken to realize in full the recommended solutions.

Parallel to the above mentioned steps of action, selection and cross-breeding with milk race bulls by artificial insemination should be executed.

Should there, later on, be still more demand than supply for milk, the introduction of, or substitution by, high yielding pure race milk cows should be considered. This will require a high investment which will have to be justified economically.

Registration and follow-up of fertility performance and conception rate of all cows participating in the scheme as well as performance and progeny testing of the bulls should be included. It would be advisable at the same time to establish a full herd record, with usage of computer facilities if possible.

#### D. Milk Production, Processing and its Organization by the Social Sector

##### 1. Production

Milk production in the social sector of the BK region is centralized in the Nova Topola milk farm of the Kombinat.

This operation is already well advanced compared with the average private sector performance.

This farm is until now the main supplier of milk to the dairy in DL (being a unit of the same Kombinat).

Modern methods of rearing and feeding are applied but the way is still open for further improvements.

The stages from "smoothing the annual curve" onwards in the section A. of this chapter should be followed with emphasis on scientific - economic improvement of the feeding and rearing system.

This farm could be run, apart from regular production, as a demonstration and experimental farm for the whole region in order to realize the change of the production patterns as described previously.

A special budget would have to be allocated by republic authorities in order to finance constant experiments and demonstrations in coordination with scientific and technical service institutes. This farm should be as well the applied base for the extension service to serve the private sector.

##### 2. Processing

Expansion of the dairy from 30.000 to 60.000 l./day is already under way. Advanced planning of milk supply, through the establishment of organization and services as suggested will require in the near future further extension of the plant to a more economic size.

The input of the plant, as long as platform tests are applied, is one sole standard raw material, hence production schemes depend only little on quality, variety and type of input product and mainly on quantities supplied.

In order to obtain a more or less even supply of milk to operate continuously on a profitable basis, it is recommended that the plant uses, from its own resources or from authority allocated subsidies, a differential price structure in order to encourage the dairy farmers to supply more milk in low seasons, by price incentives.

The new special unit to be formed in the Kombinat, which would be the spear-head to develop organized milk production, should be administering the price differentials in order to use this as a tool for creating incentives, apart from credit and services, to the dairy farmers participating in this scheme.

Such incentives applied for contract farming only, will develop a chain reaction from other potential dairy farmers who will want to join the scheme.

When this will happen the capacity of the processing plant and strength of the enterprise, together with marketing possibilities of the processed products will define how much milk from how many dairy farmers could be incorporated additionally.

### 3. Organization

A special unit, within the Kombinat, will have to be created in order to accelerate milk supply and processing in the BK region.

This unit will be in charge of all operations envisaged in order to deliver high quality milk in accordance with the production schedule of the processing plant.

This unit will have inter alia the following tasks:

- Planning
- Extension service
- Veterinary and artificial insemination service (integrated with existing regional services)
- Regional dairy centers and local collection centers, establishment and maintenance
- Technical department for lactofreezer and transportation means purchase, installation and maintenance
- Feedmix supply
- Credit and accounting
- Contracting with participating farmers and information distribution
- Training and demonstration
- Registration and analysis of herd, farm and production data
- General department in charge of coordination with institutes and agencies and promoting the introduction of new breeds, feeding and maintenance systems, etc.

The maintenance cost of such a unit may look high at first sight, but part of it should be seen as an investment within the overall development of the BK dairy sector, with primary concentration on the Kombinat as the carrier of such development. BK should be looked at as one of the main potential regions for future development of milk production. This for its ecological conditions and geographical location. It should be noted that this same unit will give similar services to other livestock and agricultural branches like beefcattle, pig-farming, poultry farming, soybean development, etc., including the forage crops and pasture improvements for milk and beefcattle, all to serve the processing industry of the BK region and thereby reducing costs.

**E. Recommendations**

- Establish a department in the Kombinat which will be responsible for planning, scheduling, supply and market organization, credit allocation contracting with cooperants and coordination with other institutes and agencies. The dairy branch will be one of many branches treated similarly by this department.
- Define areas for developing dairy farming
- Supply dairy farmers with services and credits
- Differential price for milk according to seasons
- Widening the milk collection facilities and combine them with services to be supplied
- Changes in feeding/rearing systems and marketing patterns
- Utilization of the Nova Topola dairy farm for demonstration and experimentation
- Allocation of funds for experimentation, demonstration and services
- Allocation of credit lines to finance milk production/processing and investments for further development.

\* \* \* \*

## 2. DAIRY IN BL

### A. General

The main problems of the dairy in BL, a working unit of the Kombinat, are:

- To supply the population of BK the year round and a part of the tourist market with quality dairy products.
- An uneven supply of raw milk, creating the necessity to import a certain amount of it from Slovenia and Croatia in winter.
- A "hinterland" of milk production potential which is not exploited for lack of sufficient collection facilities and infrastructure.
- Diversification of the products.

(The following map shows the wide influence area of the BL dairy).

### B. Expansion Program Already Approved of the Dairy

An expansion of the dairy in BL was approved prior to the execution of this study.

The main points of this expansion program are:

- Change of equipment thereby increasing the capacity to 60.000 l. of milk p. day
- Introduction of 3 new products to the previous ones.

The previous products were:

- Pasteurized milk normal fat content (3.2%)
- Natural yoghurt
- Flavored yoghurt.

The 3 new products are:

- Fruit yoghurt
- Trappist cheese
- Drum dried milk and whey.

The annual turnover of the expanded plant will be 65 million dinars on the basis that 60% of input will be marketed as pasteurized milk.

### C. Suggestions for Alterations of the Expansion Program

Our recommendations are that the expansion should be as follows:

1. Change of equipment should be to 100.000 l. milk per day. This increase was discussed between the team and the management of the dairy and others in May-June and at the September meeting, and accepted by them. It is understood that there are already negotiations with the equipment suppliers to increase the capacity in accordance, and some specifications for this purpose have already been recommended to the dairy by us.
2. A wider product mix in accordance with the potential product list which is detailed further on.
3. Not to drum-dry milk as a buffer but to evaporate milk for concentration. This mainly due to the high investment and production cost for drum drying.
4. If the expansion will be for 100.000 l./day a wider range of the proposed products can be started simultaneously.
5. Utilization of high protein dry whey has to be studied apart in order to define the most profitable use of it.

## D. Product Classification

1. By raw material - cow milk, sheep milk
2. By plant - BL dairy, cheese factory(las)
3. By product - pasteurized milk, flavored milk drinks, cultured products, soft cheese, butter spreads, semi-soft cheese, hard cheese and processed cheese. Varied by taste, smell, flavor and percentage of fat.
4. By destination - local consumption, tourist market. Retail, individual and family size packaging, institutional and wholesale packaging.
5. By delivery time - immediate, short time, medium/long time.

## E. Products List and Packaging. (Percentages of fat are mostly according to Yugoslav standards)

Following is a list which includes proposed products and their packaging form. This list should be looked at as an indicative one which is neither complete nor obligatory as a product-mix.

Some products might be produced daily while others will be produced only in certain seasons or upon availability of excess milk supply. Products which need ripening or can be stored can be produced at a better ratio than 1:1 processing/sales. The annual/seasonal product-mix will have to be defined according to demand and prices.

### 1. At BL dairy

#### a) Drinks -

1. Pasteurized milk normal fat content (3.2%)
2. Pasteurized milk low fat content (1.6%)
3. Cocoa flavored milk (2% fat)
4. Coffee flavored milk (2% fat)
5. Vanilla flavored milk (1.5%)

Packaging for 1-2: Retail - 0.5 l. and 1 l.

Institutional - 4 - 5 l.

for 3-5: Retail individual - 200-250 grs.

Retail family size - 1 l.

#### b) Cultured products -

1. Natural yoghurt
2. Stirred yoghurt with fruits in required flavor
3. Flavored yoghurt (strawberries, peach, pineapple, cocoa, cherry, etc.)
4. Sour cream (30% fat)
5. Half fat dietetic cream (16%)
6. Coffee cream (8-9%)

3 - 6. Produced either set or stirred.

Packaging - Retail, individual - 170-250 grs.

Retail family size - 1 l.

Institutional - 5 l.

c) Soft cheeses (similar to the German Quark or the French Fromage Blanc or Bervais)

1. Skimmed (for baking)
2. 5% fat (dietetic)
3. 10% fat
4. 15% fat

All these can be diversified by:

- a) spices - pepper, onion, etc.
  - b) fruits
5. Cottage cheese half-fat (5%) creamed
  6. Cottage cheese fat (10%) creamed

Packaging - Retail individual - 125 grs. cup

Retail family size - 250-500 grs, cup

Institution - Polyethylene bags - 2-5 kg.

d) Butter spreads

Produced from imported butter prior to retail packing

- 1) Chocolate spread
- 2) Honey spread
- 3) Other spreads

e) Processed cheese

Produced from leftovers of hard cheese.

There is a wide range of processed cheese which can be produced with different spices, flavors and fat contents either for consumption as cheese or as spreads.

Packaging - Retail small packs 12, 25, 40, 100, 150 grs.

- Wholesale and institutional blocks - 2 kg.

2. At cheese factory(ies) - seasonal selections from:

a) Semi-soft cheese

1. Camembert
2. Brie
3. Belpasse

Packaging - Retail small packs - one or more per retail carton of 100-250 grs.

- institutional - in cartons of 500 grs. - 2 kg.

b) Hard cheese

1. Port Salut (Trappist)
2. Gouda
3. Edam

Packaging - Retail slices and slices in PVC or polystyrene bags of 200-500 grs.

- Wholesale and institutional blocks 2-5 kg.

## c) Sheep milk cheese

1. Local cheese like Slatki sir  
Sitni sir
2. Brinza (Balcan cheese)
3. Pecciocavallo (Katchkeval)

Packaging in blocks of different size (weight) and shape.

F. Some Considerations Regarding Processing System

1. Milk input for processing should be continuous and not depend on day to day fluctuations. The present system is based on receipt during 16 hours per day (0600-2200 hr.)

Instead the following method is recommended:

The milk, arriving from the collection centers after passing platform tests will be directed by pumps and triway valves either directly to processing or through a plate cooler to operational storage silos (2 vertical of 75.000 l. each). The storage of milk for 24-36 hours before processing is a desirable aging, for taste and flavor reasons, in products processed - like yoghurt, etc.

This system will ease storage/transportation problems and no production intervals should happen.

2. It was already mentioned that there is a considerable reduction of milk supply to the dairy in wintertime.

This is a critical economic question for the dairy, which is presently overcome by import of milk from other regions of Yugoslavia. An increase of price during winter could be an incentive for dairy farmers to supply more milk to the dairy, although it has to be considered that transportation problems in winter are grave.

3. Production schemes should be able to switch over from one product to another according to market demand and raw milk supply. During the periodic surplus (summer), although there is an increase in potential consumers (tourists), production lines for more durable products should be active, like milk-sweets and processed cheese.
4. Pasteurizing should be done in one 8-hour shift (including or excluding 2 hours per day of cleaning the equipment).
5. Cold storage and ripening rooms should have a reserve volume of 20% above regular planned capacity.
6. Some processing sections will not be fully employed. They will work either some hours per day or some day(s) in the week.

For example, milk evaporation, by a plate evaporator, for raw material for milk sweets and as an auxiliary input in producing cultured products in order, by adding this concentrated milk, to improve texture and increase viscosity.

7. Semi-soft, hard and sheep milk cheese should be produced in another location. This for the following reasons:

- a) For sanitation, cheese production should be apart from dairies.
- b) To save transport (90%!) the cheese factory should be located in main producing areas and where most sheep milk production is concentrated.

8. In order to assure future expansion (parallel or additional lines) the layout of the plant should be such that expansion can be executed without interrupting production. This can be done by "color planning", considering all possible alternatives.



### G. Organization of Milk Supply

This subject is treated in detail in the previous sub-chapter on "Milk Production in the BK Region".

The main points are:

- Widening and improving the present collection system.
- Concentration in improving milk production and collection in selected areas according to infrastructure.
- Differential price for milk according to seasons.
- Controlled credit to the dairy farmers including extension, veterinary and artificial insemination services, supply of inputs, improvement of feeding and rearing systems, assurance of purchase of milk produced.

### H. Organization of the Dairy

The dairy should be operated in three working units:

1. Main dairy in BL which will concentrate on production of fresh products for immediate consumptions.
2. Cheese factory for processing hard and semi-soft cheeses. The utilization of existing industrial facilities of the Kombinat in Bosanska Dubica and the existing ripening stores in Nova Topola would be feasible. Both installations were used previously for cheese processing. It would be advisable to use both installations for one product line in spite of the distance between them instead of constructing new ones.
3. A cheese factory for processing sheep milk into cheese in the main producing area.

By operating in three work units the following advantages will be achieved:

- Avoiding bacterial contamination in the main dairy by processing hard and semi-soft cheese at a different geographical location, this, as different starters are used for cultural products and hard cheese.
- Lower transportation cost of raw material, as cheese weighs only 10% of its milk equivalent.
- Each working unit will specialize in its products.
- The storage and cooling facilities at each cheese factory will serve also as distribution centers for fresh products from the main dairy in BL.

The three working units will be operated as it is customary to administer working units in the social sector in Yugoslavia.

The BL dairy will be in charge of coordination between the working units as well as responsible for the marketing of all the produce. This for the following reasons:

- The BL dairy is located at an administrative center from which demand and supply, price decisions, marketing and promotion, etc. can be better dominated.
- The cheese factories will operate, as processors, during certain periods over the year according to milk supply. Their staff will be reduced to the marketing and maintenance personnel during off processing periods.

### I. Manpower

A good distribution of work in a dairy is as follows:

Milk reception, processing a laboratory staff	55%
Services	22%
Professional direction	10%
Administrative staff	13%

The slaughtering facilities should include two parallel lines for dressing, one for cattle and one for pigs and calves. Certain operations can be done for both lines at one station according to volume of production, for instance deboning. Calves can be dressed on a continuous line with pigs, but if necessary the bigger ones can be dressed on the cattle line.

#### B. Product Classification

1. According to raw material: beef, veal, pork, mutton, mixed, cuts.
2. According to product type: frozen for cooking or frying, frozen products, chilled or frozen ready-to-eat, preserves, smoked products, sausages. Halves of pork and veal, quarters of beef and carcasses of mutton, fresh and frozen, prime cuts and assorted cuts, cooked or other special requests, edible offal, by-products.
3. According to destination: domestic consumption - retail, institutional.

Exports - abroad and to tourists - especially beef which is in growing demand. Industry - rendering, tannery and pharmaceutical.

#### C. Product List

The plant will produce a wide range of products in order to penetrate the domestic and export markets.

Selection from the following list of products is recommended. The definite products will depend on their suitability for the domestic and export markets.

##### 1. Fresh meat

Beef quarters  
Pork halves

##### 2. Fresh or Frozen Products

Meat cuts (with or without bones),  
fillet, porkloins, ham  
Hamburger  
Cevapcici (Kebab)  
Minced meat  
Loaf

##### 3. Frozen Portions or Products, ready-to-eat

Grilled steak - frozen	Stews
Goulesh	Tongue in Jelly
Roast beef in gravy	Beefsteak
Roast bacon in gravy	Meatloaf
Fried battered meat cuts (Wiener Schnitzel)	Corned Meat
Beef (Roulade) in jelly	Meat Balls
Pork Roulade; Sausages in gravy	Corned Meat Loaf
Chili con carne	

To this marketing, transporting, distributing and sales staff have to be added according to the marketing system recommended in the marketing section of this chapter, as well as the personnel required for the milk collection centers and the transportation from there to the dairy and cheese factories.

#### J. Product Mix and Turnover

The average produce of dairies in Europe is divided as follows:

1. Drinking milk	16.0%
2. Cultured products	8.2%
3. Butter	2.2%
4. Cheese	34.4%
5. Milk powder	22.2%
6. Miscellaneous	17.0%

Under specific BK conditions the following product-mix can be expected:

1. Drinking milk	45%
2. Cultured products	25%
3. Cheese	25%
4. Miscellaneous	5%

Considering the fixed pricing policy existing and assumed to be continued, the dairy can be a profitable operation as long as correct administration, including optimum utilization of raw materials, control of quantitative yield and establishing and maintaining loss factors in general handling and production, is applied.

The annual turnover is expected to be 100-125 million dinars depending on the product-mix and prices of the different products. Some payoff has to be considered for the longer cycle - ripening and storage - of some products.

#### K. Marketing

It is recommended to market the produce in BK by a direct marketing line. If a similar system will be used for other products there can be close cooperation in distribution with them.

Each distribution center, the main ones will be the dairy in BL and the cheese factories, will distribute in a radius of about 50-80 km.

Marketing from the plants to the distribution centers will be in the evening or at night so that the products can be distributed early in the morning.

At the distribution center - there will be a cooling installation, administration space and a store for returnable packing material. The distribution center must have a capacity above regular daily consumption in order to avoid unexpected deficiencies due to unforeseen demand. The nature of the produce, apart from hard cheese, requires to operate this stock in the FIFO mode, (first in first out).

Of major importance is to develop the marketing and distribution along the Adriatic Coast. Fluctuations in the tourist population, which is most mobile, can change demand from place to place day to day. Therefore operational storage is a primary must. As many tourists pass their time in a picnic mode, the marketing through kiosks would be a good idea. The importance and potential of this market can be envisaged through the official estimate that tourist consumption will increase from 1966 to 1986 sixfold. This market should be seen as a major potential for future expansion of dairy activities.

Analysis of statistical tourist figures and forecasts shows that even if the BL dairy will supply only a small percentage of this market and at a rate of consumption lower than that the tourists - foreign and local - are accustomed to consume at their homes it will provide a market for 25,000 l./day or more during the high season (May-August) and a lower figure during low season. This will enable coordination between the higher spring - summer milk production and the seasonal increase of demand by the tourist market as far as their consumption of fresh dairy products.

#### L. Promotion

Increased marketing will have to be accompanied by promotion activities. Presently there is near to none advertising activity of dairy products in BK. Most consumption is in primitive fashion (drinking plain milk, eating cheese or yoghurt, etc.).

By increasing consciousness of the nutritional and dietetic values of milk and dairy products and introducing them to the general public, the utilization of them as cooking, baking and dressing ingredients, apart from conventional consumption methods, might increase demand considerably.

This can be done by:

- Advertising
- Distribution of recipes
- Posters
- Slogans
- Lectures, especially by medical personnel
- Direct demonstration by selected personnel at Supermarkets and sales centers which should include also tasting of new dairy recipes.
- Last but not least by nutritional lessons on milk values to the future consumer - i.e. the pupils in schools.

#### M. Recommendations

- Expansion of BK dairy to 100000 l./day
- Altering the system of milk receipt in the dairy
- Include more products in the production
- Evaporate milk for concentration instead of drum drying
- Utilize existing cheese producing facilities in Bosanska Dubica and Nova Topola
- Organize distribution centers in BK and in the coastal (tourist) area
- Promote the consumption of dairy products.

\* \* \* \*

## 1. INTRODUCTION

Cereals Processing on an industrial scale in the project area is undertaken in four plants of three enterprises:

- ZITOPRODUKT - Banja Luka - Flourmill and Bread Bakery
- ZITOPRODUKT - Prnjavor - Flourmill and Bread Bakery
- ZITOPROMET - Prijedor - Flourmill and Bread Bakery
- MIRA CIKOTA - Prijedor - Biscuits, Waffles & Pastry Plant

This chapter contains summaries of visits to these plants as well as proposals for new products in the cereals processing field, including feasibility analyses for these products.

The cereals processing sector in BK, which is carried by the above plants, is characterized by:

- a) The plants are not units by themselves but each belong to groupings dealing with other fields as well, mainly trading.
- b) The Zitoprodukt group and the Zitopromet group are, each one by itself, heavily engaged all over the project area in retail trading shops, for food, hardware and other general and farmers' supplies.

Thus flourmilling and baking is only one of their sectors, and according to discussions with their managements, not necessarily the profitable one. Trading employment and profits are considerably higher than their processing operations which is understandable, particularly as milling/breadbaking are a first processing stage, and are done within controlled prices.

- c) The Mira Cikota biscuits plant is today fully integrated with the large, Zagreb-based, Josip KRAS chocolate and confectionery production and trading complex.
- d) Zitoprodukt and Zitopromet, despite their large network, are purely regional. They have neither the structure nor the experience to market nationally.
- e) Most of the main raw material used by the BK cereals processing industry - wheat - does NOT come from the region but from Vojvodina/Banat, since the controlled price of wheat is fixed by the average Vojvodina price which is less than BK wheat.

\* \* \* \*

## 2. ZITOPRODUKT

Zitoprodukt has the flour mills and bakeries in Banja Luka and Prnjavor as well as a chain of retail stores for food and other consumer goods.

### - Flour Milling

The flour mills use Vojvodina wheat (May '72 price 1,350 ND/t), both soft and hard Russian varieties. They produce 3 types of flour for retail and bakeries sale as well as for their own use. The types are No's 400, 600 and 1,000. Outside sales are in 1 - 25 kg. paper bags and for bakeries and village households in 50 kg. fiberbags. The silos and the mills are of conventional design and the mills are quite old.

There is sufficient storage space. The Vrbanja/Banja Luka silos have 10,000 tons storage and are fully mechanized; Prnjavor is much smaller. Flour is received by rail or truck, in bulk and bags. Milling capacity in Vrbanja is 55 tons/24 hr.

Flour packaging is manual, women only being employed

### - Bread Baking

A new automatic industrial bakery was just being completed at the Vrbanja/Banja Luka mill/bakery site. Capacity of the 2 presently installed lines is 2 tons/hr.

Reserve space is available for a third line, if needed, as well in several other bakery areas.

The new bakery shows excellent design, good material, good installations. Equipment comes from Yugoslavia and Germany.

Ample office space was built and the large production and office/service areas make expansion of the plant, including for new products, an economic possibility and (see below) a necessity.

The small bakery in Prnjavor is standard and less mechanized.

a. General Comments:

1. Zitoprodukt's processing operations seem to be managed, in the business and technical sense, well above the average.
2. The major problems areas, and possible solutions, for the Banja Luka and Prnjavor plants are the following:

- a) In flour milling the operation lives on the small but guaranteed profit resulting from the difference between the Government-fixed wheat and flour prices.

Should free prices develop then the two bakeries would probably find it more profitable to "import" the flour from Vojvodina. The Zitoprodukt management is well aware of this situation and may at some future date be forced to close down their mills, or one of them.

The team does not consider that any upgrading possibilities of the flour-milling operations as such could be considered. The production of self-raising flour was discussed but it seems that for the near future home baking habits will not change and there will be no demand for this product (habits seem to be polarizing between the generations - either simple home baking or buying all products in the shops).

On the other hand it is suggested to introduce bulk-handling and bulk storage of that part of the flour produced by the Vrbanja/Banja Luka flour mill for its own bakery. This would certainly cut the overall cost and would be economically justified at the daily throughput of flour considered.

Zitoprodukt should evaluate this possibility with their designers. The wheat is double and triple handled in the mills before it is milled but due to the old design of the mills it would seem to be too expensive to reequip for wheat handling simplification.

- b) In bread baking there is one common problem area to the Banja Luka and Prnjavor bakeries, and another problem area specific to the Banja Luka bakery.
  1. Both bakeries are mechanized - the new Banja Luka bakery fully automated and the Prnjavor bakery less so. This created an excess of under utilized labor in the permanent staff of the bakeries.
  2. The profit on bread baking is very small, particularly on the "standard" bread which these bakeries produce. This bread is sold at a fixed subsidized price, the profit is guaranteed but small.

Although the investment credit for the new bakery was received at 2.5% interest, and the credit was received just before the devaluation, the repayments are nevertheless a large burden for a low-profit operation such as standard bread.

b. Recommendations:

Based on the need and possibilities to utilize the labor force in the two bakeries, as well as on availability of spare space, particularly in the Banja Luka bakery, and considering the need to productivize more the large basic capital invested in the Banja Luka bakery, a number of proposals for additional products were worked out by the team.

These proposals include five product lines in the cereals processing field for which a profitable market in Yugoslavia exists, or is expected to develop. It is suggested that all five product lines, if accepted, should be produced under one managerial roof by Zitoprodukt, though possibly in a number of locations. If produced in Banja Luka and Prnjavor in the bakeries, this will contribute considerably to the solution of the problem areas pointed out above. If part of the products should, by decision of Zitoprodukt and the development authorities, be earmarked for production at a new

location, in new facilities, this would be possible; it would still be suggested to keep the production under the integrative managerial association of Zitoprodukt.

The five product lines proposed could be developed stagewise, as indicated in the feasibility data given in the next pages. Their marketing through a national network - which Zitoprodukt does not possess, nor is presently connected to - would make the difference between small regional sales and quick expansion to national sales, including the tourist market on the coast for which some of the products are partly intended. We shall revert to this requirement of joining a national distribution network at the end of the discussion on the products.

c. Projects Proposed in the Cereals Processing Field - for Zitoprodukt

<u>Project</u>	<u>Production Status In Yugoslavia</u>	<u>Proposed Annual Production (Tons)</u>		
		<u>Stage I</u>	<u>Stage II</u>	<u>Stage III</u>
1. Industrial Cakes	Some are produced. Rising market. Project proposes added varieties.	500	1,000	2,500
2. Specialty Breads	No production yet	250	750	2,500
3. Industrial Oriental Sweets	No production yet	120	310	620
4. Corn (Meize)-based Snackfoods	No production yet	1,000	2,000	3,000
5. Puffed Wheat & Rice	No production yet	500	750	1,000

Like in other chapters of this report dealing with different branches of the food processing industry, the feasibility data are presented for the case of single-shift production. Profitability could be increased considerably by working two or three shifts. For the same reasons profitability will be less if the production facilities of these products will be dispersed and new production areas will be constructed.

\* \* \*

1. Industrial Cakes

a. Production in Yugoslavia

Production of industrial cakes in Yugoslavia started about 3 years ago and the branch is in its initial development stage, in production and distribution.

i) The largest manufacturer at present is reported to be "Zito-Ljubljana"/Lesce-Bled. It has achieved the widest market penetration with its products. Its assortment includes rolls, spongecakes, 110-180 gr. chocolate-covered "minicakes" and fruit cakes. Packages are carton trays/cellophane wrap.

Other manufacturers are:

- ii) PIK Valpovo - started in 1972 - capacity 10 million pieces/yr. Selling mostly in the Eastern parts of Yugoslavia. Production is under licence of Baker-Perkins England.
- iii) Radnik/Opatija - well known on market, particularly in Northern part of Yugoslavia. Produces poppyseed cake, walnut cake, sponge cake.
- iv) Jenuar/Pula - started in 1972. Producing under licence of "Aiemagna" (Italy).
- v) Soko-Stark/Beograd - produces mainly spongecakes, also under Italian licence. Markets in many regions of Yugoslavia.
- vi) Fidelinka/Subotica - produces "Kuglof" type cakes mostly for the region of Vojvodina and Beograd.

Projects in construction/installation stage are:

- vii) PIK Sarajevo - will soon start production of rolls under Baker-Perkins licence.
- viii) Maj-Zitokombinat/Zagreb - will soon start up a factory with a capacity of 25 million pieces/yr. under the licence of "Panetone" (Italy).

b. Consumption in Yugoslavia

Interviews with personnel in self-service stores, supermarkets and foodshops showed a strong demand in the urban centers, both in the central shopping districts and in the outskirts. Market penetration in the smaller population centers is still very small and it is difficult to foresee the buying pattern of the rural population. On the other hand urban demand is not only brisk but supplies do not catch up with demand, neither in quantities nor in varieties supplied. The personnel interviewed remarked that while in the first period working women were the main customers, other housewives soon followed suit and they believe that they could sell three to four times the quantities sold today, particularly if quality and packaging will be as good or better than today.

It was not possible to ascertain the present total consumption, beyond the partial production data given above. It was evident, though, that the market had just been opened and that a project in BK could be considered on that basis and on the following assumptions:

- a. Investments would be kept to a minimum so as to be able to build up sales gradually without a heavy capital repayment debt. (This would be possible by starting in the Vrbanja/Banja Luka new bakery.
- b. Marketing would soon be expanded to parts of the national market - not restricted to BK. (This could be achieved by association in marketing with a national distribution network).
- c. The product mix would include items for retail sale and for sale (precut portions) to catering establishments.
- d. Quality, packaging, shelf-life, etc. would be assured by proper technical assistance.

A project is therefore proposed on these lines. Its details are included in the set of feasibility data on the next pages.

\* \*

2. Specialty Breads

No industrial production was found in the country of this article.

Breadbaking concentrates mainly on standard bread and on white rolls/buns

It was the impression of the team that in the urban centers as well as in the tourist areas there would be a market for specialty bread - of the Westfalian, Pumpernickel and similar types, made from rye + wheat.

A project is proposed to start with gradually expanding production and marketing of specialty bread in the Zitoprodukt bakery in Prnjavor since this bakery would have the free space and part of the required equipment; thus additional investments for the first stage, where the market could be tested and developed, would be marginal.

In this product line, too, it would seem advisable to have an association with a national marketing network.

Also, technical knowhow would have to be obtained.

Feasibility data are given in the next pages.

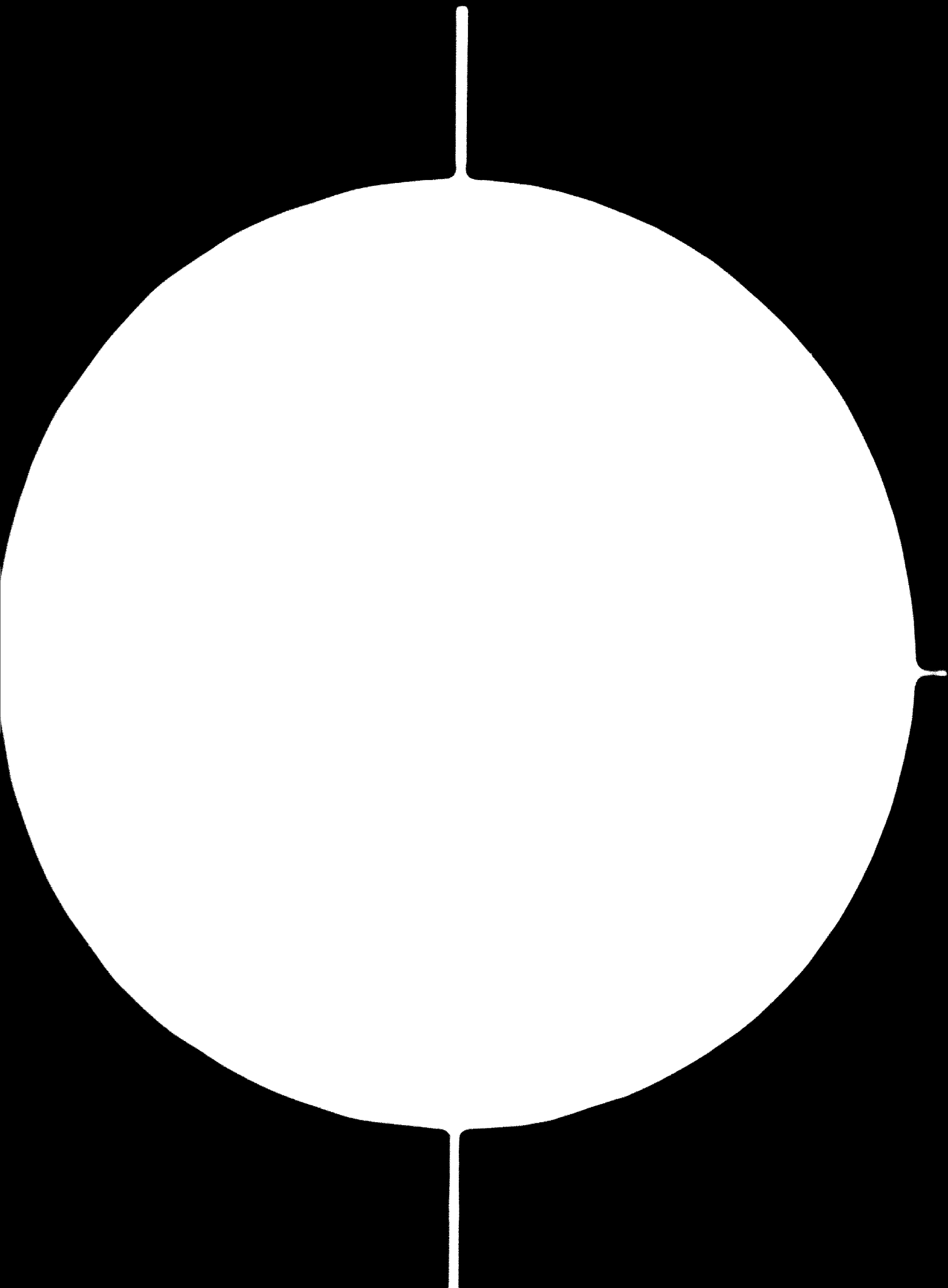
\* \*



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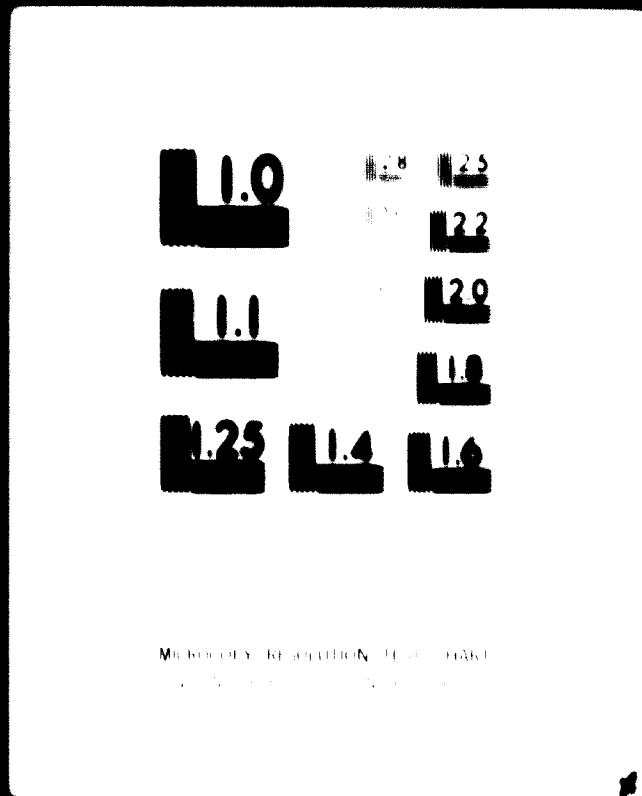


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SPECIALTY BREADS LINE11) DIAGNOSTIC FLOWSHEET

1	Hopper and Automatic Seal	7	Molder
2	Water Meter	8	Final Proofer
3	Mixer	9	Oven
4	Fermenter	10	Cooler
5	Divider	11	Slicer and Packaging Equipment
6	First Proofer		

12) MANPOWER:

<u>Shift</u>	<u>1</u>	<u>2</u>	<u>3</u>
Operators*	6	7	3

\* The above operators are required half a day only. They will be employed elsewhere-ORIENTAL SHEETS (INDUSTRIAL)-LINE for half a day.

13) UTILITIES:

<u>Shift</u>	<u>1</u>	<u>2</u>	<u>3</u>
Power (Kwh/year)	14,500	23,000	34,000
Water (M <sup>3</sup> /year)	negligible		
Steam (Tons/year)	480	1,440	4,800
Fuel <sup>o</sup> (Tons/year)	10	30	100

\* Extra to that needed for steam generation

14) MATERIALS BALANCE:

For 1 Ton of Pumpernickel Bread

<u>Material</u>	<u>Kg.</u>	<u>Kg. Total</u>
<u>Ingredients:</u>		1,160
Clear Flour	585	
Rye Flour	205	
Pumpernickel Flour	77	
Water	243	
Yeast	20	
Starter	18	
Salt	20	
<u>Residues and Rejects:</u>		168
Water and Other Vapors	168	
<u>Product</u>		1,000

SPECIALTY BREADS LINE16) PROCESSING COSTS (Mill. \$/Year)

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Packaging Material	0.150	0.440	1.400
Utilities	0.010	0.030	0.080
Direct Labor	0.080	0.090	0.040
Overhead Share*	0.280	0.360	0.500
<u>Amortization</u>	<u>0.080</u>	<u>0.200</u>	<u>0.530</u>
<b>Total (Mill. \$/Year)</b>	<b>0.570</b>	<b>1.120</b>	<b>2.550</b>

\* Includes maintenance, administration and transportation

16) PROCESSING COST SENSITIVITY

<u>ITEM (1)</u>	<u>Stage 1</u>		<u>Stage 2</u>		<u>Stage 3</u>	
	<u>ITEM CHANGE (-%)</u>		<u>ITEM CHANGE (-%)</u>		<u>ITEM CHANGE (-)</u>	
	<u>± 10%</u>	<u>± 20%</u>	<u>± 10%</u>	<u>± 20%</u>	<u>± 10%</u>	<u>± 20%</u>
<u>LEADS TO CHANGE IN PROCESSING COST/UNIT (-%)</u>						
Packaging Material	2.6	5.3	3.9	7.9	5.5	11.0
Utilities	0.2	0.3	0.3	0.5	0.3	0.6
Direct Labor	1.4	2.8	0.8	1.6	0.2	0.3
Overhead Share	4.4	8.8	3.2	6.4	1.9	3.9
Amortization	1.4	2.8	1.8	3.6	2.1	4.2

(1) Changes of different levels in different items may be calculated by addition of the appropriate percentages.

- 1) PROPOSED ENTERPRISE: ZITOPRODUKT
- 2) PROPOSED LOCATION: Banja Luka
- 3) a) PRODUCT LINE: SNACKFOODS (maize-based) LINE
- b) VARIETIES: Various types and shapes of snackfoods
- c) PACKAGING: 100 Gr Carton Box, with an inner Polyethylene Bag
- 4) MODE OF PROJECT: Addition to Existing Plant
- 5) PLANNED OUTPUT:

<u>Stage</u>	<u>Output (Tons nett product/year)</u>
1	1,000
2	2,000
3	3,000

- 6) ANNUAL SALES ESTIMATES:  
(Assumed ex-factory price obtainable at December 72 Yugoslav price levels)

<u>Stage</u>	<u>Annual Sales (Mill. MD)</u>
1	16.0
2	30.0
3	46.0

- 7) PROCESSING SEASON:  
All year round

8) FACILITIES - EXISTING AND NEW:

A new production line is proposed already for Stage 1. It will however fit into the existing buildings.  
 For Stage 2 a new 100 sq.m. production area will be needed, plus 300 sq.m. for storage.  
 For Stage 3 a further 100 sq.m. will be needed, for production.  
 The storage area required will be 450 sq.m.

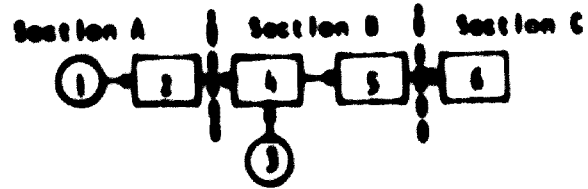
9) FIXED INVESTMENT ESTIMATE (Mill. MD)

<u>Stage</u>	<u>1</u>	<u>1*</u>	<u>2*</u>
Equipment	2.000	3.000	6.000
Buildings	0	0.200	1.300
<u>Engineering &amp; Installation</u>	<u>0.200</u>	<u>1.000</u>	<u>2.000</u>
<b>Total Fixed Investment</b>	<b>2.200</b>	<b>4.200</b>	<b>9.300</b>
*****			
Working Capital	2.000	4.000	6.000
	****	****	****

\* Cumulative Total

SHOCKFROD (MAJOR ROAD) LINE

## 10) PROCESS DESCRIPTION



Section A  
COOKING AND  
SHAPING

1. Corn Brits
2. Cooking, Extrusion  
and Shaping

Section B  
FINAL  
TREATMENT

3. Flavorings
4. Coating
5. Drying & Inspection

Section C  
PACKAGING

6. Packaging

SNACKFOODS (maize-based) LINE

11) DIAGRAMATIC FLOWSHEET:



- |   |                              |   |                            |
|---|------------------------------|---|----------------------------|
| 1 | Bin                          | 5 | Drying and Inspection Belt |
| 2 | Hopper and Automatic Weigher | 6 | Filler and Sealing Machine |
| 3 | Extrusion Cooker             | 7 | Casser                     |
| 4 | Tumbling Mixer               |   |                            |

12) DIRECT MANPOWER:

<b>Stage</b>	<u>1</u>	<u>2</u>	<u>3</u>
Operators	5	8	11

13) UTILITIES:

<b>Stage</b>	<u>1</u>	<u>2</u>	<u>3</u>
Power (kWh/year)	75,000	150,000	200,000
Water (M <sup>3</sup> /year)	negligible		
Steam (Tons/year)	400	960	1,400
Fuel* (Tons/year)	12	24	36

\* Extra to that needed for steam generation

14) MATERIALS BALANCE:

For 1 Ton of Product

Material	kg.	kg. Total
<b>Ingredients:</b>		1,416
Corn Grits	1,100	
Water	300	
Flavorings	16	
<b>Residues and Solvents:</b>		416
Water	416	
<b>Product</b>		1,000

15) PROCESSING COSTS (Mill. ND/Year):

<b>Stage</b>	<u>1</u>	<u>2</u>	<u>3</u>
Total (Mill. ND/Year)	3,000	8,000	13,000
.....			
Unit Processing Cost (ND/Ton Product)	3,000	4,000	4,300
	.....	.....	.....



- 1) PROPOSED ENTERPRISE: ZITOPRODUKT
- 2) PROPOSED LOCATION: Prnjavor
- 3) a) PRODUCT LINE: ORIENTAL SWEETS (INDUSTRIAL) LINE
- b) VARIETIES: Baciava, Murmanica and Others
- c) PACKAGING: 1/4 Kg. Polyethylene Bags
- 4) MODE OF PROJECT: Addition to Existing Plant
- 5) PLANNED OUTPUT:

<u>Stage</u>	<u>Output</u> (Tons nett product/year)
1	120
2	310
3	680

- 6) ANNUAL SALES ESTIMATES:  
(Assumed ex-factory price obtainable at December 72 Yugoslav price levels)

<u>Stage</u>	<u>Annual Sales</u> (Mill.MD)
1	1.8
2	4.6
3	9.2

- 7) PROCESSING SEASON:

Half day all year round.

- 8) FACILITIES - EXISTING AND NEW:

For Stage 1 the present small bakery will suffice, needed only some simple extra equipment.

For Stage 2 a batch oven will be needed (alternative - a continuous oven) plus a fermenter needing an extra 100 sq.m. production space.

The Stage 3 equipment including a continuous oven and dough mixer requires a further 200 sq.m. production space and an additional 150 sq.m. storage.

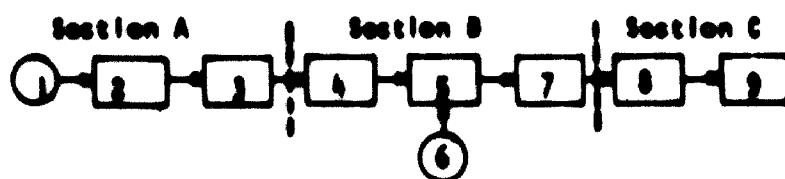
- 9) FIXED INVESTMENT ESTIMATE (Mill.MD):

<u>Stage</u>	<u>1</u>	<u>2*</u>	<u>3*</u>
Equipment	0.170	0.340	2.500
Buildings	0	0.300	0.900
<u>Engineering &amp; Installation</u>	<u>0.000</u>	<u>0.100</u>	<u>0.300</u>
Total Fixed Investment	0.200	0.740	3.700
Working Capital	0.300	0.700	1.800

\* Cumulative Total

ORIENTAL SWEETS (INDUSTRIAL) LINE

## 10) PROCESS DESCRIPTION



Section A  
PREPARATION

1. Ingredients
2. Ingredient Addition
3. Mixing

Section B  
FERMENTATION

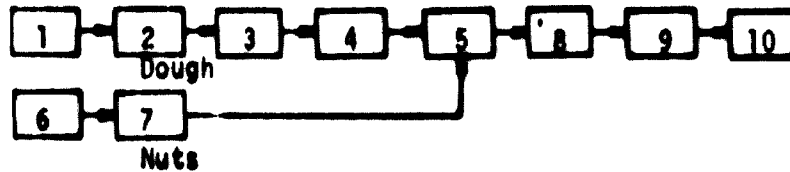
4. Dough Fermentation
5. Tray Filling
6. Crushed Nuts
7. Baking

Section C  
FINAL TREATMENT

8. Cooling
9. Division

ORIENTAL SWEETS (INDUSTRIAL) LINE

## 11) DIAGRAMMATIC FLOWSHEET



- |   |                  |    |   |
|---|------------------|----|---|
| 1 | Ingredient Carts | 6  | Nut Crusher                                     |
| 2 | Mixers           | 7  | Nut Cleaner (could be done by hand for Stage 1) |
| 3 | Dough Carts      | 8  | Oven  |
| 4 | Fermenter        | 9  | Cooling Carts                                   |
| 5 | Tray (Filling)   | 10 | Division Tables                                 |

## 12) DIRECT MANPOWER:

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Operators *	6	7	3

\* The above operators are required half a day only. Part of them will be employed elsewhere-SPECIALTY BREADS LINE-for half a day.

## 13) UTILITIES:

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Power (KWh/year)	15.000	37.000	75.000
Water (M <sup>3</sup> /year)	negligible		
Fuel (Tons/year)	13	33	65

## 14) MATERIALS BALANCE:

For 1 Ton of Oriental Sweets

Material	Kg.	Kg.Total
<u>Ingredients:</u>		
Flour	345	
Sugar	62	
Fat	62	
Salt	7	
Milk Solids	17	
Eggs (Yolks)	31	
Yeast	17	
Roll in Fat	86	
Crushed Nuts	173	
Water	200	
<u>Product</u>		1,000

ORIENTAL SWEETS (INDUSTRIAL) LINE15) PROCESSING COSTS (Mill.ND/Year)

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Packaging	0.240	0.600	1.200
Utilities	0.020	0.040	0.060
Direct Labor	0.080	0.090	0.040
Overhead Share*	0.240	0.330	0.410
<u>Amortization</u>	<u>0.030</u>	<u>0.060</u>	<u>0.330</u>
Total (Mill.ND/Year)	0.610	1.120	2.040
.....			
Unit Processing Cost (ND/Ton Product)	5,080	3,610	3,290
	.....	.....	.....

\* Includes maintenance, administration and transportation

16) PROCESSING COST SENSITIVITY

ITEM (1)	Stage 1		Stage 2		Stage 3	
	ITEM CHANGE ( $\pm$ %)		ITEM CHANGE ( $\pm$ %)		ITEM CHANGE ( $\pm$ %)	
	$\pm$ 10%	$\pm$ 20%	$\pm$ 10%	$\pm$ 20%	$\pm$ 10%	$\pm$ 20%
	LEADS TO CHANGE IN PROCESSING COST/UNIT ( $\pm$ %)					
Packing Material	3.9	7.8	5.4	10.7	5.9	11.8
Utilities	0.3	0.7	0.4	0.7	0.3	0.6
Direct Labor	1.4	2.7	0.8	1.6	0.2	0.4
Overhead Share	3.9	7.8	2.9	5.9	2.0	4.0
Amortization	0.5	1.0	0.5	1.1	1.6	3.2

(1) Changes of different levels in different items may be calculated by addition of the appropriate percentages.

- 1) PROPOSED ENTERPRISE: ZITOPRODUKT
- 2) PROPOSED LOCATION: Banja Luka
- 3) a) PRODUCT LINE: PUFFED WHEAT AND PUFFED RICE LINE
  - b) VARIETIES: Puffed Wheat & Puffed Rice
  - c) PACKAGING: 150 grms polyethylene bags, 350 grms bags in cartons
- 4) MODE OF PROJECT: Addition to Existing Plant
- 5) PLANNED OUTPUT:

<u>Stage</u>	<u>Output</u> (Tons nett product/year)
1	500
2	750
3	1000

- 6) ANNUAL SALES ESTIMATES:  
(Assumed ex-factory price obtainable at December 72 Yugoslav price levels)

<u>Stage</u>	<u>Annual Sales</u> (M111.ND)
1	6.0
2	9.0
3	12.0

- 7) PROCESSING SEASON: All year round
- 8) FACILITIES - EXISTING AND NEW:

The old facilities of ZITOPRODUKT can be used to put up a line of puffing guns, coating and packaging equipment.

- 9) FIXED INVESTMENT ESTIMATE (M111.ND)

<u>Stage</u>	<u>1</u>	<u>2*</u>	<u>3*</u>
Equipment	0.800	0.800	1.200
Buildings	-	-	-
Engineering & Installation and Knowhow	1.000	1.000	1.000
<b>Total Fixed Investment</b>	<b>1.800</b>	<b>1.800</b>	<b>2.200</b>
-----			
Working Capital	1.000	1.500	1.800
	-----	-----	-----

\* Cumulative Total

### 3. Industrial Oriental Sweets

The consumption in B & H of oriental sweets is high - by both the Muslim and the other parts of the population. Availability depends on the baking schedules of small pastry shops, or consumption of these products in coffee houses, restaurants and snackbars.

They are partially available in retail outlets and catering establishments in other republics but to a lesser degree.

It is proposed to consider the manufacture of oriental sweets, to be sold in and through the same outlets as the industrial cakes. In the initial stage marketing should be concentrated on B & H in order to penetrate and assure a market, as well as in the tourist areas.

The two first products suggested for production are Beclava and Murmesica which are well known, have good sales, and lend themselves to easy production and packaging, with possibilities to prolong their shelf-life.

Production in the Zitoprodukt bakery in Prnjavor is suggested so as to utilize the spare space and equipment there and give employment which would be small in the beginning but could increase as the market grows.

It would be important to start production with good technological preparation so that the industrial product would be immediately acceptable and not be considered inferior to any shop-baked oriental sweets.

Feasibility data are given in the next pages.

\* \*

### 4. Cornbased Snackfoods

None of the various types of cornbased snackfoods seem presently to be made in Yugoslavia. Neither did it appear that production plans by other enterprises in Yugoslavia are under way.

The consumption in West Europe of these snackfoods has increased several fold over the last few years and they are particularly popular with the young generation everywhere.

On observing the living habits of the young generation in Yugoslavia in urban centers, as well as in many rural regions where modern retailing and youth club and group activities have strongly penetrated, it seemed to the team that in these age groups as well as in other potential buying groups there might be large demand for such snackfoods, if produced in high quality and marketed with sales appeal and promotion.

It is proposed to start an industrial scale production, for marketing in selected areas in the initial stages, and to use the spare facilities of the Vrbanja/Banja Luka bakery of Zitoprodukt. If and when large expansion will be intended, the moving of production to a separate plant in another commune could then be considered.

It would be advisable to associate in the marketing efforts with a national distributor of similar product lines in order to penetrate, after testmarketing in selected areas, as soon as possible into the national market.

Technical assistance would be needed to design the product, the packaging, and the process.

Feasibility data are given in the next pages.

\* \*

PUFFED WHEAT AND PUFFED RICE LINE

10) **DIAGRAMMATIC FLOWSHEET**



- |   |                          |   |                             |
|---|--------------------------|---|-----------------------------|
| 1 | Bin                      | 5 | Puffing Gun                 |
| 2 | Hopper & Automatic Scale | 6 | Inspection Belt             |
| 3 | Cooker                   | 7 | Filling & Sealing Equipment |
| 4 | Tempering Bin            |   |                             |

11) **DIRECT MANPOWER:**

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Operators	12	15	10

12) **UTILITIES:**

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Power			
Water			
Electricity			

S M A L L

13) **PROCESSING COSTS (Mill.ND/Year)**

<u>Stage</u>	<u>1</u>	<u>2</u>	<u>3</u>
Total (Mill.ND/Year)	1.750	2.150	2.600
.....			
Unit Processing Cost (ND/Ton Product)	3,500	2,870	2,600
	.....	.....	.....

3 ZITOPROMET

Zitopromet is a vertical/horizontal Kombinat having besides the flourmill and bakery in Prijedor about 100 retail trading shops selling foods, textiles, hardware all over the project area. (Prijedor, Bosanska Dubica, Bosanska Novi, Sanski Most, Kljuc, etc.)

They also have 7 restaurants in the same places. Zitopromet is integrated with 4 similar organizations and cooperating with others. Their direct employment is 650, plus 250 in their shops. Gross annual turnover is about 200 million ND (\$12 mill.)

The Prijedor plant was built in 1945 from war reparations funds, since then expanded several times, via expansion credits for this branch.

In addition to the Prijedor mill plus bakery they have a smaller mill in Bosanska Dubica and bakeries in Bosanska Dubica and Sanski Most.

Milling capacity in the Prijedor mill is 80 tons/24 hrs. The plant uses 70% Vojvodina wheat (like Zitoprodukt) bought from intermediary wholesalers and 30% local wheat bought directly from the growers - cooperatives (Zadruga) integrated with Zitopromet as well as from non-cooperant individual farmers who bring the wheat to the mill.

Their sales of flour are partly for self-use in their bakeries, partly for sale in their shops, partly to the coastal area.

The enterprise is totally trading-oriented and wants to put all its financial and organizational expansion effort into local-regional trading. Their total activities are very profitable and the problem of productivizing investment does not exist for them.

It is thus not proposed to start cereals processing projects at this plant, or connected with it, in the near future. Their expansion is financed from own means or short-term bank credits and employment is created by them via their trading network which is regionally-inward oriented.

\* \* \* \*

4 BISCUITS PRODUCTION IN BK

There is presently one producer in the project area, the MIRA CIKOTA plant in Prijedor. The plant was visited twice by three food technologists of the team in order to evaluate its production and marketing structure and its possible connection with the BK foodprocessing industry development plan.

The discussions were held with the General Manager, the Technical Director, the Plant Economist and the managers of the biscuits and waffles departments.

The factory produces presently 5,700 annual tons of 40 varieties of biscuits, pastry and waffles, with sales of 55 million dinars. Total threeshift capacity is 6,000 tons, i.e. there is full capacity utilization, like Badel-Bosanka in Banja Luka (the soft-drinks bottling plant). 90% of production is sold to the domestic market, 10% exported to Canada, Kuwait, Czechoslovakia, Hungary. 500 workers are employed. All raw materials are domestic, except some flavoring and the aluminium foil for packaging.

The plant started at another location as a small pastry shop in 1924. It was renamed after the war and in the early sixties was reconstructed and moved to the present facilities.

The plant is of standard design, has one line for biscuits, one for flat waffles, one line for empty waffles (batons), one line for pastry. Most of the packaging is done by hand. The packages and designs on them are rather simple and could be improved to have better market appeal.

In 1967 the plant was integrated with the large, old established Josip Kras chocolate and confectionary concern which has a national distribution network. Kras is taking over the whole production for distribution and the plant has thus no marketing problems. The full employment and specialization as well as joint purchasing and development enabled the plant to cut production costs by 30% after integration, according to the plant management. Kras has two directly controlled plants in Zagreb and a dairy in Slovenia.



The position in Yugoslavia in this branch is as follows:

- Biscuits and pastry consumption is presently 4.5 kgs/ceput/year, compared to 14.5 in West Europe.
- There is a large number of manufacturers - about 40. This creates problems connected with such diffusion. The Kras Combine (incl. Mira Cikota) has about 30% of the market.
- Export chances are considered to be very small but the domestic market is developing

Development plans of Mira Cikota were prepared by Industroprojekt/Zagreb. Production forecasts for 1975 are 12,000 tons in 2 shifts. Thus the plant has to move. A new plot has been selected (9 ha) on which in the first expansion stage 6,000 sq.m. will be built. For the beginning, the old plant will continue to produce (1,600 tons waffles). The new plant will start with 150 workers and eventually employ 800.

Investment for the first expansion phase is budgeted at 45 million ND, of which 12 for construction, 10 for equipment and 23 for infrastructure, the latter having to be financed as well by the enterprise from the investment funds available to it, as is customary in Yugoslavia.

Our comments are as follows:

1. The profitable 3-shift operation and plant utilization show here, like in the case of Badel-Bosanka in Banja Luka, that specialization, marketing integration and joint services can be a solution to many problems which beset the other plants in BK.
2. The expansion program of Mira Cikota seems reasonable and since they and Kras know the market well, there are no comments on the marketing.
3. The phasing of the new project seems properly chosen.
4. The plant specializes, already has a large variety product line, and it is not suggested to add different lines presently.
5. The team was thinking about the possibility of proposing the introduction of milk biscuits which have recently been developed abroad (mainly New Zealand and Australia) and the production of which has been started in several protein-deficient countries. However, discussions with pediatricians and marketing channels convinced the team that schools and other institutions would not have budgets to buy such biscuits for school meals, and that there would hardly be a demand for them in the retail trade.
6. One of the new products proposed by the team for the region is milk caramels which are not yet produced in Yugoslavia. Saleswise this would be a product to be marketed through the Kras chain but productionwise it would be preferable to make it at the Banja Luka dairy. If the proposal for the production of milk caramels will be adopted, the dairy and Mira Cikota might wish to discuss a production-marketing arrangement.
7. Another group of new products proposed includes several bakery items to be produced, partly in existing facilities, by the Zitoprodukt enterprise in Banja Luka and Prnjavor. Here, too, the possibility of marketing across the Federation should be considered in which case the Kras network would be one solution and production-marketing arrangements could be initiated.

\* \* \* \*

5 NOTE ON THE POSITION IN THE BREWERY INDUSTRY IN BK

There is one enterprise in the region, the Pivovara Banja Luka which is independently run.

The plant operates like a number of other regional breweries in Yugoslavia and is participating in the sales 'boom' of beer which has taken place in the last decade all over the Federation.

The team saw the development plan for 300,000 hectolitre capacity and there are no comments on this expansion. With the constant rise in beer consumption there should be no marketing problem for these quantities.

In discussions of the team with various food industry, marketing and import organizations the question of past imports of malt was brought up by the team. It was understood that up till recently the breweries could import malt cheaper than buying it domestically because of very low prices being offered by several East European suppliers. This situation seems to have changed recently since some Yugoslav malterias are being modernized and import prices also seem to rise.

\* \*

Should the Banja Luka brewery want to modify its product mix by introducing some new varieties of beer then it is advisable that they consult with other Yugoslav breweries before going abroad for technical knowhow or brandname arrangements. There is today an understandable trend in this expanding industry for such a direction but it may pay more to make such arrangements simultaneously for several breweries, each one of whom could then serve its nearest market area with these new brands.

\* \* \* \*

This subject was not included in the terms of reference of the project but in its fieldwork the team came across some problems and possibilities which are being commented upon here.

### 1. Fishbreeding and Processing.

There is some pondcarp breeding near the northern border parts of the project area. In discussions in industry, and in particular when reviewing the financial statements of several agroindustrial kombinats who had pondcarp operations, it was seen that pondcarp breeding was the most profitable branch of all their agroindustrial operations (catering or other services excluded). This branch is long established in Yugoslavia.

Pondcarp breeding would be possible in several areas of BK. Riverfish caught and/or cultivation could also be considered; subject to knowing more about marketability and about the possibility to develop cheap mass catches. Recently the controlled breeding of riverfish in cages was developed in Japan and this could possibly be examined for application in the Sava and Vrbas rivers (the latter west of Banja Luka since from BL eastwards the Vrbas is polluted by the waste of the cellulose factory).

Regarding the markets and advisability of processing modes we would remark at this stage as follows:

Yugoslav percaput Fish consumption - consisting mainly of pondcarp and sea fish - remains fairly static; partly through food habits and partly because until recently no interesting new products were offered to the consumer. Consumption in the main towns rose recently since chilled fish was introduced into the supermarkets and selfservice shops.

It does not seem that the Yugoslav population will consume fish in much larger quantities as living standards go up, contrary to the situation of meat; and processed vegetables; fruit and dairy products. However, there seems to be place for added markets through variety improvement.

The export in quantities of frozen pond and riverfish would depend not only on price but also on penetrating new markets - which is not impossible, considering the large imports of many European countries despite their own catches. It is proposed to consider such export of live carp in railcars with built-in watertanks.

Domestic and export sales of canned fish would mean the setting up of a cannery which would not seem to be a profitable proposition under the prevailing conditions of the canned fish products market.

\* \*

It is therefore not recommended to consider fishprocessing on any commercial scale in the project area for the time being (except for chilling) but to concentrate on further study towards decisions, in the following fields:

- a) Would increased pondcarp cultivation, as fresh and chilled product, be justified by domestic market conditions?
- b) What is the marketing trend in frozen fish?
- c) Would the newly developed Japanese techniques of concentrated riverfish breeding be applicable in the Sava and Vrbas rivers, and if so, where and in what form (fresh and/or frozen) would commercial utilization be feasible?
- d) Could export of live pondcarp in railcars be organized soon?

These matters could be studied by ZEP in a short time with the help of fishbreeding and fishmarketing experts in Yugoslavia, and with some technical assistance from abroad.

## 2 Lobster Catch and Marketing.

The availability of lobsters in several areas on the rivebanks of the upper Vrbas near the Pliva Jazera was brought to the attention of the team, and lobster-catching was observed by team members in one of these areas. Catching is done by simple traps. If these lobsters appear in concentrations it would be worthwhile to ask one or two of the relevant communes to organize experimental controlled catching cycles, with sufficient concentrated feeding of waste fish-heads, etc. applied so that the numbers in some areas could be increased to commercial quantities.

Once available in such quantities there would be no problem to market them, since all catering establishments are looking out for good seafood.

Should interested initiators be found to convert this operation to larger scale river-lobster "farming", then freezing and larger sales to a wider radius could be considered.

## 3 Trout Breeding and Smoking

There would be a possibility to breed trout on a large scale in some river areas in the project region. The techniques for such breeding are today wellknown and can be studied in various places.

Part of this trout would go to the catering and retail trade in the domestic market, including to the tourist areas - since the major part of the foreign tourists originate from trout-consuming countries.

Another part of the catch could be processed, at very small investment cost (Equipment about 6,000 dollars), in a modern smokery, with a possibility for sales at large distances.

\* \* \* \*

4 G.

THE INFLUENCE OF TOURISM ON BK  
FOOD INDUSTRY DEVELOPMENT

Both foreign and local tourism which are constantly increasing in quantity and sophistication of demand should be considered as having an influence on the BK food industry. Although BK itself is getting an increased number of tourists who are staying or passing in the region, these do not form a significant buying public. On the other hand, the foreign and local tourists in the Adriatic coastal resorts constitute a very distinct buying group whose seasonal purchases, due to higher than average per capita consumption habits during their vacations (via catering or retail outlets) could be felt in the market, both by quantities consumed and by spurring demand of items which the foreign tourists know from their countries.

Also, the tourist area markets are of interest to the food processing industry for two other reasons - the invisible export values created and the "test market" aspect, i.e. the possibility to have some response to new products (intended for later export abroad) by a public similar to that in the export market. The team visited various tourist regions and was impressed with the progress made in many new retail outlets and catering places, particularly the larger self-service shops. It is obvious that the top grade of presently available Yugoslav processed food and drinks is finding its way to these outlets. This is particularly evident in the dairy, meat, chocolate, soft drinks products. On the other hand, the choice is still limited and a wide market seems to be open for organized high grade supplies of processed foods. The price levels in these tourist areas are a bit higher than in the non-tourist urban regions. Thus a certain amount of transport and better packaging can be paid from the price differential.

An official survey was undertaken by the Zagreb Food Technological Institute in 1970 on the food buying habits of tourists in Yugoslavia. About 1,000 tourists were questioned as a sample. Part of the foreign tourists in the sample group were questioned on food habits in their countries and their opinion of the Yugoslav food products. Catering establishments were also included in the survey.

The important results are summarized here (resulting from detailed statistics and other data of the survey):

- Both local and foreign tourists have an above-average per capita food consumption.
- Specialty items are consumed by a higher percentage out of the foreign tourist group than of the Yugoslav group, but the absolute consumption by domestic Yugoslav tourists is also high.
- Meat products, milk products (yoghurts and cheeses), breads, salads, canned fruit, ice cream and confectionery items are the most popular products.
- The supply is increasing but demand is much bigger than supply.

\* \* \*

Considering the very large and increasing foreign tourist trade - most of which is concentrated along the Adriatic Coast - which is now approaching 30 million tourist nights per season (see statistics overpage) it is proposed that BK development should take this market into account. The prerequisites will be:

1. Production of articles of the right type and quality;
2. Suitable transport modes to the coast, to storage/distribution points on the Adriatic, via the road through Hercegovina to Dalmatia and the new road to Split.
3. Proper storage, promotion and distribution arrangements along the Adriatic Coast.

For ecological reasons the Dalmatian coastal area is mostly unsuitable for growing all the types of foodstuffs which could be marketed to tourists in processed form. Thus BK had an advantage towards this market as a relatively near source.

Discussions were initiated by the team between the BK enterprises, ZEP and the General Manager of PIK NEPOK (the Mostar, Herzegovina, Agroindustrial Kombinat) with a view to set up mutually beneficial arrangements where NEPOK could store and market BK processed foods in the Dalmatian tourist region. It is recommended that this should be followed up and a concrete first plan be worked out.

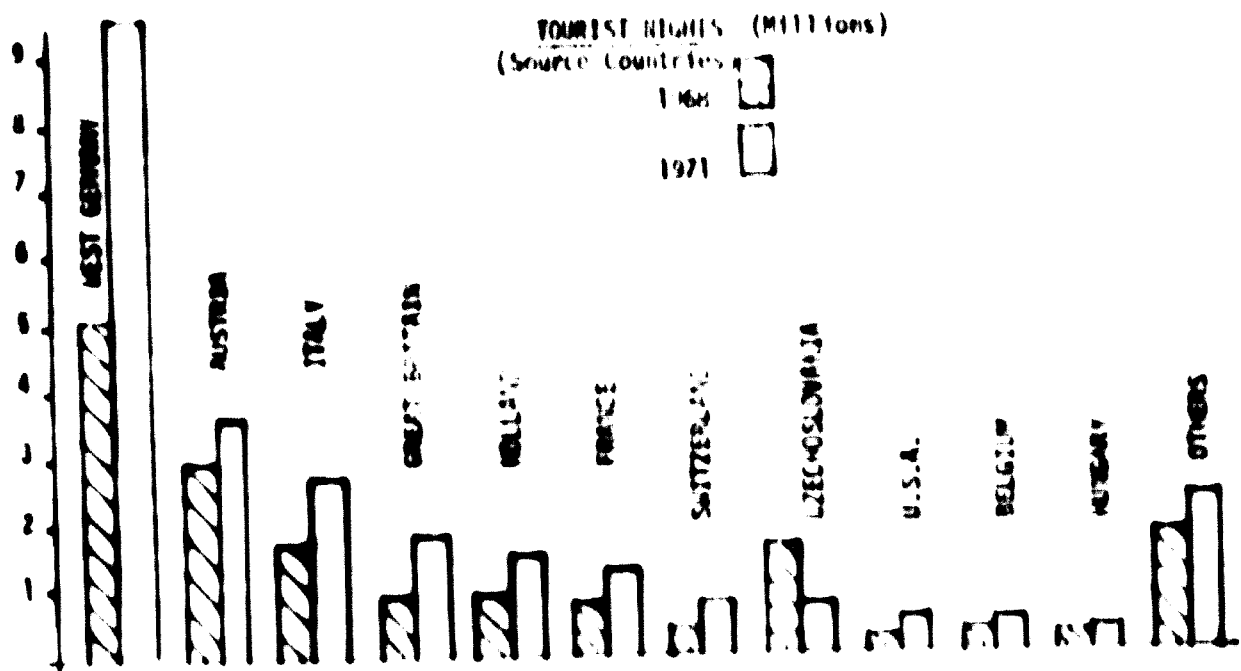
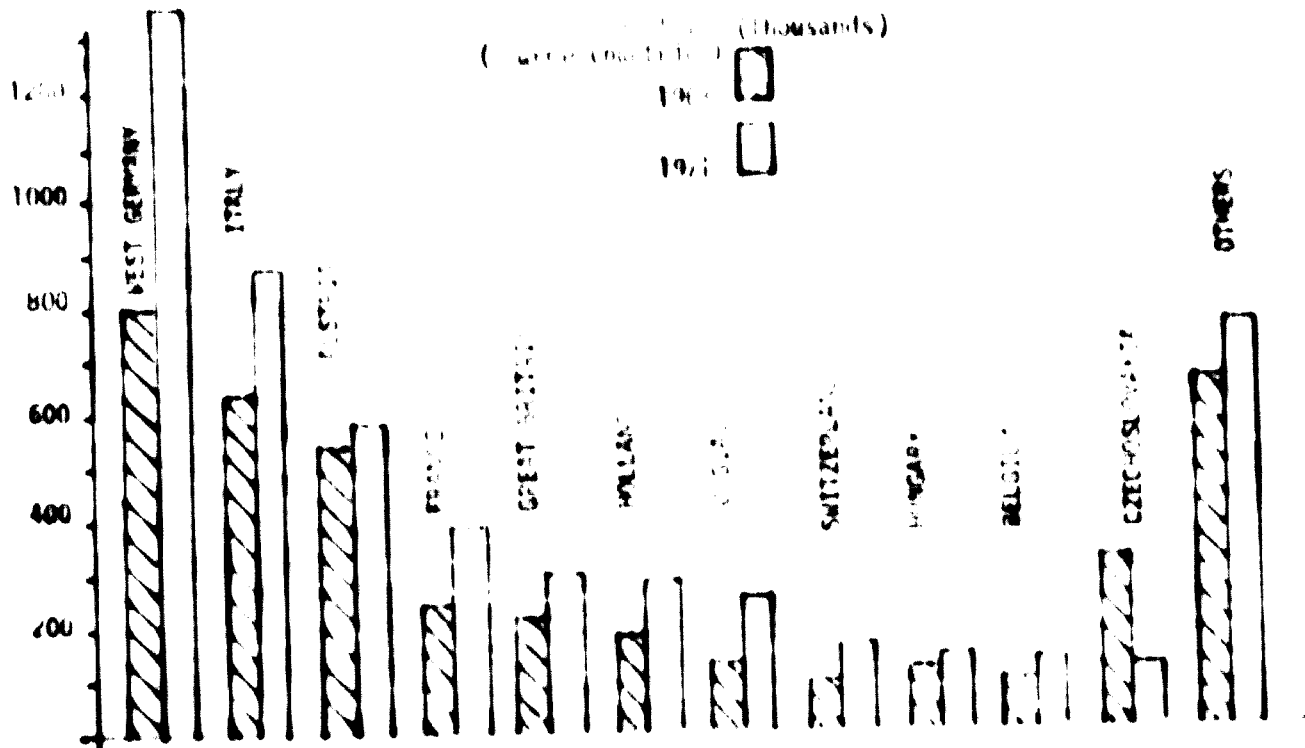
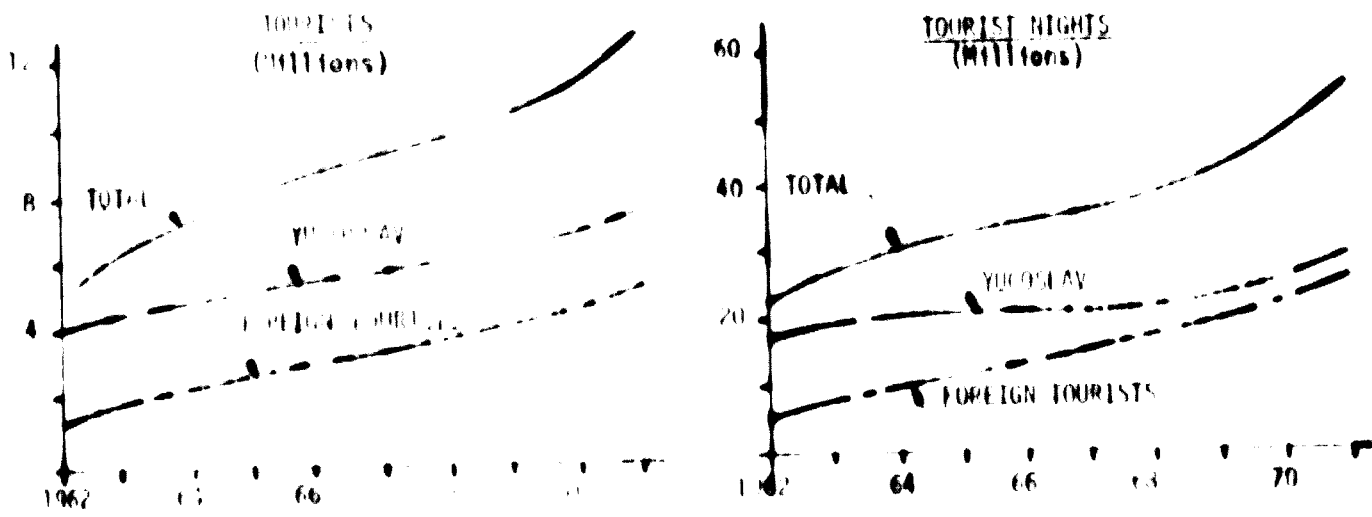
Specific products of the proposed BK foodprocessing industry projects which are suitable for tourist area marketing are:

- a. Biscuits
- b. Babyfood (homogenized, veg/fruit/meat)
- c. Various canned fruit/vegetables
- d. Various quickfrozen fruit/vegetables/dishes
- e. Highgrade Jams
- f. Industrial Cakes
- g. Specialty Breads
- h. Candied Fruit
- i. Oriental Sweets
- j. Soft Drinks
- k. Canned Meat (Beef, Pork)
- l. Semipreserved Meat (Beef, Pork, Poultry Products).

The team firmly believes that if the above stated prerequisites are met, a large market for BK foodproducts can be created and brandnames can be propagated. This market alone could determine in several product lines to plan outputs for "Stages" 2 or 3 instead of remaining long at "Stage 1".

\* \* \* \*

### TOURISTS AND TOURIST NIGHTS



Source: SFMO YEARBOOK 72

POSREDAVAČI ZA PROMET Uslugama U PROMETU TURISTIČKIM PRILICIMA U 1971. u hiljadama

TOURIST NIGHTS BY TYPES OF CATERING BUSINESS UNITS IN 1971 - Thousands

	Ukupno	Primerena mesta	
	Total	Seaside Resorts	
<b>TOURIST NIGHTS OF YUGOSLAV TOURISTS</b>			<b>DOMAĆIN TURISTA</b>
<b>TOTAL</b>	<b>28,942</b>	<b>15,369</b>	<b>UKUPNO</b>
Hotels-all	6,499	1,941	Hoteli- svega
Hotels, Category L	47,0	20,0	Hoteli A kategorije
Hotels, Category A	800	233	Hoteli B kategorije
Hotels, Category B	3,160	1,206	Hoteli C kategorije
Hotels, Category C	1,319	196	Hoteli D kategorije
Hotels, Category D	1,204	207	Pansioni- svega
Boarding Houses-all	309	36,8	Pansioni I kategorije
Board. Houses, Cat. I	27,1	2,4	Pansioni II kategorije
Board. Houses, Cat. II	121	7,0	Pansioni III kategorije
Board. Houses, Cat. III	210	26,6	Hoteli
Hotels	370	32,4	Turistička naselja
Tourist Settlements	206	310	Radnička odmarališta
Workers' Rest Centers	6,676	4,004	Dečja i omladinska odmarališta
Children's and Youth Rest Centers	3,267	2,446	Domaćinstva (privatna soba)
Households (Rooming Houses)	7,001	4,636	
<b>TOURIST NIGHTS OF FOREIGN TOURISTS</b>			<b>STRANCI TURISTA</b>
<b>TOTAL</b>	<b>26,000</b>	<b>21,677</b>	<b>UKUPNO</b>
Hotels-all	12,309	9,026	Hoteli- svega
Hotels, Category L	104	76,9	Hoteli L kategorije
Hotels, Category A	1,710	1,120	Hoteli A kategorije
Hotels, Category B	6,027	7,000	Hoteli B kategorije
Hotels, Category C	826	600	Hoteli C kategorije
Hotels, Category D	600	443	Hoteli D kategorije
Boarding Houses-all	197	140	Pansioni- svega
Board. Houses, Cat. I	22,7	7,0	Pansioni I kategorije
Board. Houses, Cat. II	80,0	62,4	Pansioni II kategorije
Board. Houses, Cat. III	94,3	70,9	Pansioni III kategorije
Hotels	446	66,1	Hoteli
Tourist Settlements	2,000	2,000	Turistička naselja
Camping Sites	4,006	4,410	Kamp-tereni
Households (Rooming Houses)	3,623	3,376	Domaćinstva (Privatna soba)

Source: SFRJ Stat. Yearbook 72



### 5. Puffed Wheat and Puffed Rice

These are simple snacks eaten mainly by children and young people, usually sugar coated or otherwise flavored.

No production could be observed in Yugoslavia

It is proposed to start production at Zitoprodukt in their Vrbanja/Banja Luka bakery (probably the old area should be used), stepwise

These products are usually very profitable and are easy to produce once the production technique of puffing cereals is learned. Technical knowhow could be found for the plant, and equipment could be made in Yugoslavia.

In these products, too, an association with a national marketing network should be sought.

Feasibility data are given in the next pages.

\* \* \* \*

### d. Conclusions:

In addition to suggestions for some minor improvements as set out in the "recommendations" lines in the beginning of this chapter, it is proposed to decide on the initial investments and organization of production of five new product lines in the cereals processing field.

These product lines should be located in the existing bakeries of Zitoprodukt in Vrbanja/Banja Luka and in Prnjavor.

A concentrated productivization of formerly invested basic capital and new investments can thereby be achieved. Once the products will be marketed in large quantities and expansion will be considered, the "spinning-off" of some of the production ("old" + expansion) to newer development nuclei in other communes, under the guidance of and within the Zitoprodukt complex, could be considered.

In order to achieve marketing on a national scale, it is recommended that Zitoprodukt consider a marketing integration with one or two enterprises in similar fields who have national distribution networks, a brand name and the promotional resources, facilities and connections which are important for such consumer products. Such possibilities were explored by the team and it appears that a number of suitable enterprises would be interested to cooperate with a BK project, considering the preferred industrialization credits position for BK and the manpower pool there, on condition that they would deal with a sizeable well organized production complex which could expand quickly towards nation wide marketing. It is proposed that Zitoprodukt and the Banja Luka Chamber of Commerce explore such possibilities with suitable enterprises, among them also Kras and Franck who are in similar lines and have their head offices near the project area. (One of them, Kras, is already integrated with a cereals processing plant of the region - the Mira Cikota Prijedor biscuits manufacturing plant - see later in this chapter).

\* \* \* \*

P.S. In some of the discussions on cereals processing in the project area the possibility of producing instant (precooked) cereals, such as instant rice, or breakfast-food cornflakes/wheatflakes was brought up.

Our comments are that precooked instant rice (or similar products) are such high-priced "super-convenience" foods that for the next five years a large market for them would be doubtful. Market prospects for breakfast cereals (corn-wheat-rice flakes) seem better but for both the above types of products the investments in equipment, building and technology are rather high. The team therefore considered that financial credit resources could be better used for the other projects, for reasons explained.

KAPACITETI U UGOSTITELJSTVU  
Starije 31.VIII

CATERING CAPACITY  
AT 31 August

Broj ležaja Primorsk  
Ukupno a mesta

No. of Beds  
Total Seaside  
Resorts

1967	432,797	293,945	1967
1968	454,096	314,335	1968
1969	647,764	471,090	1969
1970	697,301	516,476	1970
1971	770,628	577,623	1971
Hotels-all	141,884	101,702	Hoteli svega
Hotels, Category L	1,469	407	Hoteli L kategorije
Hotels, Category A	16,439	11,363	Hoteli A kategorije
Hotels, Category B	93,873	75,889	Hoteli B kategorije
Hotels, Category C	16,785	8,548	Hoteli C kategorije
Hotels, Category D	13,318	5,495	Hoteli D kategorije
Boarding Houses	5,710	2,231	Pansioni
Motels	5,681	1,074	Moteli
Quarters for the Night	10,953	825	Prenočišta
Tourist Settlements	36,896	36,096	Turistička naselja
Catering Establishments of Spa and Climatic Cures	11,365	1,220	Ugostitelj.radnje banjskih i klimatskih lečilišta
Inns	1,604	18	Gostionice
Mountain Hostels & Huts	7,163	28	Planinski domovi i kuće
Worker's Rest Centers	83,338	69,333	Radnička odmarališta
Youth & Children's Rest Centers	47,726	37,098	Odmarališta za decu i omladinu
Camping Sites	181,628	156,655	Kamp-tereni
Sleeping Cars	6,290	-	Kola za spavanje
Other Catering Business Units Providing Accommodation	10,499	2,452	Ostale ugost.poslovne jedinice za smestaj
Households (Rooming Houses)	219,891	168,891	Domaćinstva (privatne sobe)

Source: SFRJ Stat. YRBK 72

5. PROPOSED REORGANIZATION OF BK  
FOOD PROCESSING INDUSTRY

## 5. PROPOSED ROOFORGANIZATION OF BK FOOD PROCESSING INDUSTRY

### A. INTRODUCTION

1. As mentioned in several sections of the report, the analysis of the situation plus the needs for development lead to the conclusion that the enterprises of the region should together found a rooforganization. Such an organization should have the character of a supra-enterprise coordination unit as well as give services which, because of considerations of scarce resources or otherwise, are uneconomical or impractical to organize and keep at individual plant level.
2. It seems to the team that the tasks involved in carrying out any one of the stages of the major recommended projects - both new product lines and new organizational features - will be so large that maximum concentration of specialized development assignments will be required. Even if there is high mobility of trained manpower in Yugoslavia and additional people can be attracted to come and work in BK, the dispersal among the individual enterprises of specialists who could alternatively serve all the enterprises, could slow down development considerably.
3. The proposed rooforganization is not meant to decrease any of the functions of selfmanagement of the enterprises; on the contrary, by owning and running the rooforganization jointly the managements of the enterprises would be freer to concentrate on their management tasks of production and sales, and could call upon a wide range of expert services from the rooforganization.
4. Such rooforganizations, in one form or another, do exist in various activities in many countries. Central planning and service units of larger industrial conglomerates are one example. There the managers of the component enterprises, or their delegates for specific technical tasks, are the Board of such a central unit. Another example can be found in the technological field where "forward" maintenance and repair bases exist, with defined tasks, and certain repairs are done at the echelon of a "rear" base-depot.
5. Although it would be too early in this report to fix all the functions of this organization at this stage where the main purpose is to obtain a regional consensus that such an organization should be set up, the major tasks will be set out below. Modifications will be required and special study should be undertaken, after approval in principle of the establishment of such a body, about the creation, delineation and staffing of functions.
6. The intention would be that the rooforganization will consist partly of fulltime workers - specialists in their fields - who will do the daily work in the various activities, and of various decision-making representatives of the individual enterprises, from the staff of the enterprises, who will participate on a part-time committee level in the running of the rooforganization.
7. Partial points connected with the activation of the rooforganization have been included in the sectoral chapters of the report, in those cases where they are dominantly connected with a particular case of that sector.
8. Below are given first recommendations on the functions of the proposed organization.

### B. FUNCTIONS OF PROPOSED ROOFORGANIZATION

#### 1. Overall Planning

One of the major functions of the r.o. will be to perform for the

enterprises planning services, for expansion and for new units. Priorities fixing, on a discussed and mutually agreed basis, for new investments will be a central task for the reorganization. It should be assumed that there will always be a scarcity of investment funds and of trained development teams and therefore an overall planning committee, consisting of the managements of the enterprises and of the representatives of the commune, should concentrate on this vital function.

The planning staff of the r.o. should also be entrusted with the following fields of work:

- a) Setting up industry-wide training and manpower development programs.
- b) Performing studies and hiring consultants for such work.
- c) Giving out research and development contracts.
- d) Updating plans continuously and monitoring their progress.

## 2. Raw Materials Organization

As explained in several sections of the report this is a recurring theme and vital for any part of the development program. Raw materials organization, within the given socioeconomic structure, can and should be done only by the processing enterprises who will be the main buyer of them. The planning and organization of such supplies would be the function of a special unit in the r.o. while the daily implementation would be the function of each plant unit for itself, within the overall contractual arrangements determined periodically by the r.o.

The successful rawmaterial organization will characterize the integrated agroindustrial feature in the regional foodprocessing development program. Today this is still in the initial stages, without a specific agroindustrial emphasis, although good beginnings were made by the Kombinat in some projects.

Specifically, the tasks of this section would be:

- a) Organization of contract farming on a much wider scale than hitherto. The motivations and possibilities of the farmer have been referred to in the report, as well as the need to arrive at good incentive contracts which give the farmer the chance to have a reasonably profitable, secure buyer and give the plant secure supplies at clearly defined prices of materials of defined industrial-grade quality, without giving the farmer the alternative to sell at the critical moment on the parallel consumer market.  
The aim would be to arrive at standard contracts for each type of raw material.
- b) Negotiations with farmer groups, with the authorities, and with suppliers of inputs- regarding price levels of raw materials and other supply matters.
- c) Extensions Services to Farmers.
- d) Development of land tracts.
- e) Overall direction and coordination of efforts to secure improved raw material supplies (such as guiding the new meat division of the Kombinat in its efforts to increase cattle supply from the region).
- f) Coordination and arbitration in matters of duplication between the enterprises connected with raw material organization.

### 3. Technology and Production

Most matters of technology and production belong to the functions of the individual enterprises. However, for reasons of specialization, coordination and speeded-up development, certain functions should be assigned to the reorganization staff who will work in close coordination with the relevant departments in the enterprises.

The proposed functions for the Technology and Production section of the r.o. would be:

- a) Aligning production programs of the enterprises so that critical factors can be coordinated. These critical factors may be raw material supplies forecasts, manpower problems, smoothing out seasonal fluctuations (particularly in the vegetable/fruit products and dairy products fields where a lot can be done in this matter).
- b) Assisting the Planning Section in all technological expertise matters.
- c) Creation of a group - fulltime workers of the r.o. plus experts from the enterprises, to deal with technological knowhow matter, knowhow agreements with firms in Yugoslavia and abroad, and coordination of equipment orders for the enterprises.
- d) Introducing quality control standards for all the products where this is critical. The central foodprocessing laboratory, the information section of the r.o., and the production departments of the enterprises will be at the disposition of these activities.
- e) Dealing with the technological parts of the marketing section, in an advisory manner.  
This will include the technical aspects of product and packaging design, matters of refrigerated transport and similar problems.
- f) Coordinating and assisting the Planning Section in the introduction of new production techniques - such as concentrated feeding, soybean production, milk sector technical reorganization, etc.

### 4. Marketing.

Reference was made in several sections of the report to the need for market-oriented, forward integrative arrangements in Yugoslavia, as well as to the characteristics of the West European export markets for the type of products envisaged in the development program.

Although sales will be the function of such enterprise and contacts with their buyers have to be made and kept by the enterprises, there are some central functions which, for the same reason as explained for other activities, should be carried by a marketing section of the r.o.:

- a) Overall selection, priority and methods for "integrative" arrangements with organizations outside the region who would be ready to take over nationwide marketing.
- b) Direct links with large trading enterprises in Western Europe, first on pilot cases of specified adhoc sales (including technical assistance from raw material selection through packaging/labelling), later on selected permanent arrangements. These links could first be in trading, later possibly also operationally.

Discussions by the team in some export market areas with large private and cooperative wholesale import/distribution enterprises, representing some 60,000 retail outlets, showed that a concrete interest exists - for specific lines and under specific conditions, the main ones being assurance of quality, delivery time and proven organization, rather than price.

- c) Coordinated determination when one of the BK enterprises should set up its own marketing chain, and if so, whether this chain should, if feasible, also carry the products of another enterprise belonging to the r.o.
- d) Negotiations with the authorities regarding pricing of products, on behalf of the industry as a whole.
- e) Assisting the Export Technology Section (see below) in marketing matters, on an advisory basis.
- f) Assisting the Planning Section in the training program selections in the marketing fields.
- g) Influencing product and packaging design from the marketing aspect.

#### 5) Export Techniques.

The development of export markets for BK processed foods will be a long and detailed effort of such complexity that it is recommended to have a special section in the r.o. for this purpose alone, without it being a subsection of the Marketing Section.

Export techniques change constantly and it is the dealing with these changes and their requirements that will become the specialization of this section which has to be staffed with highly trained and experienced people. The various fields like marketing, information, finance, technology are covered in their respective sections and will be a service to the Export Techniques Section, and vice versa.

It will be the specific task of the Export Techniques section to magnetize all the possible resources in the enterprises and in the r.o. to devote sufficient time and attention to a constant export drive. Also, this section will have to deal with the outside factors which need to be aligned to make exporting possible - such as transport, agencies, affects of competition, governmental export incentives, etc.

One of its main activities will be to analyze periodically all aspects of Product Development so as to assure that the plants and the other sections of the r.o. are dealing in their planning and implementation of export products only with products which are expected to be saleable tomorrow.

#### 6) Information.

Mention was made in the report of the lack of information, and information services, as a major weakness of the region.

It is recommended that within the r.o. an information section be formed, with physical facilities (computer installation, technical library, multi-lingual correspondence and information handling staff).

Their task would be:

- a) to set up and run a computer installation - starting with a small unit - which would first do administrative, accounting, animal registration, and similar information handling.
- b) To set up and run a technical central library and provide a technical abstracts service to the enterprises.
- c) To set up and run a periodical market news service for the enterprises and for the farmers.
- d) To provide information about BK agroindustrial development progress to the authorities.
- e) To be in touch with international sources of technical and market information, and digest this information for its usefulness in the BK agro-industry.

- f) To lay the groundwork for a later integrated MIS (Management Information System) which in computerized form will give all the decision-making levels in the enterprises and the rooforganization a powerful tool of management, planning and control.

## 7. Finance

It is proposed to have a Finance Section in the r.o. whose tasks would be to undertake, on behalf of the enterprises, a number of activities - onetime or periodical - in the finance fields where the combined strength of the enterprises in the r.o. can achieve better results than individual dealings by each enterprise.

These activities would include:

- a) Setting up and negotiating with financial institutions in the region or outside it a detailed investment plan for the whole of the region's agroindustry, based on these development projects that will be approved by the management committee of the r.o.
- b) Getting the local (BK) and republic-region (B&H) banking system involved in a much closer and deeper way than hitherto in the longterm and shortterm financing needs of the enterprises. It has been felt by the team that functions which belong to the banks are undertaken internally by the managements of the enterprises who cannot be sure of funds and therefore delay urgent sales and expansion programs. This has brought several development projects to a delay or standstill.

Particularly, the matter of a fuller system of credit to farmers, to be given by the r.o. via the enterprises for contract farming on a larger scale, will need full attention of the banks.

The Finance Section of the r.o. will have as a central task, and as a specialized activity, the planning and servicing of this system.

- c) Determining an overall cashflow system for the enterprise which would approximate optimizing of funds available at any time. This would include the appropriation of investment funds by the finance committee, in terms of time, amount and conditions; provision and distribution of working capital and access to it in the banks; consolidation of loans and their extension.
- d) Setting up and servicing a centralized financial operation for those financial matters where pooling can lead to savings, such as a joint insurance fund, joint accounting with the Government, accounting of export incentives and matters of price stabilization funds, etc.

\* \*

Once the main organizational points of the r.o. will be approved and agreed upon by the enterprises and the communal and republic authorities, it is proposed to set the r.o. up with skeleton staff representing the various sections, and to appoint working committees from the enterprises whose task it will be to steer these sections into agreed action. There is no need to wait until all personnel will have been recruited and it is preferable, in our view, to have a "running-in" period of about 6 months during which the organizational details will be worked out. It is recommended that ZEP participate in the working out of this detailed plan.

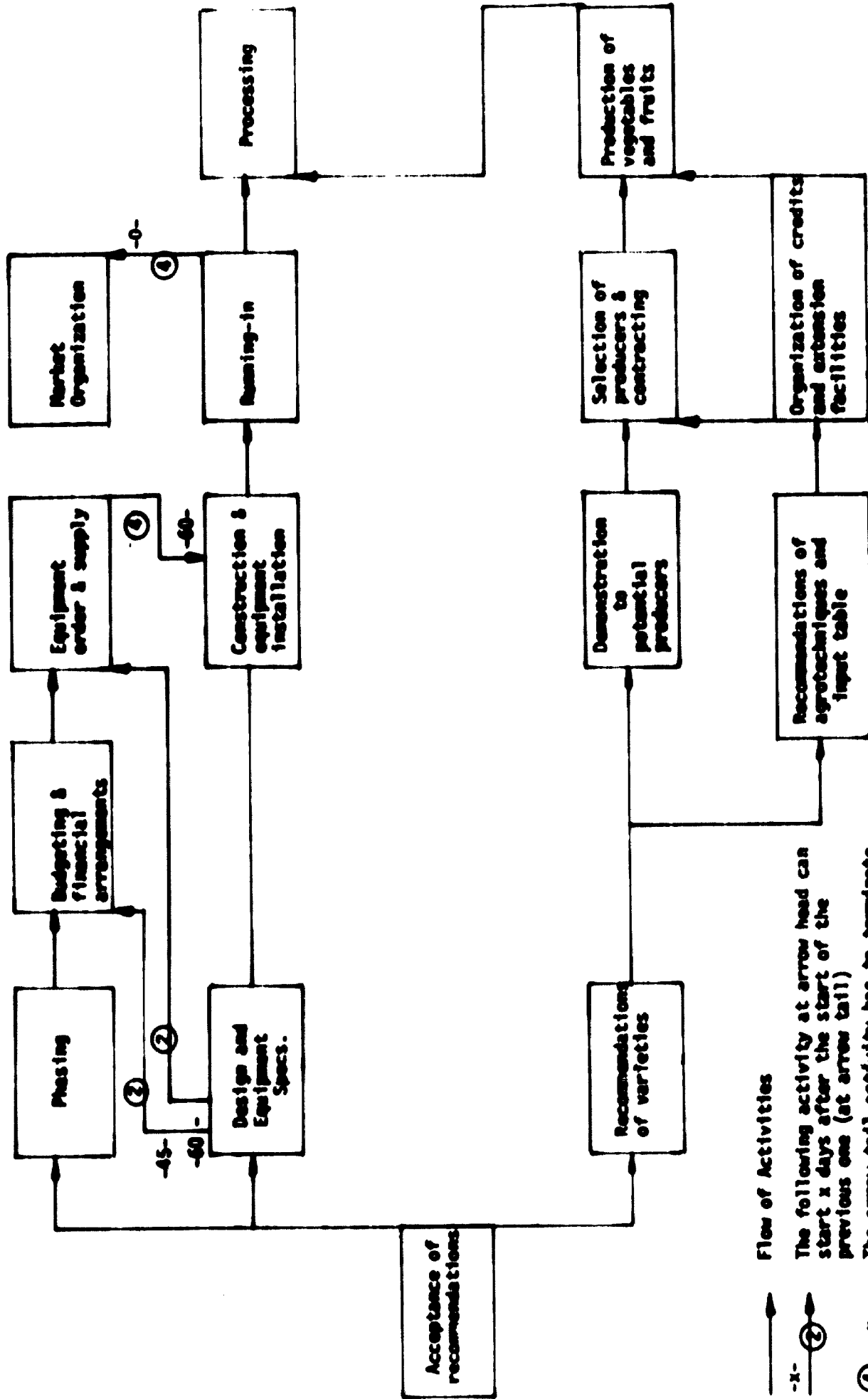
Regarding the financing of the r.o. it is proposed that this is derived partly from investment funds and partly from operational funds of the enterprises. Contributions should be based on an annual fixed sum - equal for all member enterprises, plus an annual sum on account of services bought. That second sum would form part of a charging system between the enterprises and the services given to them by the rooforganization.



In the next pages the various phases of the development programs are shown in block-diagram form. This will give an indication of the multitude and complexity of the tasks ahead for the BK foodprocessing industry and of the vital role that a centralized body such as the proposed reorganization will have to play in the implementation of its contribution parts to the development program.

\* \* \* \*

**VITONINA - BLOCK DIAGRAM**



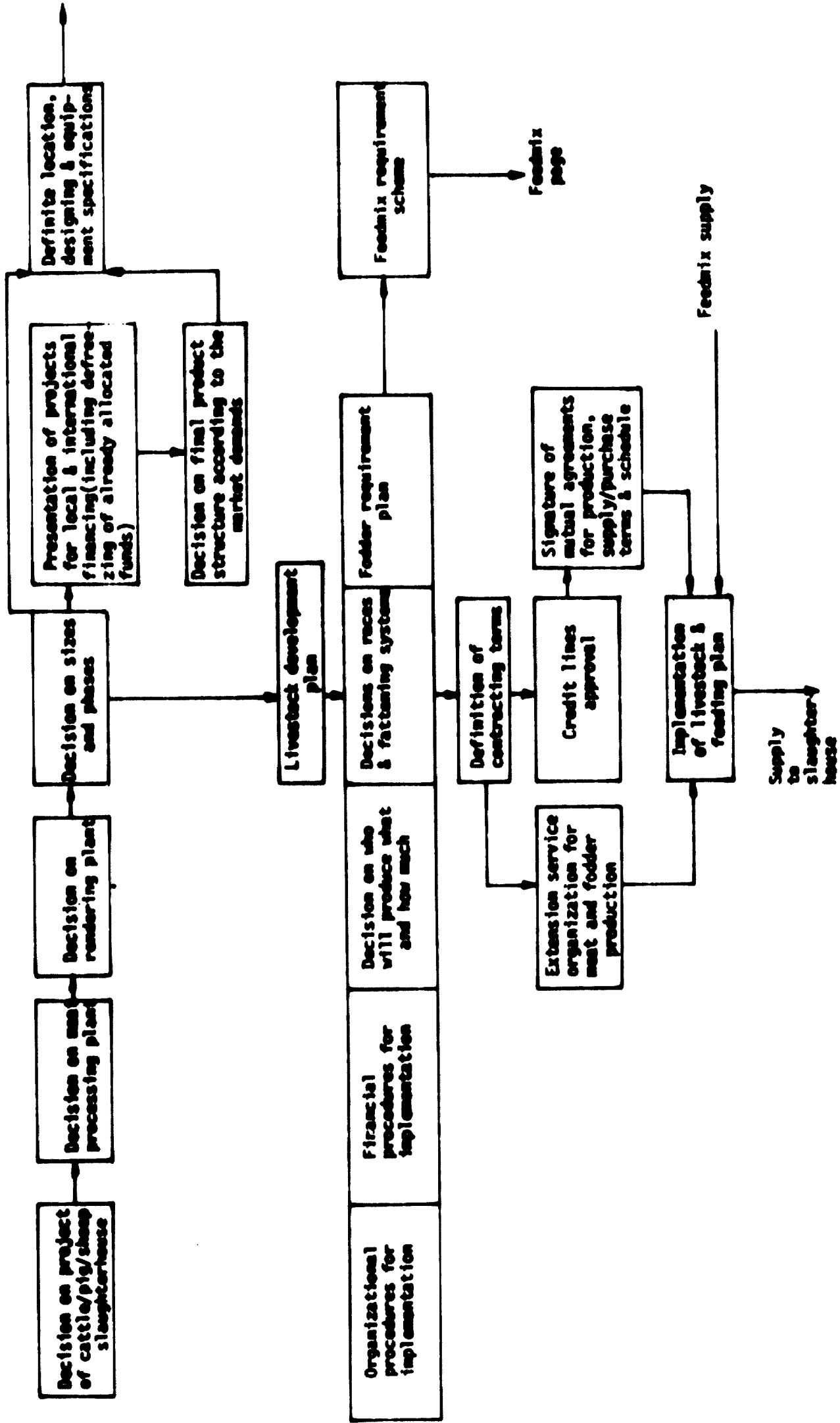
**Flow of Activities**

The following activity at arrow head can start x days after the start of the previous one (at arrow tail)

The arrow tail activity has to terminate x days before the arrow head activity terminates



**CATTLE/PIG/SHEEP PRODUCTION/PROCESSING - BLOCK DIAGRAM**



- 1) PROPOSED ENTERPRISE: ZITOPRODUKT
- 2) PROPOSED LOCATION: Banja Luka
- 3) a) PRODUCT LINE: CAKES (INDUSTRIAL) LINE
  - b) VARIETIES: English Cake, Swiss Roll, Danish Pastry (incl. sliced for catering and shops)
  - c) PACKAGING: 1/2 Kg. Polyethylene Bags, also packaging for filled cup cakes
- 4) MODE OF PROJECT: Addition to Existing Plant
- 5) PLANNED OUTPUT:

Stage	Output (Tons nett product/year)
1	500
2	1,000
3	2,500

- 6) ANNUAL SALES ESTIMATES:  
(Assumed ex-factory price obtainable at December 72 Yugoslav price levels)

Stage	Annual Sales (Mill. ND)
1	4.0
2	8.0
3	20.0

- 7) PROCESSING SEASON  
All year round.

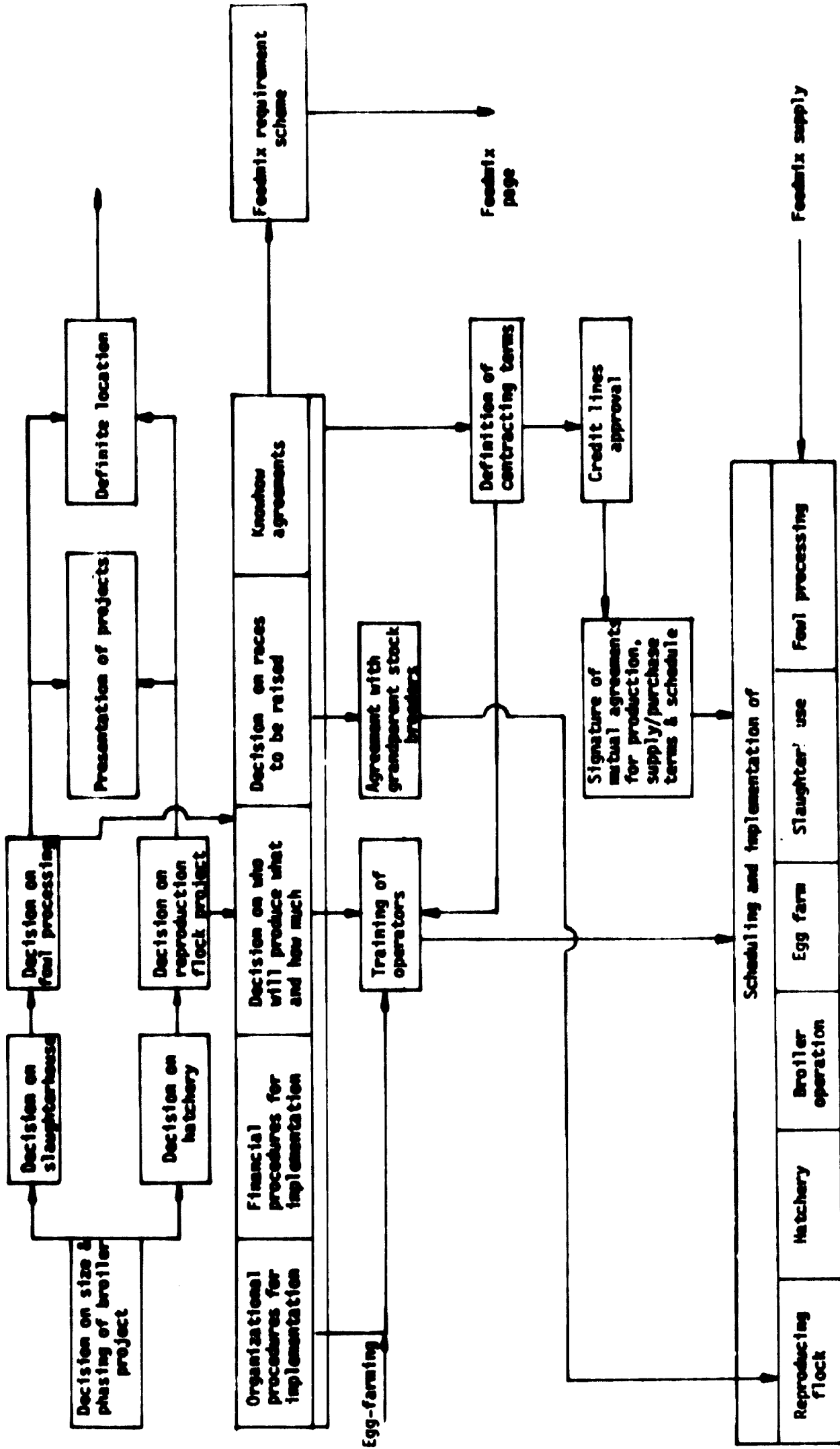
- 8) FACILITIES - EXISTING AND NEW:  
 For Stage 1 a new production line will be fitted into the existing building  
 Stage 2 can also be achieved without new production areas, though some new equipment is needed. Additional investment in production line will be needed  
 For Stage 3 production level a new production area of 500 sq.m. will be needed to house the new equipment needed. Storage area of 280 sq.m. must then also be added.

- 9) FIXED INVESTMENT ESTIMATE (Mill. ND)

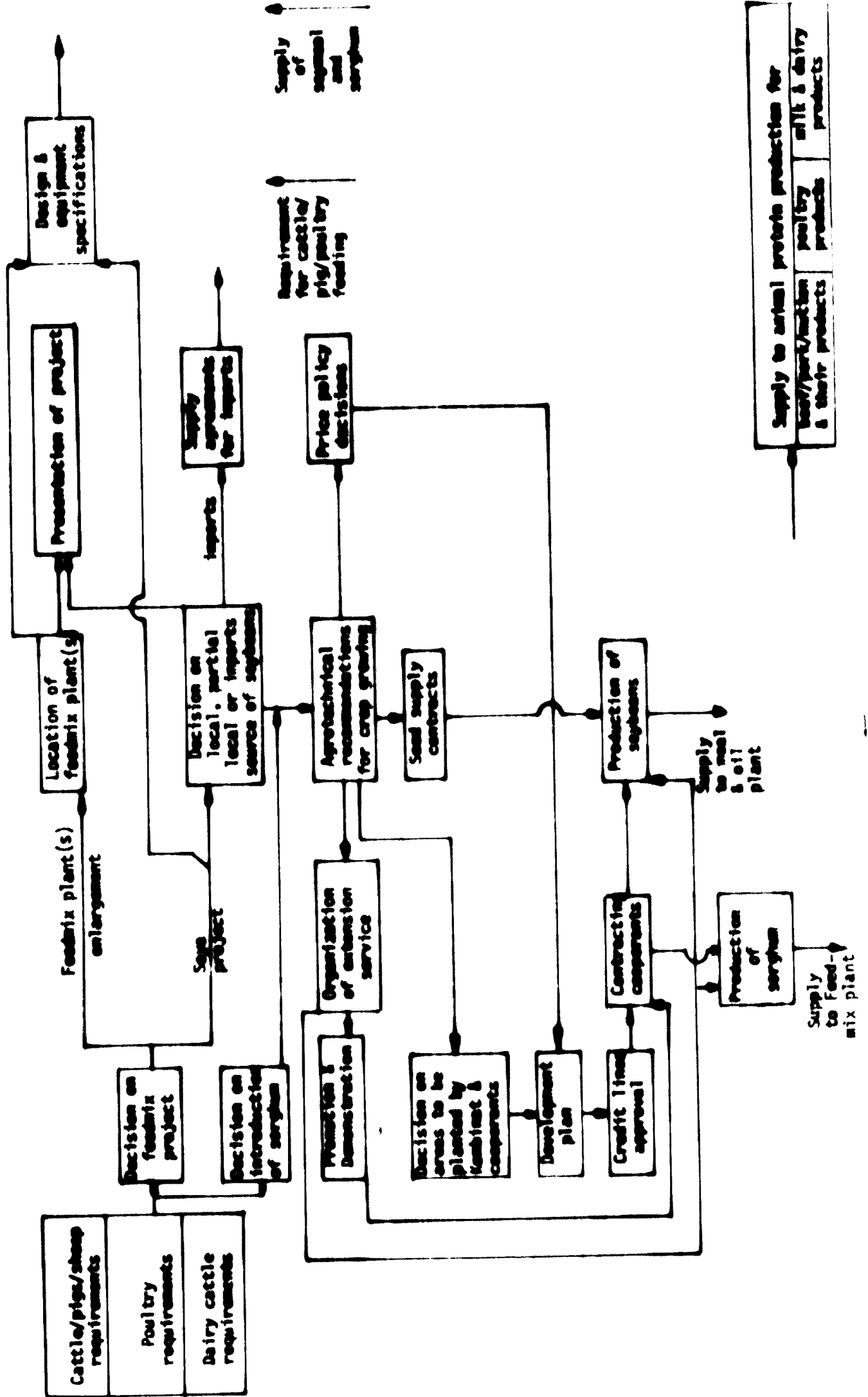
Stage	1	2*	3*
Equipment	2.900	3.400	4.300
Buildings	0	0	0.700
Engineering and Installation	0.500	0.600	1.000
<b>Total Fixed Investment</b>	<b>3.400</b>	<b>4.000</b>	<b>6.000</b>
Working Capital	1.000	2.000	4.000

\* Cumulative Total

Poultry Production/Processing - Block Diagram



**FEDERIX PROJECT - BLOCK DIAGRAM**

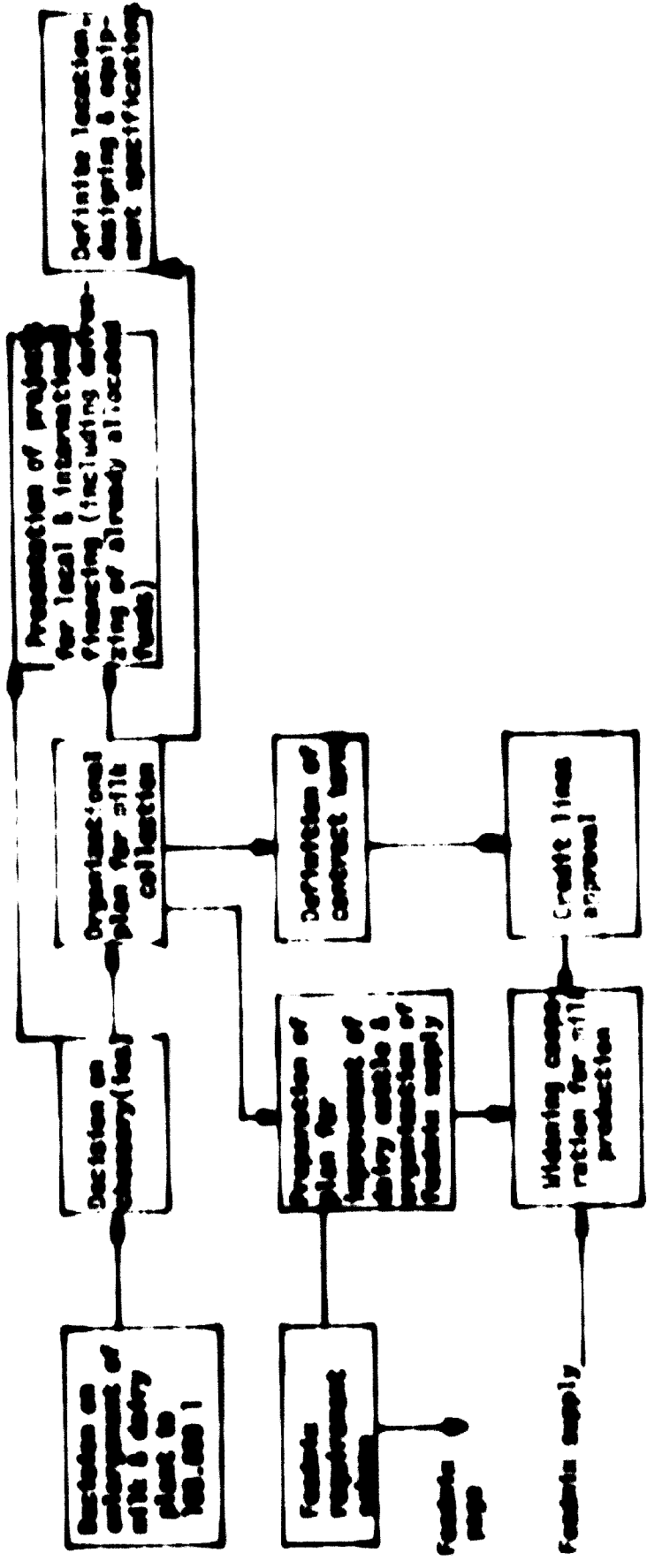


Supply of animal protein

Supply to animal protein production for beef/pork/lambton & other products

Supply to Feed-mix plant

**WATER PROJECTS - A SUMMARY - BUREAU OF REVENUE**



### C. BK FOOD INDUSTRY INDUSTRIAL LABORATORY

- 1 One of the questions considered by the team was the type, organization and equipping of industrial foodtechnological laboratory facilities which the BK food-industry would need for the next phase of its development.
- 2 This matter has to be seen in the context of the existence of various specialized foodtechnological laboratories in Yugoslavia who perform contract research, development and testing. The team foodtechnologists visited six of these laboratories (Zagreb, NoviSad, Beograd, Cacak) in the course of the fieldwork. These laboratories work in the vegetable, fruit, meat and milk fields - each one specialized in one group. Their work is done for various industrial and other clients all over Yugoslavia. It stands to reason that specialized R&D for BK projects could be done in these laboratories, and in others - including facilities in BanjaLuka (Agricultural Research Station) and in Sarajevo.
- 3 However, the team felt that if a massive foodindustry development program in BK is embarked upon, centered in BanjaLuka and surroundings, for which in any case professional personnel from other areas of Yugoslavia will be attracted, a start should be made immediately to build up central laboratory facilities for those parts and phases of work linked with the development programs in the enterprises which in the opinion of the reorganization development department should be performed in situ. This laboratory/pilot plant will work on a service basis to the individual enterprise.
- 4 Since this laboratory has to be seen as a nucleus and training facility it should be central - i.e. serving the regional industry and not one enterprise only. It could be temporarily located in free space in Vitinka or another BanjaLuka site available; perhaps at the Agricultural Research Station. For the same reason it is recommended that UNIDO assist by financing the first equipping stage of pilot-planting equipment as specified overpage.
- 5 The owner and operator of the laboratory would be the reorganization.
6. Regarding staffing the laboratory it is recommended to concentrate in the first phase on drawing manpower from the existing institutes in other parts of Yugoslavia plus from the graduate schools of the foodtechnological faculties which do not exist. Once a group of 3 - 4 key technologists is signed up, this group might benefit from a 3 weeks' concentrated study tour abroad of foodtechnological laboratories (industrial, university, governmental) in the quality control, pilot-planting and research fields. This tour should be undertaken after coordination with several of the parallel Yugoslav laboratories, and after the group will have carried out a series of study visits with them to familiarize themselves with the status of development work there.
7. Proposed Laboratory and Pilot Plant Equipment for BK Foodindustry Industrial Laboratory - Phase I

The following basic equipment is proposed for phase I, considering the needs of Vitinka, the Kombinat and Zitoprodukt for their project development. These equipment items should be seen as a basic all-purpose foundation for later expansion in specified directions. The equipment is divided into 5 main groups. Total cost is estimated at \$150,000 (assuming no Yugoslav import duties).



<u>Equipment</u>	<u>Quantities</u>
<b>1. <u>Fruit &amp; Vegetables</u></b>	
a. Reel Washer	1
b. Treatment Bath	1
c. Fruit & Vegetable cutter/dicer	1
d. Juice extractor	1
e. Plate heat exchanger	1
f. Centrifugal separator	1
g. Agitated kettles	2
h. Evaporator	1
i. Spray dryer	1
j. Freezer - combined Blast/I.Q.F. unit	1
k. Seamer - Semi-automatic with steam/gas injection	1
l. Retort	1
<b>2. <u>Meat</u></b>	
a. Grinder	1
b. Cutter	1
c. Sausage filler	1
d. Brine injector	1
e. Meat mixer	1
f. Smoke house	1
g. Plastic vacuum sealing unit	1
<b>3. <u>Bakery</u></b>	
a. Planetary mixer	2
b. Fermentation cabinet	1
c. Test baking oven	1
<b>4. <u>General</u></b>	
a. Incubators	2 (33°C, 55°C)
b. Stainless steel tables	2
c. Utensils	2 sets
<b>5. <u>Laboratory</u></b>	
a. Extraction unit - Soxhlet type	1
b. Nitrogen determination unit - Kjeldal type	1
c. Drying oven	1
d. Scales - Analytical & semi-analytical	4 (2 x 2)
e. Spectrophotometer	1
f. General laboratory equipment	2 sets

D. TRAINING OF PERSONNEL OF BK FOODPROCESSING INDUSTRY

1. The team had many discussions in the project area and in other regions of Yugoslavia on the various training aspects. These discussions were held with the FAO Project Manager, with ZEP, with the managements of all the enterprises and with various institutes
2. Although it became clear that in most fields training would be required - today and especially for any of the expansion phases recommended - the three main fields of need turned out to be:
  - Specific application of new technologies or methods
  - Marketing (Sales, Distribution, Promotion)
  - Information handling on one's own field of activity
3. Regarding the effectiveness of training alternatives it was concluded that in the various fields of activities of the enterprises the major longterm need is for LONGER training (6-12 months), partly in other places in Yugoslavia and partly abroad, of specific personnel. This training should be "in-plant" in 2 - 3 places of training per trainee. There are, however, two limitations to the implementation of such training within the present UNIDO/FAO Project:
  - None of the enterprises can presently spare their first and second echelon technical or marketing personnel for such long periods and alternatively they do not feel they would want to send newly hired personnel directly on such training.
  - UNIDO informed us that its own budgets are earmarked more for short study tours than for long in-plant training schemes
4. Short study tours could be very useful in a number of fields and a proposed priority schedule is given overpage. It is recommended that these study-tours be preplanned with suitable organizations in the various countries who are ready to receive such a team for working sessions and detailed visits to all departments. The implementation of the studytours should be decided upon if and when the relevant development projects proposed in this report will be approved, since the studytours are connected with getting specific awareness in these fields
5. It is also recommended that the reorganization should, as one of its first tasks, plan a longrange training and manpower development program which would start by resolving the matter mentioned under 3 (-) above

**E. PROPOSED STUDYTOURS WITHIN TRAINING SCHEME**

<b>Personnel from Plant</b>	<b>Group</b>	<b>Duration (Weeks)</b>	<b>S u b j e c t</b>	<b>Countries</b>
Vitaminka	one group of two	3	Salespromotion techniques in the veg/fruit preserves and the babyfood fields	Switzerland Holland Germany, UK Sweden
Vitaminka + Kombinat	one group of three	2	Raw materials Growers' contracts	Austria Holland Denmark, Italy
<u>Products</u>				
Kombinat + Vitaminka	one group of three	3	Quickfrozen (vegetables fruit, and other) - production & marketing	Sweden Denmark Germany, UK
Zitoproduct + Mira Cikote	one group of three	3	Modern Bakery Products (Industrial Cakes, Biscuits, Breads, etc.)	Switzerland UK, Holland Austria Germany, Italy
Brewery	one group of two	2	To be coordinated with brewery on their priorities	
ZEP + techni- cal committee of roof orga- nization	one group of five	2	Industrial Planning, Information & Management Coordination between tech- nical group in a rooforga- nization (or holding com- pany) and managements of associated enterprises	Switzerland <sup>*)</sup> Israel <sup>**)</sup> Sweden <sup>***)</sup>
Kombinat	one group of three-four	4	<u>Meat Sector -</u> a) Progress in concentra- ted feeding methods for cattle, pigs & poultry b) Industrial poultry raising c) Meat Products Plants d) Poultry Slaughterhouses e) Poultry Products Plants	USA Denmark Germany Italy Israel
Kombinat	one group of two	2	a) Feedmix installations b) Soybean Processing plants	UK Holland Denmark

- Notes:**
- \*) Eternit Group or Nestle or similar
  - \*\*\*) Agroindustrial and similar
  - \*\*\*) Cooperatives Union Group

**APPENDIX**  
\*\*\*\*\*

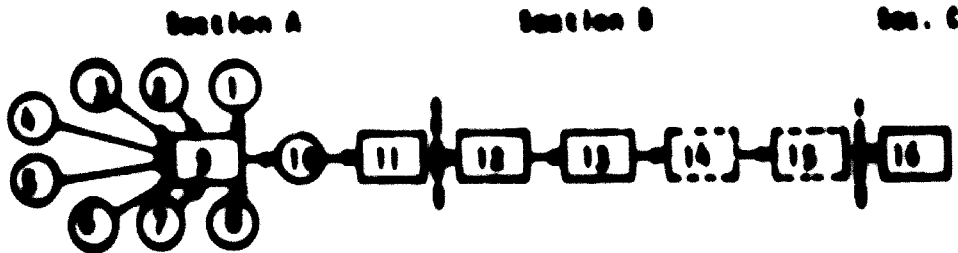
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**CANES (INDUSTRIAL) LINE**

**10) PROCESS DESCRIPTION**



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- 2. Cake Flour
- 3. Baking Powder
- 4. Milk Powder
- 5. Shortening
- 6. Eggs
- 7. Water
- 8. Additives
- 9. Mixing
- 10. Sweet Dough
- 11. Dividing & Planeting

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BAKING**

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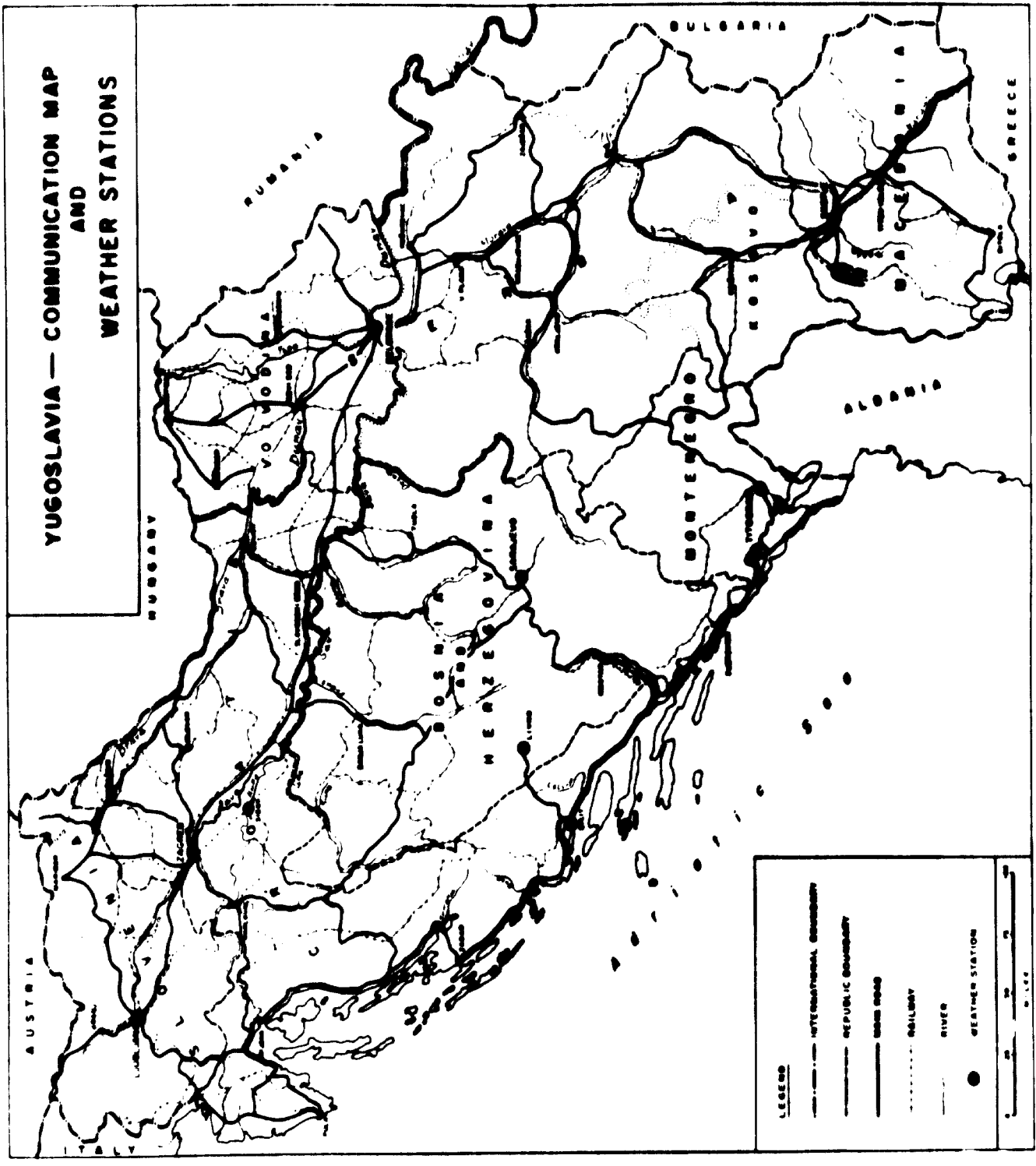
\* \* \* \*

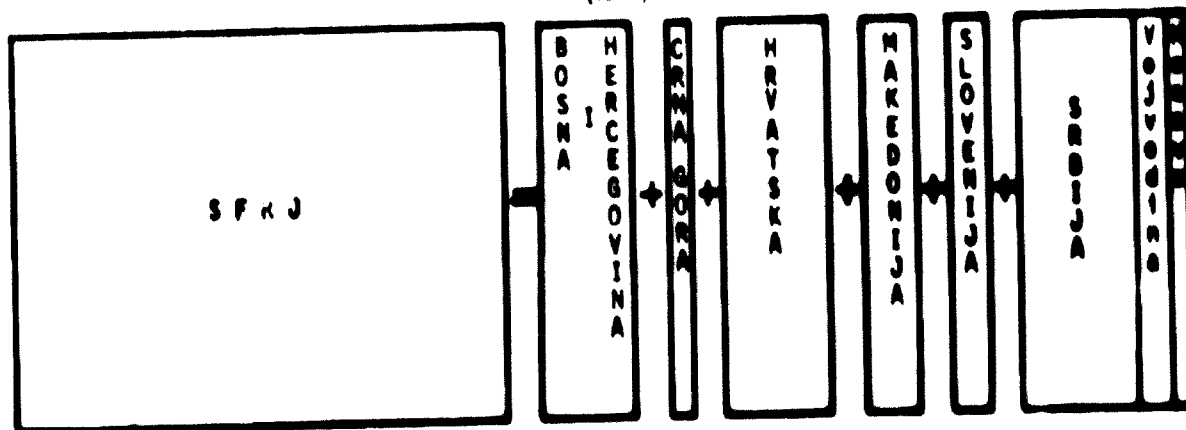
#### A. TABLES, GRAPHS AND MAPS

The statistical and other data given here were selected and collated for their contents of relevant background information. A study by the reader of the economic indicators, of the growth of production and trade including in foodprocessing, as well as of the division between the social and private sectors, is important for the understanding of the considerations that led to the structure of the plan.

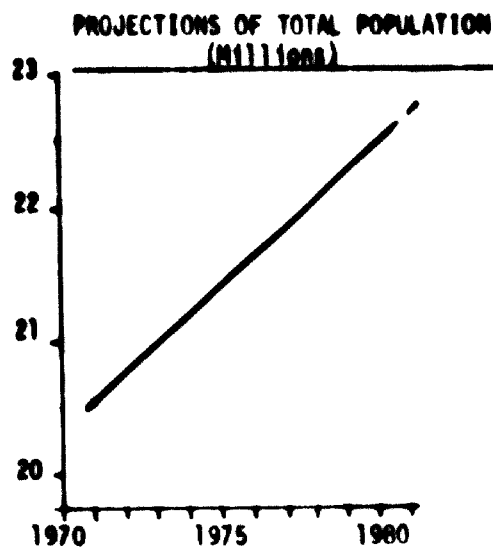
Most of the tables have been prepared in English and Serbocroat so that the appendix can also serve a Serbocroat edition of this report.

1. a. YUGOSLAVIA-GENERAL





Source: SFRJ Stat. YRBK 72



Source: SFRJ Stat. YRBK 72

STANOVNIŠTVO STARO 10 I VIŠE GODINA PREMA ŠKOLNOJ SPREMI PO POPISIMA U 1961  
POPULATION AGED 10 AND OVER ACCORDING TO EDUCATIONAL ATTAINMENT BY THE CENSUS OF 1961  
 (Latest available in this breakdown)

	Sve ga	Muš- ko Male	Žensko Female	
TOTAL	14,611,415	7,030,258	7,581,157	UKUPNO
Without Educational Attainment	4,864,315	1,617,117	3,247,198	Bez školske sprema
Four Classes of Primary (Elementary School)	7,092,845	3,747,574	3,345,271	Četiri razreda osnovne škole
Primary (Elementary) School (Eight Year)	1,068,549	534,580	533,969	Osnovna škola (osmogodišnja)
Schools for Skilled and Highly Skilled Workers	877,758	687,874	189,884	Škole sa kvalifikovane i visokokvalifikovane radnike
Schools for Secondary Vocational Training	311,627	182,502	129,125	Škole sa srednji stručni kadar
General Secondary School	175,915	99,390	76,525	Gimnazija
Higher Schools	64,216	50,482	13,734	Više škole
Faculties, High Schools and Art Academies	132,456	97,976	34,480	Fakulteti, visoke škole i umetničke akademije
Unknown	23,734	12,763	10,971	Nepoznato

Source: SFRJ Stat. YRBK 72.

POVRŠINA, DOMAĆINSTVA I STANOVNIŠTVO PREMA POPISIMA

AREA, HOUSEHOLDS AND POPULATION ACCORDING TO CENSUSES

Površina km <sup>2</sup>	Domaćinstva	Stanovništvo			Broj stanovnika, na 1 km <sup>2</sup>	Broj lica na 1 do- maćinstvo	Broj žena na 1000 muških sta- novnika
		Ukupno	Muško	Žensko			
Area Sq. Km.	House- holds	P o p u l a t i o n			No. of Inhabi- tants p.1 sq.km.	No. of Persons per Household	No. of Females p.1000 male Inhabitants
		Total	Male	Female			
255,804	4,648,563	18,549,291	9,043,424	9,505,867	72,5	3,99	1,051
255,804	5,391,284	20,504,516	10,090,477	10,414,039	80,3	3,80	1,032

Source: SFRJ Stat. YRBK 72

POSREĆENJE  
EARTHQUAKES

Godina	Ukupno	Stepan jačina					manji V	Najjači u godini	Dat- um	Mesto	SR
		IX	VIII	VII	VI	V					
Year	Total	Magnitude of Intensity					Under V	The Largest Earthquake of the Year	Date	Place	Socialist Republic
		IX	VIII	VII	VI	V					
1960	54	-	1	-	1	8	44	VIII	12/3	Gradac	M
1961	94	-	-	1	1	3	89	VII	22/6	Titograd	CG
1962	368	1	2	2	1	26	337	IX	11/1	Makaraka	M
1963	517	1	-	1	1	8	506	IX	26/7	Škoplje	M
1964	164	-	1	-	1	7	156	VIII	13/4	Kindrovo (Sl. Br.)	M
1965	68	-	-	-	4	10	54	VI	23/1	Senica	BAH
								VI	23/4	Široki Brijeg	BAH
								VI	11/10	Škoplje	M
1966	169	-	-	2	16	31	120	VI	25/12	okolina Ulič, Polj.	Sr
								VII	6/8	okol. Petrovoa rm.	CG
								VII	20/8	okol. Petrovoarm.	CG
1967	173	1	1	7	15	36	113	IX	30/11	Debar	M
1968	338	-	1	2	4	30	301	VIII	3/11	Ulcinj	CG
1969	857	-	1	4	4	9	839	VIII	27/10	Banja Luka	BAH
1970	513	-	1	2	9	25	476	VIII	7/9	Planina Ruzija	M
1971	261	-	-	1	3	10	247	VII	12/11	okol. Glasova	BAH

\* The three most intensive shocks in Bosanska Krajina of 6.1/2, 7.1/2 and 8.1/2 of MCS scale.

\* Tri najjača potresa u Bosanskoj Krajini iznose 6.1/2, 7.1/2 i 8.1/2 stupnj. MCS skale

DRUŠTVENO-POLITIČKE ZAJEDNICESOCIO-POLITICAL COMMUNITIES

Communes according to Total Area 1971	SFRJ	Bosna i Hercegovina	Opštine prema ukupnoj površini 1971.
Under 50 sq.kilometres	11	-	Do 50 km <sup>2</sup>
50 - 100	7	3	50 - 100
100 - 200	36	11	100 - 200
200 - 300	82	18	200 - 300
300 - 400	94	21	300 - 400
400 - 500	62	15	400 - 500
500 - 600	48	9	500 - 600
600 - 700	46	7	600 - 700
700 - 800	36	7	700 - 800
800 - 900	20	4	800 - 900
900 - 1000	16	5	900 - 1000
1000 - 1200	26	2	1000 - 1200
Over 1200 sq.km.	18	4	Preko- 1200 km <sup>2</sup>
 Communes according to Number of Inhabitants			 Opštine prema broju stanovnika
Under 5000 Inhabitants	3	1	Do 5000 stanovnika
5 - 10	26	4	5 - 10
10 - 15	38	12	10 - 15
15 - 20	94	18	15 - 20
20 - 25	53	9	20 - 25
25 - 30	45	12	25 - 30
30 - 35	46	14	30 - 35
35 - 40	30	6	35 - 40
40 - 45	24	5	40 - 45
45 - 50	26	6	45 - 50
50 - 55	16	4	50 - 55
55 - 60	9	3	55 - 60
60 - 70	23	2	60 - 70
70 - 80	13	1	70 - 80
80 - 90	10	·	80 - 90
90 - 100	11	1	90 - 100
Over 100,000 Inhabitants	33	5	Preko 100,000 stanovnika

source: SFRJ Stat. YRBK 72

OPŠTI PRIVREDNI INDENSI

1952 = 100

GENERAL ECONOMIC INDICES

1952 = 100

Ukupno stanovništvo u društvenom sektoru	Zaposleno osob. u društvenom sektoru	Narodni dohod. u staln. na I pr. stan. u društvenom sektoru	Indeks fizičkog obima proizvodnje		Indeks fizičkog obima prometa robe		Osnovni podaci	
			industrija	poljoprivreda	industrija	poljoprivreda	ind. proizvodnja	polj. proizvodnja
			na malo	na malo	na malo	na malo	na malo	na malo
			na veliko	na veliko	na veliko	na veliko	na veliko	na veliko
			izvoz	izvoz	izvoz	izvoz	izvoz	izvoz
			uvoz	uvoz	uvoz	uvoz	uvoz	uvoz
			izvoz i uvoz	izvoz i uvoz	izvoz i uvoz	izvoz i uvoz	izvoz i uvoz	izvoz i uvoz
			izvoz i uvoz	izvoz i uvoz	izvoz i uvoz	izvoz i uvoz	izvoz i uvoz	izvoz i uvoz

Index of Physical Volume of P r i c e s o f

	Persons Employ. in Soc. Sector	Nat. Income at Const. Prices Per Total Capita	Commodity Turnover				Producers of			Receipts							
			P r o d u c t i o n		Extern. Trade		Retail Trade	Mamu- factd. Goods	Agri- cult. Prod.	Build- ing	Retail Prices	Costs of Living					
			Industr.	Agric. Constr.	Exports.	Impts.							Nominal	Real			
1966	117	207	311	266	474	245	180	359	409	326	148	517	420	256	345	753	218
1967	118	206	319	270	473	243	192	384	412	349	151	490	450	273	369	855	232
1968	119	207	331	278	503	233	200	411	415	360	152	459	476	285	387	937	242
1969	120	215	366	304	560	255	218	448	457	416	156	519	514	306	419	1,076	257
1970	121	224	387	319	611	246	238	502	476	509	171	618	506	335	463	1,275	275
1971	122	234	419	341	674	263	243	557	490	519	198	769	(715)	386	535	1,557	291

Source: SFRJ Stat. YRBK 72



OPŠTI PREGLED RAZVOJA PRIVREDE  
u milionima dinara

GENERAL DATA ON DEVELOPMENT OF ECONOMY  
MILLION DINARS

Ukupno stanovništvo u hilj.	Zaposleni u društvenom sektoru u hilj.	Osnovna sredstva i priv. organizacija	Društveni proizvod u tekućim cijenama	Narodni dohodak u stalnim cijenama	Neto lični prihodi	Lična potrošnja	Opšta potrošnja	Ukupno U proizvodne fondove	Bruto investicije u osnov.fondov.	Gross Fixed Capit. Formation		Exports	Imports
										Total Populat. thou.	Persons Employed in Soc. Sector thou.		
1966	3,491	179,744	99,052	91,740	44,088	50,510	9,236	26,616	17,823	18,301	23,631		
1967	3,466	186,804	103,710	94,014	46,877	56,897	10,985	30,283	21,911	18,775	25,610		
1968	3,487	200,975	111,973	101,573	50,126	61,921	12,680	35,044	25,289	18,956	26,952		
1969	3,622	185,250	131,960	119,690	59,173	71,706	14,344	41,049	30,021	22,117	32,007		
1970	3,765	206,416	157,207	142,835	70,798	86,064	15,976	51,723	36,094	25,187	43,110		
1971	3,944	360,020	204,050	185,830	89,584	...	...	...	...	27,217	48,781		

Source: SFRJ Stat. YEAR 72

## CAKES (INDUSTRIAL) LINE

### 11) DIAGRAMMATIC FLOWSHEET:



- |                     |                       |
|---------------------|-----------------------|
| 1 Automatic Weigher | 5 Oven                |
| 2 Water Motor       | 6 Cooler              |
| 3 Mixer             | 7 Packaging Equipment |
| 4 Divider           |                       |

### 12) DIRECT MANPOWER:

<u>Stages</u>	<u>1</u>	<u>2</u>	<u>3</u>
Operators	3	3	3

### 13) UTILITIES:

<u>Stages</u>	<u>1</u>	<u>2</u>	<u>3</u>
Power (kWh/year)	20,000	40,000	75,000
Water (M <sup>3</sup> /year)	negligible		
Fuel (Ton/year)	20	40	100

### 14) MATERIALS BALANCE: (Example for one product)

For 1 Ton of English Cake

Material	Kg.	Kg. Total
<b>Ingredients:</b>		<b>1,170</b>
Cake Flour	300	
Sugar	340	
Eggs	167	
Water	167	
Shortening	167	
Milk Powder	27	
Baking Powder	18	
Salt	6	
Vanilla	6	
Lemon Flavor	2	
<b>Residues and Rejects:</b>		<b>170</b>
Vapor Losses	170	
<b>Product</b>		<b>1,000</b>

### 15) PROCESSING COSTS (Mill. ND/Year)

<u>Stages</u>	<u>1</u>	<u>2</u>	<u>3</u>
Packaging Material	0.400	0.960	2.400
Utilities	0.020	0.030	0.060
Direct Labor	0.000	0.000	0.000
Overhead Share*	0.540	0.600	1.200
Amortization	0.310	0.400	0.600
<b>Total (Mill. ND/Year)</b>	<b>1,400</b>	<b>2,150</b>	<b>4,300</b>
<b>Unit Processing Cost</b> (ND/Ton Product)	<b>2,950</b>	<b>2,150</b>	<b>1,744</b>

\* Includes maintenance, plant depreciation and insurance

KRETANJE DRUŠTVENOG PROIZVODA  
 Obračunato po cenama 1966.  
 u milionima dinara  
 SOCIAL/GROSS NATIONAL/PRODUCT  
 Computed at 1966 prices  
 Million Dinars

	1958	1969	1970	1971	
ECONOMY TOTAL	52,267,6	116,644,4	123,726,0	134,234,2	PRIVREDA UKUPNO
Social Sector	34,984,5	91,420,4	99,292,2	108,679,5	Društveni sektor
Private Sector	17,283,1	25,224,0	24,433,8	25,554,7	Privatni sektor
Manufacturing, Mining and Quarrying	14,735,3	41,016,6	45,105,6	49,557,6	Industrija i rudarstvo
Electric Energy	1,003,1	3,124,1	3,471,5	3,989,6	Elektroenergija
Coal and Coke	1,125,8	1,347,7	1,396,8	1,504,0	Ugalj i koks
Crude Petroleum	187,9	1,112,9	1,309,0	1,544,0	Nafta
Ferrous Metallurgy	700,7	1,503,0	1,544,8	1,667,8	Crna metalurgija
Non-Ferrous Metallurgy	818,2	1,977,7	2,074,4	2,104,0	Obojena metalurgija
Manufacture of Non- Metallic Mineral Products	342,0	1,112,7	1,237,8	1,363,4	Nemetali
Manufacture of Metal Products	2,629,6	7,324,7	8,340,1	9,006,1	Metalna industrija
Shipbuilding	320,4	1,072,4	1,078,2	1,112,2	Brodogradnja
Manufacture of Electr. Machinery, Apparatus, Appliances & Supplies	565,8	2,432,1	2,723,0	2,955,4	Elektroindustrija
Manufacture of Chemicals & Chemical Products	604,3	3,686,3	4,350,3	5,044,7	Kimijaska industrija
Building Materials	614,0	1,750,0	1,917,8	2,128,4	Gradjevinski materijali
Manufacture of Wood	871,2	2,153,8	2,330,4	2,607,1	Drvena industrija
Manufacture of Paper and Paper Products	175,0	781,7	830,6	899,4	Industrija papira
Manufacture of Textiles	1,891,5	4,485,0	4,712,5	5,009,7	Tekstilna industrija
Manufacture of Leather	343,7	840,7	825,6	916,2	Industrija kože
Manufacture of Rubber Products	121,5	452,6	492,8	548,9	Industrija gume
Food Manufacturing Industries	1,231,2	3,534,5	3,953,2	4,411,1	Prehrambena industrija
Printing, Publishing and Allied Industries	557,7	1,471,5	1,604,0	1,779,4	Grafička industrija
Tobacco Manufacture	550,8	619,4	635,0	666,1	Industrija duvana
Agriculture	17,127,7	26,285,5	24,838,9	26,776,1	Poljoprivreda
Social Sector	1,741,0	5,682,3	5,418,5	6,521,8	Društveni sektor
Private Sector	15,386,7	20,603,2	19,420,4	20,254,3	Privatni sektor
Forestry	1,131,4	1,428,8	1,456,2	1,474,1	Šumarstvo
Construction	3,686,6	10,850,2	11,847,2	12,084,3	Gradjevinarstvo
Transport & Communications	3,742,9	8,846,0	9,640,6	10,470,0	Saobraćaj i veze
Retail Trade & Catering	8,432,8	21,925,0	24,141,4	26,744,5	Trgovina i ugostiteljstvo
Arts & Crafts/Prod. Part	3,411,2	5,763,1	6,113,5	6,517,0	Zanatstvo (proizvodni deo)
Social Sector	1,949,3	3,846,8	4,074,2	4,334,9	Društveni sektor
Private Sector	1,461,9	1,916,3	2,039,3	2,182,1	Privatni sektor

Source: SFRJ Stat. YRBK 72

## BRUTO-BILANS PRIHODA I RASHODA STANOVNIŠTVA - 1969

## GROSS BALANCE OF RECEIPTS AND EXPENDITURE OF POPULATION - 1969

TOTAL RECEIPTS	109,571	UKUPNI PRIHODI
Net personal incomes and other personal receipts	73,177	Neto lični dohoci i druga lična primanja
From the economy of the social sector	39,116	Iz privrede društvenog sektora
From the economy of the private sector	20,564	Iz privrede privatnog sektora
In which consumption of own products of individual producers	9,596	U tome naturalna potrošnja individualnih proizvođača
From non-economic activities	13,497	Iz neprivrede
Receipts from social security and social welfare	12,448	Primanja po osnovu socijalnog osiguranja i socijalne zaštite
From social security	10,923	Od socijalnog osiguranja
From the budget of socio-political communities (federation, republics, provinces and communes)	(653)	Od budžeta društveno-političkih zajednica
Other	(872)	Ostalo
Receipts from abroad	3,417	Primanja iz inostranstva
Other receipts	683	Ostala primanja
Claims for insurance of property (excluding livestock and crop insurance)	110	Oštete osiguranja imovine (bez osiguranja stoke i useva)
Prizes from the games of chance (lottery, lotto, sports forecast)	170	Zgodici od igra na sreću (lutrija, loto, sportska prognoza)
From sale of real estate and other assets to the social sector	255	Od prodaja nekretnina i dr. sredstava društvenom sektoru
Other	148	Ostalo
Credits drawn	8,709	Podignuti krediti
Consumer credits drawn	5,893	Podignuti potrošački krediti
Investment credits drawn	2,720	Podignuti investicioni krediti
Other credits drawn (credits and borrowings to students, etc.)	96	Podignuti ostali krediti (kredit i pozajmice studentima)
Resources drawn from savings	11,137	Sredstva povučena sa štednje
Resources drawn from savings deposits	7,977	Povučena sredstva sa štednih uloga
Resources drawn from foreign exchange accounts of individuals	1,524	Povučena sredstva sa deviznih uloga gradjana
Used deposits for the housing constr.	702	Iskorišćeni depoziti za stambenu izgradnju
Resources drawn from other savings accts.	166	Povučena sredstva sa ostalih računa štednje
Other	768	Ostalo
TOTAL EXPENDITURE	109,571	UKUPNI RASHODI
Contributions, taxes, stamp duties and customs paid by individuals	1,652	Doprinosi, porezi, takse i carine koje plaćaju gradjani
Expenditures for personal services and social welfare services	5,380	Izdaci za lične usluge i usluge društvenog standarda
Expenditure for personal consumption (for material goods and productive services)	71,706	Rashodi za ličnu potrošnju (za materijalnu dobra i usluge proizvodnog karaktera)
Investment in dwellings	4,950	Investicije u stanove
Expenditures abroad (tourist and business trips, medical treatments)	1,217	Izdaci u inostranstvu (turistička i službena putovanja)
Other expenditures	572	Ostala izdavanja
Premiums for property insurance (excl. livestock & crop insurance)	176	Premije za osiguranje imovine (bez osiguranja stoke i useva)
Deposits for the games of chance (lottery, lotto, sports forecast)	357	Ulozi za igre na sreću (lutrija, loto, sportska prognoza)
Other	39	Ostalo
Payment of credit	7,015	Otplata kredita
Consumer credit payment	5,256	Otplata potrošačkih kredita
Investment credit payment	1,751	Otplata investicionih kredita
Payment of other credits (credits and borrowings to students, etc.)	8	Otplata ostalih kredita (kredit i pozajmice studentima)
Resources put on savings	17,073	Sredstva položena na štednju
Put on savings deposits	11,207	Položeno na štedne uloge
Put on foreign exchange accts. of individ.	2,224	Položeno na devizne račune gradjana
Time deposits for housing constr.	923	Oračeni depoziti za stambenu izgradnju
Cash circulation increase	2,351	Povećanje novca u opticaju
Other (current accounts of citizens, life insurance, national loan)	368	Ostalo (žiro-računi gradjana, osiguranje života, narodni zajam)

DEVIZNI BILANS - 1971  
u milionima dinara

THE BALANCE OF PAYMENTS - 1971  
Million Dinars

	sredstva (priliv)	plaćanja (odliv)	razlika	
	Resources Inflow	Payments Outflow	Difference	
<b>A. CURRENT TRANSACTIONS</b>				<b>A. TEKUĆE TRANZAKCIJE</b>
Total	50,094	56,608	- 6,514	Ukupno
Exports, Imports	28,178	47,265	-19,087	Isvos, uvos
Transportation, Insurance and other Services	4,132	3,035	+ 1,097	Transport, osiguranje i dru- ge usluge
Interests	165	2,044	- 1,879	Kamate
Non-Commodity Incomings and Outgoings	17,619	4,156	+13,463	Narobni priliv i odliv
Other	--	108	- 108	Ostalo
	manj- enje Decrease	pove- ćanje Increase	razlika Difference	
<b>B. FOREIGN EXCHANGE RESERVES</b>				<b>B. KUPITNJE DEVIZNIH REZERVI</b>
Total	155	712	+ 557	Ukupno
Clearing Liabilities	17	--	- 17	Klirinška potraživanja
Free Foreign Exchange	--	712	+ 712	Slobodne devise
Effective Foreign Currency	138	--	- 138	Efektivna valuta
	sredstva Resources Inflow	plaćanja Payments Outflow	razlika Difference	
<b>C. FINANCIAL SETTLEMENT WITH FOREIGN COUNTRIES</b>				<b>C. FINANSIJSKI OBRACUN S INOSTRAJSTVO</b>
Total	22,403	22,403	--	Ukupno
Deficit or excess of the Balance of Payments	--	6,514	-6,514	Deficit ili suficit platnog bilansa
Decrease resp. Increase of Foreign Exchange Reserves	--	557	- 557	Smanjenje odnosno povećanje deviznih rezervi
Increase resp. Decrease of Clearing Liabilities	--	-18	- 18	Povećanje odnosno smanje klirinških zaduženja
Reparation and Compensation of Claims	5		+ 5	Reparacije i naknade potra- živanja
Loans and Credits	21,100	15,340	+5,760	Sajmovi i krediti
Cover for Letters of Credit	328	-26	+ 354	Pokriće po akreditivima
Purchase and Sale of Gold	--	--	--	Kupovina i prodaja zlata
Purchase and Sale of Securities	--	--	--	
Other	970	--	+ 970	Ostala

Source: SFRJ Stat. YRBK 72

BRUTO-INVESTICIJE U OSNOVNE FONDOVE  
u milionima dinara

GROSS FIXED CAPITAL FORMATION  
million dinars

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
<b>IZVOCI SREDSTAVA</b> <b>SOURCE OF FINANCE</b>											
Total	9,362	11,660	13,331	15,848	20,378	21,788	25,220	24,592	30,210	33,942	44,577
Investor's Funds Of Economic Orgns. Of Admin. & Non- Prod. Institutions	1,385	1,546	3,040	3,115	3,734	4,158	7,008	5,881	7,095	6,944	8,859
Out of Depreciation	442	852	940	981	1,172	1,480	1,377	941	1,483	1,867	2,400
Out of Investment	1,389	1,560	540	852	982	1,127	1,005	...	...	...	...
Bank Funds	85	92	359	1,326	5,904	7,006	8,731	8,928	11,859	14,346	19,659
Out of Funds for Invest. of Federat. and of other Socio- Political Communities/ Republics, Provinces, Communes/ From other Funds of Soc.-Political Comm./ Federat. Republics, Provinces & Communes/ Out of Budget	4,574	5,580	6,092	6,218	4,789	3,399	739	1,784	2,388	2,858	3,584
Appropriations Out of Accumulation of Individ. Producers & Savings of Population	355	582	924	1,718	1,720	1,267	1,668	1,442	1,345	1,410	2,015
	502	488	336	318	375	451	335	272	322	317	373
	630	960	1,100	1,320	1,720	2,900	4,357	5,344	5,718	6,200	7,687
<b>REPONZILA</b> <b>DISTRIBUTION</b>											
Total	9,362	11,660	13,331	15,848	20,378	21,788	25,220	24,592	30,210	33,942	44,577
Constructional Works Equipment with Assblg. Miscellaneous and Undistributed	4,872	6,360	7,203	8,436	11,055	12,142	14,136	14,335	17,873	20,586	25,876
	3,530	4,050	4,547	5,281	6,815	6,895	7,790	6,802	8,632	9,180	12,776
	960	1,250	1,581	2,131	2,508	2,751	3,294	3,455	3,705	4,176	5,925

Source: SFRJ Stat. YEAR 72

DISTRIBUTION OF NATIONAL INCOME (1970) - Million Dinars

	Ukupno	Industrija	Poljoprivreda	Šumarstvo	Gradjevinarstvo	Saobraćaj	Trgovina	Zanatstvo (prijemni dio)	Komunalna djelatnost (prijemni dio)
	Total	Manuf. Mining Quarrying	Agri-Culture	Forestry	Construction	Transport	Trade	Arts & Crafts (Prod. Part)	Publ. Utility (Prod. Part)
National Income	142,835,0	48,147,3	29,487,7	1,914,0	13,458,1	11,282,5	29,182,6	8,203,6	1,159,2
Social Sector	114,874,2	48,147,3	8,405,4	1,914,0	10,920,4	10,640,6	28,560,2	5,127,1	1,159,2
Total Pers. Incomes & Pers. Receipts	47,553,5	21,154,2	3,868,8	982,6	5,687,9	5,425,2	7,353,6	2,600,8	480,4
Net Pers. Incomes	43,510,4	19,785,7	3,615,5	903,4	4,863,9	4,762,6	6,791,5	2,334,1	453,7
Pers. Receipts Charged to Material Costs	4,043,1	1,368,4	252,3	79,2	824,0	662,6	562,1	266,7	26,7
Accumul. & Funds in the Social Sector	67,320,7	26,993,2	4,536,6	931,4	5,232,4	5,215,4	21,206,6	2,526,3	678,9
Turnover Tax	13,370,1	2,733,8	406,2	13,3	39,6	63,9	9,885,1	223,1	5,1
Contribution on Personal Incomes	20,284,4	9,254,7	1,687,8	411,1	2,259,9	2,170,9	3,192,8	1,092,3	214,9
Interests on Business Funds & Credits, Insur. Premiums and other	19,176,6	8,945,2	1,761,2	188,3	1,461,4	2,095,0	4,049,8	510,0	165,5
Allocats. for Funds of Economic Orgns. Private Sector	14,489,6	6,059,4	681,3	318,6	1,471,6	885,7	4,078,8	700,9	293,4
Net Pers. Incomes of Priv. Producers	27,960,8	-	21,082,3	-	2,537,7	641,9	622,4	3,076,5	-
Taxes, Contr. & Accum. of Priv. Producers	23,244,7	-	18,011,2	-	2,185,8	415,9	372,7	2,259,1	-
	4,716,1	-	3,071,1	-	351,9	226,0	249,7	817,4	-

Source: SFRJ Stat. YR8K 72

Narodni dohodak  
Društveni sektor  
Ukupno lični dohoci  
i lična primanja  
Neto lični dohoci  
Lična primanja iz  
maretijalnih troškova  
Višak proizvoda u  
društvenom sektoru  
Porez na promet  
Doprinos iz ličnih  
dohodaka  
Kamata na poslovni fond i  
kredite, premije osiguranja i dr.  
Izdavanja za fondove radnih  
privrednih organizacija  
Privatni sektor  
Sredstva privatnih proizvođača  
Porezi, doprinosi i akumulacija  
privrednih proizvođača

**STATISTIČKI PREGLED EKONOMSKIH ORGANIZACIJA**

**INTEGRATED ECONOMIC ORGANIZATIONS**

	Svega	Indus-	Poljo-	Šumar-	Grade-	Suo-	Trgovina	Zanat-	Uslu-	1968
		trija i rudar-	pri-	stvo	vinar-	brada]	i ugostit-	stvo	govina	
		stvo	vrsta		stvo		taljstvo		delat-	1969
									nost	1970
										1971
		Manuf.								
	All	Mining & Quarrying	Agric.	Forest.	Constr.	Transp.	Trade & Catering	Arts & Crafts	Public Utility	
1968	366	28	137	1	10	16	28	60	16	1968
1969	498	73	161	4	9	17	166	60	28	1969
1970	789	144	270	16	16	13	201	89	40	1970
1971	882	106	147	17	8	11	186	87	22	1971
<b>MODE OF INTEGRATION</b>										
Merged	60	7	9	-	1	-	23	4	6	<b>NAČIN INTEGRACIJE</b>
Attached	632	98	138	17	7	11	162	83	16	Spojane
Structure of										Pripojane
Merged	6,6	6,7	6,1	-	12,6	-	12,4	4,6	27,3	Struktura
Attached	91,4	93,3	93,9	100	87,6	100	87,6	96,4	72,7	Spojenih
<b>INTEGRATION WITH THE ORGANIZATIONS</b>										
Within a Commune	262	26	73	1	6	6	80	62	19	<b>INTEGRACIJA IZVRŠENA S ORGANIZACIJAMA</b>
On the Territory of Neighbouring Communes	86	20	26	1	1	-	23	13	1	U okviru opštine
Within Republics	206	49	44	16	2	2	73	19	2	Na području susednih opština
Within more than one Republic	29	10	4	-	-	3	9	3	-	Unutar republike
Structure of										U okviru više republika
Within a Commune	46,0	84,8	49,7	8,9	62,6	64,6	43,2	89,8	86,4	Struktura
On the Territory of Neighbouring Communes	14,6	19,0	17,7	8,9	12,6	-	12,4	16,0	4,5	U okviru opštine
Within Republics	36,4	46,7	29,9	88,2	26,0	18,2	39,6	21,8	9,1	Na području susednih opština
Within more than one Republic	6,0	9,6	2,7	-	-	27,3	4,9	3,4	-	Unutar republike
<b>INTEGRATION WITH THE ORGANIZATIONS</b>										
Same Group of Activity	90	24	24	-	1	2	28	2	9	<b>INTEGRACIJA IZVRŠENA S ORGANIZACIJAMA</b>
Same Branch of Activ.	103	20	44	-	1	-	24	8	6	Iste grupe delatnosti
Same Kind of Activity	119	10	6	-	-	3	88	7	6	Iste grane delatnosti
Different Kinds of Activity	270	61	73	17	6	6	46	70	2	Iste vrste delatnosti
Structure of										Raznih vrsta delatnosti
Same Group of Activity	16,6	22,9	16,3	-	12,6	18,2	16,1	2,3	40,9	Struktura
Same Branch of Activ.	17,7	19,0	29,9	-	12,6	-	13,0	9,2	27,3	Iste grupe delatnosti
Same Kind of Activity	20,4	9,6	4,1	-	-	27,3	47,6	8,0	22,7	Iste grane delatnosti
Different Kinds of Activity	46,4	48,6	49,7	100	76,0	64,6	24,3	80,6	9,1	Iste vrste delatnosti
<b>NOS. EMPLOYED IN INTEGRATED ORGANIZAT.</b>										
Under 10 Workers	49	1	12	1	2	-	19	13	1	<b>BRDJE ZAPOSLENIH U INTEGRISANIM ORGANIZACIJAMA</b>
11 - 25	62	4	23	1	-	1	14	12	7	Do 10 radnika
26 - 50	92	4	36	1	1	5	32	11	3	11 - 25
51 - 125	134	13	41	-	1	2	47	22	6	26 - 50
126 - 250	88	28	13	1	1	1	29	16	-	51 - 125
251 - 500	64	26	10	3	1	1	21	2	-	126 - 250
501 - 1000	31	16	7	6	-	-	3	-	-	251 - 500
1001 workers and over	16	6	2	6	-	-	-	-	-	501 - 1000
										1001 i više radnika

Source: SFRJ Stat. YRBK 72



Petrošnja materijalnih dobara i izdaci za proizvodne usluge  
Po nameni i izvorima snabdevanja - u milionima dinara

**PERSONAL CONSUMPTION OF HOUSEHOLDS -  
Consumption of Material Goods and Outlays for Productive Services -  
By End Use and Origin of Purchase - Million Dinars.**

	1970	1970	1970	Personal Effects & Other	1970
Consumption in Kind	86,859	2,270	Obuća	2,691	Lični predmeti i drugi
Naturalna potrošnja	10,522	38	Naturalna potrošnja	1,515	Trgovina na malo
Trgovina na malo	56,599	2,074	Trgovina na malo	942	Ugostiteljstvo
Seljačka pijaca	4,834	151	Zanatstvo	117	Zanatstvo
Ugostiteljstvo	6,830	7	Uvoz	117	Uvoz
Social Welfare	2,502	8,516	Nameštaj i oprema za domaćinstvo	795	minus potrošnje stranih turista
Bolnice i socijalno Znanstvo	1,892	198	Naturalna potrošnja	86,064	Potrošnja domaćih stanovništva
Saobraćaj i PTT usluge	2,460	7,726	Trgovina na malo		
Uvoz	1,220	125	Seljačka pijaca		
Neraspoređeno po nameni	-	346	Zanatstvo		
Ishrana	34,465	121	Uvoz		
Naturalna potrošnja	8,502	5,089	Ogrev, osvetljenje i održavanje stana		
Trgovina na malo	18,169	652	Naturalna potrošnja		
Seljačka pijaca	3,937	4,050	Trgovina na malo		
Ugostiteljstvo	2,850	170	Seljačka pijaca		
Ishrana u bolnicama	697	217	Zanatstvo		
Zanatstvo	310	3,424	Higijena i zdravlje		
Uvoz	6,117	1,055	Trgovina na malo		
Piće	810	529	Apoteke (gotovinski pro met lekova)		
Naturalna potrošnja	2,158	1,805	Socijalno osiguranje (Apoteke, bolnice)		
Trgovina na malo	520	35	Zanatstvo		
Seljačka pijaca	2,605	3,358	Kultura i razonoda		
Ugostiteljstvo	24	3,111	Trgovina na malo		
Zanatstvo	3,307	187	Zanatstvo		
Duvan	24	60	Uvoz		
Naturalna potrošnja	2,837	8,061	Saobraćaj i vrze		
Trgovina na malo	13	4,514	Trgovina na malo		
Seljačka pijaca	433	227	Zanatstvo		
Ugostiteljstvo	9,561	2,460	Saobraćajne i PTT usluge		
Odeća	298	860	Uvoz		
Naturalna potrošnja	8,861	8,061	Saobraćaj i vrze		
Trgovina na malo	69	4,514	Trgovina na malo		
Seljačka pijaca	278	227	Zanatstvo		
Zanatstvo	55	2,460	Saobraćajne i PTT usluge		
Uvoz		860	Uvoz		

Source: SFRJ Stat. YRBK 72

**SECTION 1**

Potrošnja materijalnih dobara i izdaci za proizvodne usluge  
Po nameni i izvorima snabdevanja - u milionima dinara

**PERSONAL CONSUMPTION OF HOUSEHOLDS -  
Consumption of Material Goods and Outlays for Productive Services -  
By End Use and Origin of Purchase - Million Dinars.**

	1970	1970	1970	1970	Personal Effects & Other
<b>Total</b>	<b>86,859</b>	<b>Ukupno</b>	<b>2,270</b>	<b>Obuća</b>	<b>2,691</b>
Consumption in Kind	10,522	Naturalna potrošnja	38	Naturalna potrošnja	1,515
Retail Trade	56,599	Trgovina na malo	2,074	Trgovina na malo	942
Open Market	4,834	Seljačka pijaca	151	Zanatsrvo	117
Catering	6,830	Ugostiteljstvo	7	Uvoz	117
Hospital & Social Welfare	2,502	Bolnice i socijalno	8,516	Nameštaj i oprema za	795
Arts & Crafts	1,892	Zanastvo		domaćinstvo	
Transport and PTT Services	2,460	Sabračaj i PTT usluge			
Imports	1,220	Uvoz			
Undistributed by End Use	-	Verasporedjeno po nameni			
Food	34,465	Ishrana	198	Naturalna potrošnja	
Consumption in Kind	8,502	Naturalna potrošnja	7,726	Trgovina na malo	
Retail Trade	18,169	Trgovina na malo	125	Seljačka pijaca	
Open Market	3,937	Seljačka pijaca	346	Zanastvo	
Catering	2,850	Ugostiteljstvo	121	Uvoz	
Food in Hospitals	697	Ishrana u bolnicama	5,089	Ogrev, osvetljenje i	
Arts & Crafts	310	Zanastvo		održavanje stana	
Beverages	6,117	Piće			
Consumption in Kind	810	Naturalna potrošnja	652	Naturalna potrošnja	
Retail Trade	2,158	Trgovina na malo	4,050	Trgovina na malo	
Open Market	520	Seljačka pijaca	170	Seljačka pijaca	
Catering	2,605	Ugostiteljstvo	217	Zanastvo	
Arts & Crafts	24	Zanastvo			
Tobacco	3,307	Duvan	3,424	Higijena i zdravlje	
Consumption in Kind	24	Naturalna potrošnja	1,055	Trgovina na malo	
Retail Trade	2,837	Trgovina na malo	529	Apoteke (gotovinski pro	
Open Market	13	Seljačka pijaca		met lekova)	
Catering	433	Ugostiteljstvo	1,805	Socijalno osiguranje	
Clothing	9,561	Odeća	35	(Apoteke, bolnice)	
Consumption in Kind	298	Naturalna potrošnja	3,358	Zanastvo	
Retail Trade	8,861	Trgovina na malo	3,111	Kultura i razonoda	
Open Market	69	Seljačka pijaca	187	Trgovina na malo	
Arts & Crafts	278	Zanastvo	60	Zanastvo	
Imports	55	Uvoz		Uvoz	
Consumption in Kind	8,061	Naturalna potrošnja	8,061	Sabračaj i vrze	
Retail Trade	4,514	Trgovina na malo	4,514	Trgovina na malo	
Open Market	69	Seljačka pijaca	227	Zanastvo	
Arts & Crafts	278	Zanastvo	2,460	Sabračajne i PTT usluge	
Imports	55	Uvoz	860	Uvoz	

Source: SFRJ Stat. YR.

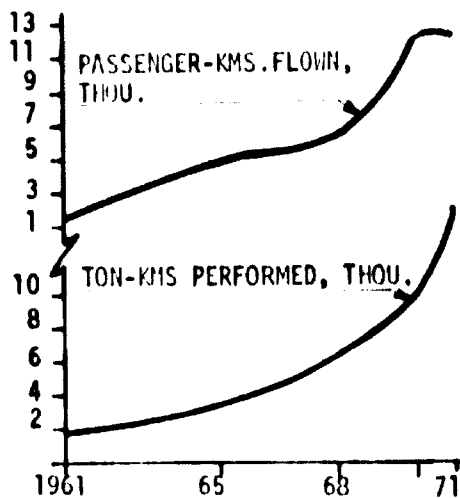
DRUMSKA MOTORNA PREGOZNA SREDSTVA

ROAD MOTOR VEHICLES

	Putnički automobili	Teretni automobili			
	Passenger Cars	Trucks/ Lorries			
1961	75,587	32,389	1961		
1962	97,942	37,703	1962		
1963	112,534	42,574	1963		
1964	141,792	48,902	1964		
1965	187,842	58,575	1965		
1966	Total	253,344	70,115	1966	Ukupno
	Social Sector of Ownership	47,819	54,096		Društvena
	Private Sector of Ownership	205,525	16,019		Privatna
1967	Total	355,875	85,641	1967	Ukupno
	Social Sector of Ownership	40,275	58,728		Društvena
	Private Sector of Ownership	315,600	26,913		Privatna
1968	Total	439,892	90,555	1968	Ukupno
	Social Sector of Ownership	40,293	61,121		Društvena
	Private Sector of Ownership	399,599	29,434		Privatna
1969	Total	562,509	95,318	1969	Ukupno
	Social Sector of Ownership	41,973	66,011		Društvena
	Private Sector of Ownership	520,536	29,307		Privatna
1970	Total	720,874	107,287	1970	Ukupno
	Social Sector of Ownership	47,098	75,321		Društvena
	Private Sector of Ownership	673,776	31,966		Privatna
1971	Total	875,365	122,105	1971	Ukupno
	Social Sector of Ownership	52,287	84,000		Društvena
	Private Sector of Ownership	823,078	38,105		Privatna

Source: SFRJ Stat. YRBK 72

AIRCRAFT, PASSENGER & CARGO  
TRANSPORT



Source: SFRJ Stat. YRBK 72



CANES (INDUSTRIAL) LINE16. PROCESSING COST SENSITIVITY

ITEM (1)	Stage 1		Stage 2		Stage 3	
	ITEM CHANGE (%)		ITEM CHANGE (%)		ITEM CHANGE (%)	
	± 10%	± 20%	± 10%	± 20%	± 10%	± 20%
LEADS TO CHANGE IN PROCESSING COST/UNIT (%)						
Packing Material	3.3	6.6	6.4	0.9	5.5	11.0
Utilities	0.1	0.3	0.1	0.3	0.2	0.4
Direct Labor	0.6	1.0	0.4	0.7	0.2	0.4
Overhead Share	3.7	7.4	3.2	6.3	2.0	5.5
Amortization	2.3	4.7	1.9	3.8	1.3	2.7

(1) Changes of different levels in different items may be calculated by addition of the appropriate percentages.

1.0. ORGANISASI KEJURUTERAAN

**1971 AND AGRICULTURAL POPULATION - 1971**

**Agricultural Population according to Size of Holdings in Dist. I.Vers.**

**Agricultural Population**

**Total Population**

	All	Total Population		Agricultural Population		Agricultural Population according to Size of Holdings in Dist. I.Vers.								
		Active	Male	Dependent	No.	%	Active	Dependent	Less than 0.10	0.11-1.00	1.01-3.00	3.01-5.00	5.01-10.00	More than 10 ha.
1. Banja Luka	158,736	60,857	8,444	89,435	44,299	28	20,805	23,494	1,594	2,567	12,248	11,593	13,282	2,705
2. Bos. Dubica	30,384	14,798	1,699	13,887	18,081	60	10,575	7,505	553	546	3,465	5,006	7,547	701
3. Bos. Gradiška	53,581	25,157	1,676	26,748	33,879	63	17,993	15,886	2,125	2,076	7,367	8,402	12,060	1,532
4. Bos. Novi	41,216	15,595	1,756	23,865	19,774	48	8,984	10,790	346	873	4,013	4,706	7,700	1,959
5. Celinac	17,430	7,087	180	10,163	9,758	56	4,869	4,889	107	334	2,327	2,888	3,320	673
6. Jajce	35,002	12,046	1,448	15,508	11,624	33	5,825	5,799	482	1,753	4,039	2,485	2,307	498
7. Ključ	39,966	13,951	1,418	24,597	17,878	45	8,723	9,155	661	1,605	6,623	4,468	3,942	441
8. Kotor Varoš	32,832	12,289	630	19,910	20,340	62	9,254	11,086	466	1,272	5,372	5,146	6,066	1,918
9. Laktaši	25,997	12,551	424	13,022	19,094	73	9,901	9,193	637	834	4,762	5,056	6,887	982
10. Mrkonjić Grad	30,159	13,402	663	16,094	18,512	61	9,764	8,748	306	890	4,365	4,726	6,218	1,859
11. Prijedor	97,894	34,015	4,591	59,288	32,261	34	16,463	16,798	1,249	3,174	10,474	8,958	8,499	712
12. Prnjavor	46,734	21,002	726	25,006	35,203	75	17,650	17,553	647	1,477	8,137	10,286	13,294	1,114
13. Skender Vakuf	21,419	8,900	202	12,317	16,410	77	7,234	9,176	205	495	3,337	3,775	5,642	2,773
14. Sanski Most	62,102	21,086	1,833	39,174	32,686	51	13,725	17,961	928	2,672	10,691	8,102	7,936	1,155
15. Srbac	21,226	10,324	495	10,411	16,889	80	8,940	7,968	740	1,493	4,837	4,348	4,733	608
<b>Total</b>	<b>714,678</b>	<b>283,069</b>	<b>26,181</b>	<b>405,438</b>	<b>346,889</b>	<b>49</b>	<b>170,705</b>	<b>175,984</b>	<b>11,686</b>	<b>22,881</b>	<b>92,867</b>	<b>89,945</b>	<b>109,232</b>	<b>19,623</b>

Source: Inst. Stat. S.L.

ECONOMICALLY ACTIVE AND DEPENDENT POPULATION - 1971

Commune	Active	Dependent
1. Banja Luka	69,301	89,436
2. Bos. Dubica	16,497	13,887
3. Bos. Gradiška	26,833	26,748
4. Bos. Novi	17,361	23,865
5. Čelinac	7,267	10,163
6. Jajce	13,494	21,508
7. Ključ	15,369	24,597
8. Kotor Varoš	12,919	19,913
9. Laktaši	12,975	19,022
10. Mrkonjić Grad	14,065	16,094
11. Prijedor	38,606	59,288
12. Prnjavor	21,728	25,005
13. Skender Vakuf	9,102	12,317
14. Sanski Most	22,988	39,174
15. Srbac	10,815	10,411
Total	309,260	405,428

Source: Inst. Stat. B.L.

TOTAL INCOME DIVISION (NAT. INCOME ACCOUNT) - 1979  
(Mill. Dinars)

Commune	Total	A c t i v i t y				
		Sec. Sector (Out of Total)	Manufy. Mining & Quarrying	Agriculture & Forestry Total	Priv. Sector (Out of Total)	Trade & Catering
1. Banja Luka	1,243.0	1,072.6	247.9	104.9	90.5	380.5
2. Bos. Dubica	89.0	52.3	24.7	35.7	28.8	15.0
3. Bos. Gradiška	313.0	163.2	63.6	134.9	114.1	51.1
4. Bos. Novi	147.8	97.2	51.2	46.6	42.4	29.6
5. Čelinac	84.8	23.5	5.4	30.4	23.0	5.9
6. Jajce	183.4	152.5	90.7	35.8	25.3	28.1
7. Ključ	137.1	88.5	22.3	74.8	40.7	21.6
8. Kotor Varoš	58.0	32.1	4.1	33.1	21.0	12.7
9. Laktaši	83.1	18.4	0.9	50.5	47.7	13.6
10. Mrkonjić Grad	112.4	55.7	18.9	57.7	49.0	13.9
11. Prijedor	467.6	342.4	168.0	103.5	94.3	94.2
12. Prnjavor	100.4	45.5	12.3	48.2	45.3	20.8
13. Sanski Most	188.2	116.9	51.5	75.3	57.8	31.5
14. Skender V.	36.6	12.2	4.0	24.8	22.0	4.1
15. Srbac	53.2	22.9	0.5	33.8	24.8	11.9
Total	3,269.4	2,295.9	766.0	890.0	726.7	734.5
B & H	17,316	13,408	5,772	3,232	2,996	3,515
S.F.R.J.	142,837	114,874	47,056	26,235	21,082	34,002

Source: SFRJ Stat. YRBK 72



2. YUGOSLAVIA-FOODPROCESSING INDUSTRY

DRUŠTVENI PROIZVOD I MATERIJALNI TROŠKOVI U 1971  
Po klasici delatnosti

SOCIAL/GROSS NATIONAL/PRODUCT AND MATERIAL COSTS IN 1971  
By Organizational Principle - Million Dinars

Društveni i priv.- lasni	Amortizacija	vred- nost	Nacionalni dohodak vredni proizvodi		Materijal- ni troškovi
			neto do- hod	prema so- pomeni	

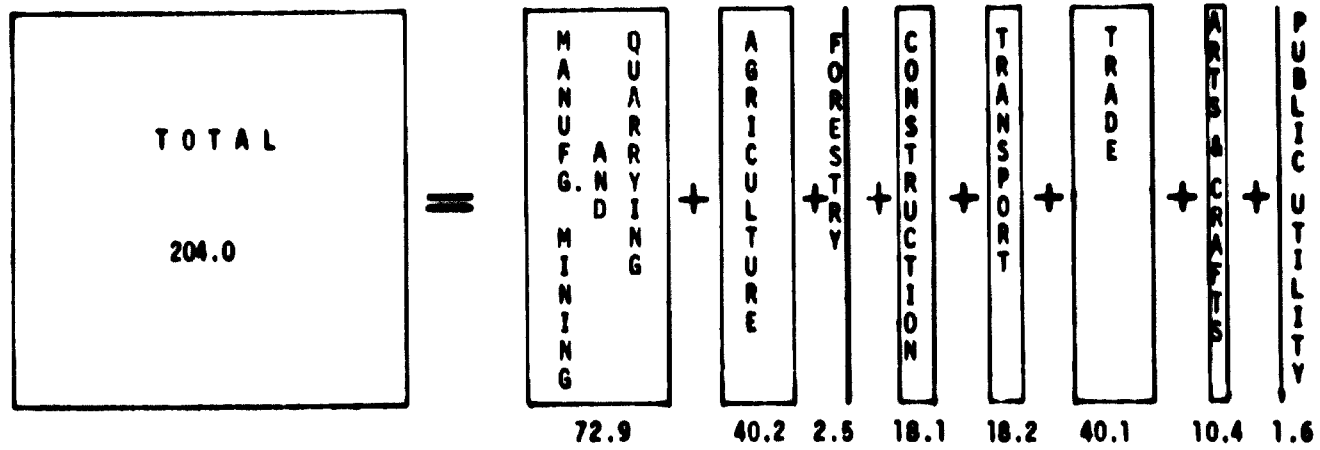
National Income

Accumulation & Funds

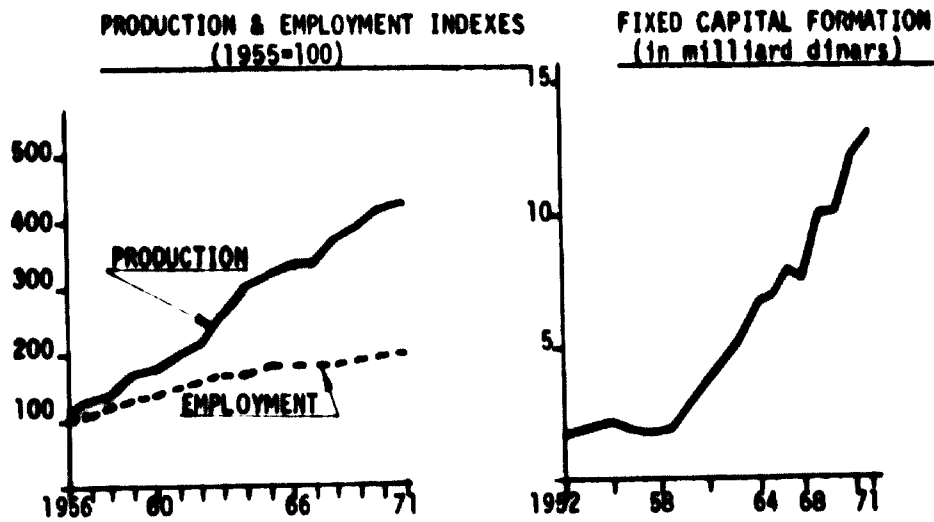
Social Gross National Product	Depreciation	Total	Net Personal Income	Accumulation & Funds		Material Costs
				ATI	Turnover Tax	
Total Economy	206,000,2	106,029,5	89,504,1	96,206,4	17,010,6	207,067,7
Social Sector	100,506,5	151,423,7	61,400,5	80,905,2	17,010,6	101,460,0
Private Sector	35,543,7	34,405,8	28,103,6	6,300,2	...	26,407,7
Manufacturing, Mining and Quarrying	71,200,1	62,016,2	27,620,3	34,387,9	1,532,3	137,056,0
Food Manufacturing Industries	6,670,1	5,004,4	2,506,9	3,327,5	154,0	27,030,3
Agriculture and Fisheries	35,207,6	33,553,9	24,947,6	8,606,3	70,3	27,513,7
Social Sector Private Sector	9,302,0 26,805,6	7,465,6 26,088,3	3,220,4 21,727,2	4,206,2 4,361,1	70,3 ...	10,157,8 17,355,9

Source: SFRJ Stat. Year 72

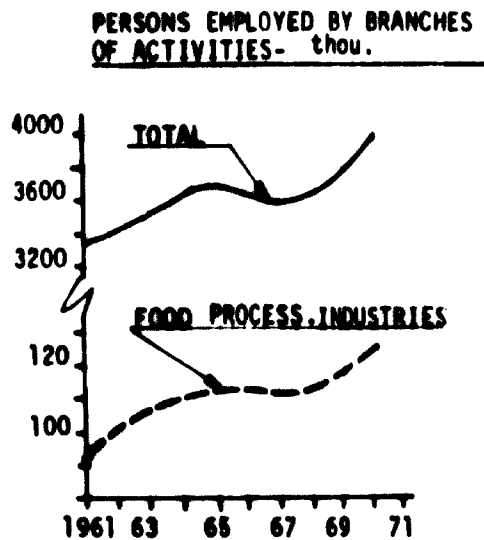
(Thousand Millions)



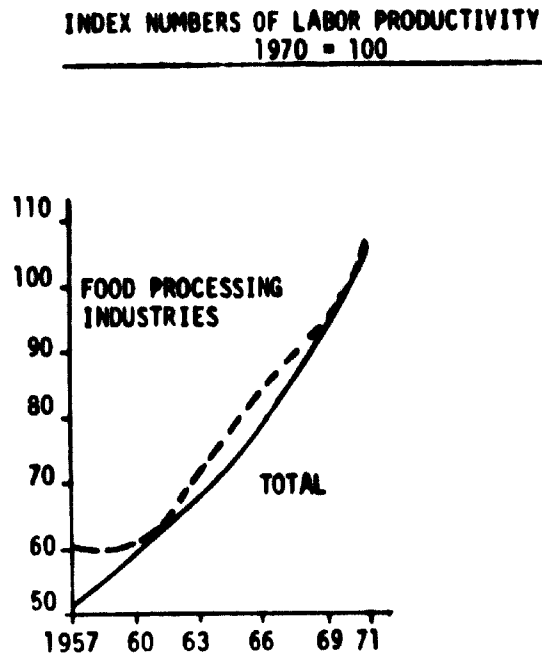
Source: SFRJ Stat. YRBK 72



Source: SFRJ Stat. YRBK 72



Source: SFRJ Stat. YRBK 72



Source: SFRJ Stat. YRBK 72

AKTIVNA I OD NJIH IZDRŽAVANA LICA PRÉMA  
1961.

ZANIMANJU I DELATNOSTI PO POPISIMA.

ECONOMICALLY ACTIVE PERSONS AND THEIR DEPENDENTS ACCORDING TO OCCUPATION AND INDUSTRY  
BY THE CENSUS OF 1961 (Latest available for the breakdown)

	Sve ga All	Akti- vna Active	Izdržavana Dependents	
TOTAL	17,400,142	8,340,400	9,059,742	UKUPNO
OCCUPATION				ZANIMANJE
Farmers, Fishermen and Forestry Workers	9,173,483	4,731,389	4,442,094	Pojoprivrednici, ribari i šumski radnici
Miners, Production- Process Workers and Craft Workers	4,059,823	1,733,448	2,326,375	Rudari, industrijski i zanatski radnici
Workers in Transport	604,443	209,220	395,223	Saobraćajno osoblje
Sales Workers	538,041	225,517	312,524	Trgovinsko osoblje
Service Workers	715,611	352,907	362,704	Osoblje usluga
Other Persons	2,181,126	1,016,026	1,165,100	Ostala lica
Unknown	127,615	71,893	55,722	Nepoznato
ACTIVITY SECTOR				DELATNOST
Mining	451,949	144,673	307,276	Rudarstvo
Manufacturing	2,191,256	993,175	1,198,081	Industrija
Agriculture	9,169,764	4,674,856	4,494,908	Poljoprivreda
Forestry	228,424	73,268	155,156	Šumarstvo
Construction	845,570	317,525	528,045	Gradjevinarstvo
Transport	703,761	249,698	454,063	Saobraćaj
Trade	496,512	226,013	270,499	Trgovina
Catering	169,510	84,404	85,106	Ugostiteljstvo
Arts and Crafts	850,919	378,908	472,011	Zanatstvo
Personal Services	54,814	27,783	27,031	Lične usluge
Public Utilities	208,519	78,174	130,345	Komunalne delatnosti
Government and Administr. of Justice	400,138	182,130	287,008	Državna uprava i pravosudje
Culture-Education and Science	392,956	212,459	180,497	Kulturno-prosvetna i naučna del.
Public Health and Social Welfare	254,217	142,826	111,391	Zdravstvena i socijalna delat.
Banking and Insurance	69,173	39,397	29,776	Bankarstvo i osiguranje
Other Industries	306,793	135,011	171,782	Ostale delatnosti
Off Industry	310,428	203,318	107,110	Van delatnosti
Unknown	226,439	176,782	49,657	Nepoznato

Source: SFRJ Stat.YRBK 72.

Godišnji proseak na 1 zaposlenog - u časovima

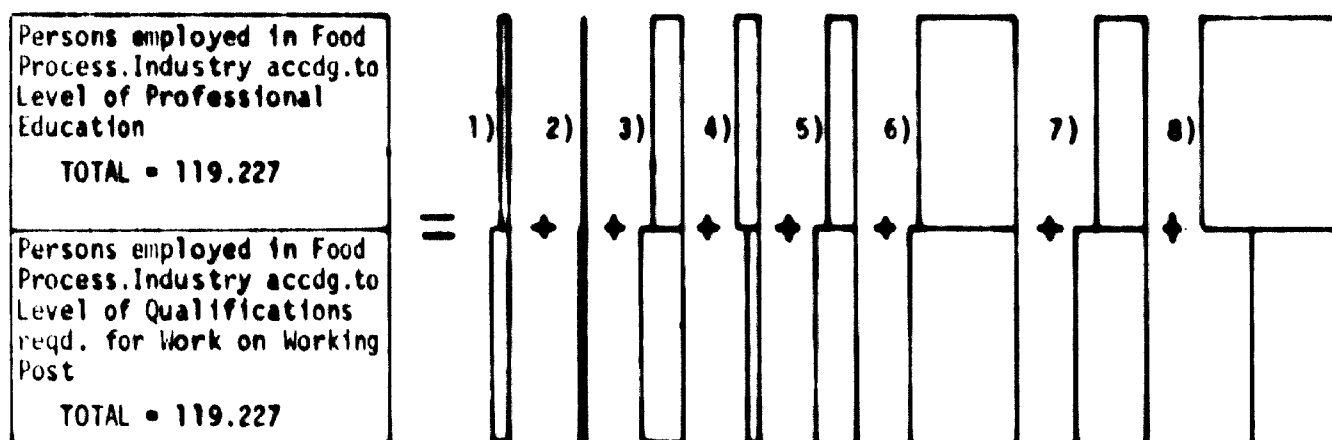
UTILIZATION OF HOURS OF WORK IN ENTERPRISES AND INSTITUTIONS 1970

Annual Average Per One Person Employed - Hours

	Ukupno Total	efektivno iskorišćeni Hours Utilized Effectively	
Total	2,249	1,842	Ukupno
Economic Activities	2,257	1,844	Privreda
Manufacturing, Mining & Quarrying	2,263	1,816	Industrija i rudarstvo
Agriculture and Fisheries	2,255	1,839	Poljoprivreda i ribarstvo
Forestry	2,193	1,805	Šumarstvo
Construction	2,285	1,831	Gradjevinarstvo
Transport and Communications	2,300	1,848	Saobraćaj i veze
Trade & Catering	2,219	1,805	Trgovina i ugostiteljstvo
Arts & Crafts	2,232	1,854	Umjetstvo
Housing & Public Utility	2,231	1,851	Stambena i komunalna delatnost
Non-Economic Activities	2,212	1,837	Napredna
Cultural and Social Activity	2,223	1,821	Kulturna i socijalna delatnost
Social & Government Services	2,185	1,873	Društvene i državne službe

Source: SFRJ Stat. YRBK 72

DEGREE OF EDUCATION



- |  |                          |
|--|--------------------------|
| 1) High Level of Professional Qualifications   | 5) Highly Skilled Worker |
| 2) Higher Level of Professional Qualifications | 6) Skilled Worker        |
| 3) Secondary Level of Prof. Qualifications     | 7) Semi-Skilled Worker   |
| 4) Lower Level of Prof. Qualifications         | 8) Unskilled Worker      |

BASIC DATA ON ECONOMIC ORGANIZATIONS OF THE SOCIAL SECTOR IN 1971 - Value Data in Million Dinars

	Aktivna osnovna sredstva 31.XII 1971.				Broj privrednih organizacija	Broj zaposlenih (god. pros. broj)	Ukupno nabavna vrednost	Sredstva zajednice po osnovi sredstva	Vrednost ulaganja u proizvodnju	Vrednost ulaganja u proizvodnju
	Ukupno nabavna vrednost	Ukupno nabavna vrednost	Ukupno nabavna vrednost	Ukupno nabavna vrednost						
<b>ECONOMY, TOTAL</b>	11,101	3,270,290	360,020,3	210,622,0	155,808,0	70,997,2	4,238,5	399,966,5	181,460,0	168,506,5
Manufacturing, Mining and Quarrying	2,393	1,532,911	175,780,5	103,088,7	85,258,5	38,968,2	2,437,2	182,449,1	109,524,1	72,925,0
Food Manufact. Industries	192	100,816	9,770,8	6,395,8	4,727,1	2,546,2	126,0	19,555,7	14,338,7	5,217,1
Agriculture & Fisheries	1,908	291,360	33,722,5	22,695,0	10,673,1	5,474,3	613,4	31,725,8	18,389,1	13,336,6
Agric.-Industr. Comb. Establishments & Farms	254	185,071	19,635,1	13,211,6	7,438,5	3,783,1	363,0	22,628,0	14,146,2	8,481,8
Peasant Working co-operatives	10	1,432	145,8	116,6	54,7	38,6	2,1	127,8	70,0	57,7
Agricultural co-operatives	964	62,493	4,088,8	2,746,9	1,695,6	914,7	192,8	5,262,1	2,460,7	2,801,4
Other Agricult. organizations	553	10,676	749,9	396,5	247,8	116,6	25,4	1,224,1	719,1	505,0
Fisheries	40	2,305	173,8	115,4	59,4	26,9	2,6	168,4	56,7	111,6
Water Economy	87	29,383	8,929,1	6,108,2	1,177,2	594,5	27,5	2,315,5	936,4	1,379,1

Active Fixed Assets at 31/12/1969

	Total		Equipment		Assets of Collective Consumpt. at 31/12/1969	Social-Gross Product (Gross Turnover)	Value of Material and Raw Materials Consumed Purchased Outside Economic Organizat.
	Purchase Value	Actual Value	Purchase Value	Actual Value			
<b>ECONOMY, TOTAL</b>	360,020,3	210,622,0	155,808,0	70,997,2	4,238,5	399,966,5	181,460,0
Manufacturing, Mining and Quarrying	175,780,5	103,088,7	85,258,5	38,968,2	2,437,2	182,449,1	109,524,1
Food Manufact. Industries	9,770,8	6,395,8	4,727,1	2,546,2	126,0	19,555,7	14,338,7
Agriculture & Fisheries	33,722,5	22,695,0	10,673,1	5,474,3	613,4	31,725,8	18,389,1
Agric.-Industr. Comb. Establishments & Farms	19,635,1	13,211,6	7,438,5	3,783,1	363,0	22,628,0	14,146,2
Peasant Working co-operatives	145,8	116,6	54,7	38,6	2,1	127,8	70,0
Agricultural co-operatives	4,088,8	2,746,9	1,695,6	914,7	192,8	5,262,1	2,460,7
Other Agricult. organizations	749,9	396,5	247,8	116,6	25,4	1,224,1	719,1
Fisheries	173,8	115,4	59,4	26,9	2,6	168,4	56,7
Water Economy	8,929,1	6,108,2	1,177,2	594,5	27,5	2,315,5	936,4

BASIC DATA ON ECONOMIC ORGANIZATIONS OF THE SOCIAL SECTOR IN 1971 - Value Data in Million Dinars (contd.)

	Amortizacija osnovnih sredstava	Neto-proizvod	Lični dohodci i drugi prihodi na poslovanje (neto)	Svega	depri- zacija iz ličnih prihoda	ugovorne obaveze	obaveze prema državi bez poreza na promet	zadržane obaveze bez poreza na promet	izdaci za izdvojeno neprofitno društvo			
	Depreciat. of Fixed Assets	Nett Product	Personal Incomes and other Personal Receipts (nett)	All	Contrib. Out of Personal Incomes	Contract. Obligats.	Legal Obligat. Excl. of Turnover Tax	Turnover Tax	Suspend. Compens. from Retail Price of Petrol	Expendit. Allocats. for Soc. Services of Econ. Require-Organizats.		
<b>ECONOMY, TOTAL</b>	17,082,8	151,423,7	61,498,5	89,925,2	24,415,5	10,100,0	5,518,2	17,018,6	1,414,9	5,293,5	26,164,5	<b>PRIVREDA UKUPNO</b>
Manufacturing, Mining and Quarrying	9,154,5	63,770,4	27,192,6	36,577,8	11,162,3	5,042,3	2,625,6	3,425,4	441,8	2,026,4	11,853,9	Industrija i rudarstvo
Food Manuf. Industries	533,7	4,683,4	1,853,6	2,829,7	758,7	387,5	168,5	236,2	-	207,3	1,071,4	Prehrambena industrija
Agriculture & Fisheries	1,340,9	11,995,7	5,104,8	6,890,9	2,054,5	1,184,2	438,9	546,6	5,1	489,2	2,172,3	Poljoprivreda i ribarstvo
Agric.-Industr. Comb.Establs. and Farms	967,1	7,514,7	3,179,3	5,335,4	1,297,0	936,3	300,0	211,3	2,2	330,7	1,257,8	Poljop.-industrijski kombinati i obrta
Peasant Work. co-operatives	9,5	48,3	20,1	28,1	7,7	7,0	1,1	1,2	-	2,4	8,7	Seljačke radn.zadruge
Agricultural co-operatives	187,8	2,613,5	1,041,9	1,571,6	420,2	167,8	73,5	328,8	2,3	75,1	503,8	Poljoprivredne zadruge
Other Agric. Organizations	25,9	479,1	241,7	237,3	91,8	7,1	17,3	2,5	-	11,3	107,2	Ostale poljop.organiz.
Fisheries	6,4	105,2	45,3	59,9	16,8	5,3	3,9	0,3	-	6,8	26,8	Ribarstvo
Water Economy	144,1	1,235,0	576,3	658,6	221,0	60,6	43,1	2,4	0,6	62,9	267,9	Vodoprivreda

Source: SFRJ Stat. YRBK 72

- 1) **PROPOSED ENTERPRISE:** ZITOPRODUKT
- 2) **PROPOSED LOCATION:** Prnjavor
- 3) a) **PRODUCT LINE:** SPECIALTY BREADS LINE
- b) **VARIETIES:** "Pumpernickel" bread and Westfalen bread, whole wheat bread and other types
- c) **PACKAGING:** 1/4 Kg. Cellophane Bags, possibly other packaging
- 4) **SCOPE OF PROJECT:** Addition to Existing Plant
- 5) **PLANNED OUTPUT:**

<u>Stage</u>	<u>Output</u> (Tons nett product/year)
1	250
2	750
3	2,500

- 6) **ANNUAL SALES ESTIMATES:**  
(Assumed ex-factory price obtainable at December 72 Yugoslav price levels)

<u>Stage</u>	<u>Annual Sales</u> (Mill. MD)
1	1.4
2	4.2
3	14.0

- 7) **PROCESSING SEASON:**  
Half day all year round.

8) **FACILITIES - EXISTING AND NEW:**

For Stage 1 bakery has all the equipment. Only a new steam boiler is required.

For Stage 2 a larger steam boiler is required, and the bakery has to purchase another mixer and baking pans. Additional investment in production line will be needed.

For Stage 3 a new automatic line has to be built and 500 sq.m. floor area for a new line is required. The packaging should be automatic too, and 200 sq.m. of storage will be needed.

9) **FIXED INVESTMENT ESTIMATE (Mill. MD):**

<u>Stage</u>	<u>1</u>	<u>2*</u>	<u>3*</u>
Equipment	0.425	1.600	4.250
Buildings	0	0	710
Engineering & Installation	0.340	340	1.000
Working Fixed Investment	0.765	1.940	5.960
Working Capital	0.200	0.800	2.500

\* Cumulative Total



STRUKTURA INDUSTRIJE PO GRANAMA U 1970.

STRUCTURE OF MANUFACTURING BY BRANCHES IN 1970

Zaposle- no osobl- je (godi- šnji pro- sek)	Osnov na sre- đstva	uob- raso	Društveni proizvod amortiz- acija	lična pri- manja	oporek na ličnu prijemlja cmet	ost- alo
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u milijardama dinara

S o c i a l P r o d u c t

Persons Employed (Annual Average)	Fixed Assets	Total	Depreci- ation	Personal Receipts	Contrib. on Personal Receipts	Turn- over Tax	Other
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M i l l i o n D i n a r s

Manufacturing, Mining and Quarrying	1,508,262	104,819	54,250	7,194	21,632	9,405	1,155	14,784	Industrija i industrija
Food Manufacturing Industries	133,946	9,064	5,135	574	1,956	869	147	1,509	Prehrambena industrija

Source: SFRJ Stat. YRBK 72

**INVESTMENT PUT IN OPERATION AND INVESTMENT NOT PUT IN OPERATION BY END USE  
AND THEIR ENVISAGED EFFECTS UPON PRODUCTION AND EMPLOYMENT -  
Social Sector - Value Data in Million Dinars**

End Use of Investment	Total	Value of Total Investment Put in Operation and Investment Not Put in Operation			Envisaged Effects upon Product. & Employment		
		Put in Operation Before	Put in Operation During	Not Put in Operation During	Envisaged to be Completed	Value of Annual Production	No. of New Working Posts
1967	109,545.6	13,439.3	18,797.9	21,581.9	55,726.5	41,946.5	174,370
1970	182,990.2	24,540.7	36,873.5	31,535.9	90,040.3	72,139.5	258,670
Manufacturing, Mining and Quarrying	89,316.0	10,622.4	14,344.8	18,841.0	45,507.9	56,425.3	142,682
Food Manufacturing Industries	5,953.7	508.0	1,360.0	756.7	3,328.9	5,593.5	7,657

Source: SFRJ Stat. YRBK 72

**INVESTMENT IN EQUIPMENT, NEW CAPACITIES AND MODERNIZATION OF CAPACITIES - 1970**  
(Million Dinars)

	SFRJ	Bosna i Herce- govina	Crna Gora	Hrvatska	Maka- denija	Slovenija	Srbija
<b>Equipment</b>							
Total	19,097	2,498	666	4,632	1,125	2,936	7,239
Manufg. Mining & Quarrying	9,137	1,327	395	2,090	557	1,484	3,462
Food Processing Industry	882	44	5	204	23	108	498
Agriculture* & Fisheries	947	48	8	301	86	54	450
Trade & Catering	1,377	117	34	523	52	286	367
<b>New Capacities</b>							
Total	15,267	2,982	1,107	4,834	1,153	2,098	3,148
Manufg. Mining & Quarrying	4,890	943	604	1,071	380	540	1,352
Food Processing Industry	344	18	1	154	8	75	88
Agriculture* & Fisheries	337	14	0	90	205	11	17
Trade & Catering	2,982	174	110	1,762	111	566	257
<b>Modernization of Capacities</b>							
Total	20,253	2,311	379	4,419	1,155	2,783	9,025
Manufg. Mining & Quarrying	8,890	1,174	84	2,001	369	1,378	3,884
Food Processing Industry	899	48	19	180	25	101	527
Agriculture* & Fisheries	1,188	39	10	322	114	64	639
Trade & Catering	2,060	145	36	705	92	308	695

\* Contains Soc. Sector only.

Source: SFRJ Stat. YRBK 72

**INVESTMENTS IN FIXED ASSETS DURING 1971 (BY SOURCE OF FUNDS) -**  
(Mill. Dinars)

	SFRJ	Bosna i Hercegovina	Crna Gora	Hrvatska	Republika Srbija	Slovenija	Srbija
<b>TOTAL</b>	41,441	4,898	1,617	10,141	3,110	6,964	14,711
Manufg. Mining & Quarrying	13,171	1,624	676	2,660	1,066	2,151	4,994
Food Processing Industry	877	66	6	264	54	132	355
Agriculture & Fisheries	2,703	207	28	451	575	223	1,216
Trade, Catering & Tourism	5,460	325	181	2,283	245	1,013	1,413
From Enterprises - Total	14,059	1,640	162	3,821	735	2,921	4,780
Manufg. Mining & Quarrying	4,165	492	31	1,063	103	1,120	1,357
Food Processing Industry	345	22	4	131	11	58	119
Agriculture & Fisheries	865	95	5	185	43	91	445
Trade, Catering & Tourism	1,906	182	24	523	80	436	659
From Banks - Total	21,101	1,889	721	5,850	1,327	3,503	7,810
Manufg. Mining & Quarrying	6,962	722	190	1,562	528	924	3,035
Food Processing Industry	488	22	1	128	37	72	228
Agriculture & Fisheries	1,346	65	17	330	200	122	612
Trade, Catering & Tourism	3,429	101	152	1,751	151	558	715
From Government Investment Budgets	3,653	676	721	22	803	3	1,399
Manufg. Mining & Quarrying	1,723	386	453	11	422	2	448
Food Processing Industry	33	22	1	-	6	-	3
Agriculture & Fisheries	544	33	5	-	321	-	184
Trade, Catering & Tourism	86	38	5	-	13	-	29

Source: SFRJ Stat. YRBK 72

**INVESTMENT IN FIXED ASSETS -  
BY INDUSTRY - million dinars - during 1971**

<b>TOTAL</b>	<b>41,400,9</b>
<b>Manufacturing, Mining &amp; Quarrying</b>	<b>19,171,3</b>
Electric Energy	2,431,1
Production & Preparation of Coal	212,1
Production & Processing of crude petroleum	232,3
Ferrous Metallurgy	1,807,7
Non-Ferrous Metallurgy	1,564,6
Manufacture of Non-Metallic mineral products	300,6
Manufacture of Metal Products	1,162,2
Shipbuilding	164,7
Manufacture of Electr. Machinery	530,4
Manufacture of Chemicals	836,3
Manufacture of Building Materials	708,9
Manufacture of Wood	607,8
Manufacture of Paper	184,4
Manufacture of Textiles	816,0
Manufacture of Leather and Footwear	160,0
Manufacture of Rubber Products	108,9
Food Manufacturing Industries	877,0
Printing, Publishing & Allied Industr.	276,4
Tobacco Manufactures	90,1
Motion Picture Production	7,8
Mining Explorations	44,0
Other & Undistributed	229,1
<b>Agriculture &amp; Fisheries</b>	<b>2,700,3</b>
<b>Forestry</b>	<b>260,5</b>
<b>Construction</b>	<b>930,4</b>
<b>Transport &amp; Communications</b>	<b>5,000,1</b>
<b>Trade, Catering and Tourism</b>	<b>5,459,7</b>
<b>Arts &amp; Crafts</b>	<b>516,1</b>
<b>Housing &amp; Public Utility</b>	<b>8,418,5</b>
<b>Culture &amp; Social Activity</b>	<b>3,140,4</b>
<b>Social &amp; Government Services &amp; Other</b>	<b>1,843,1</b>

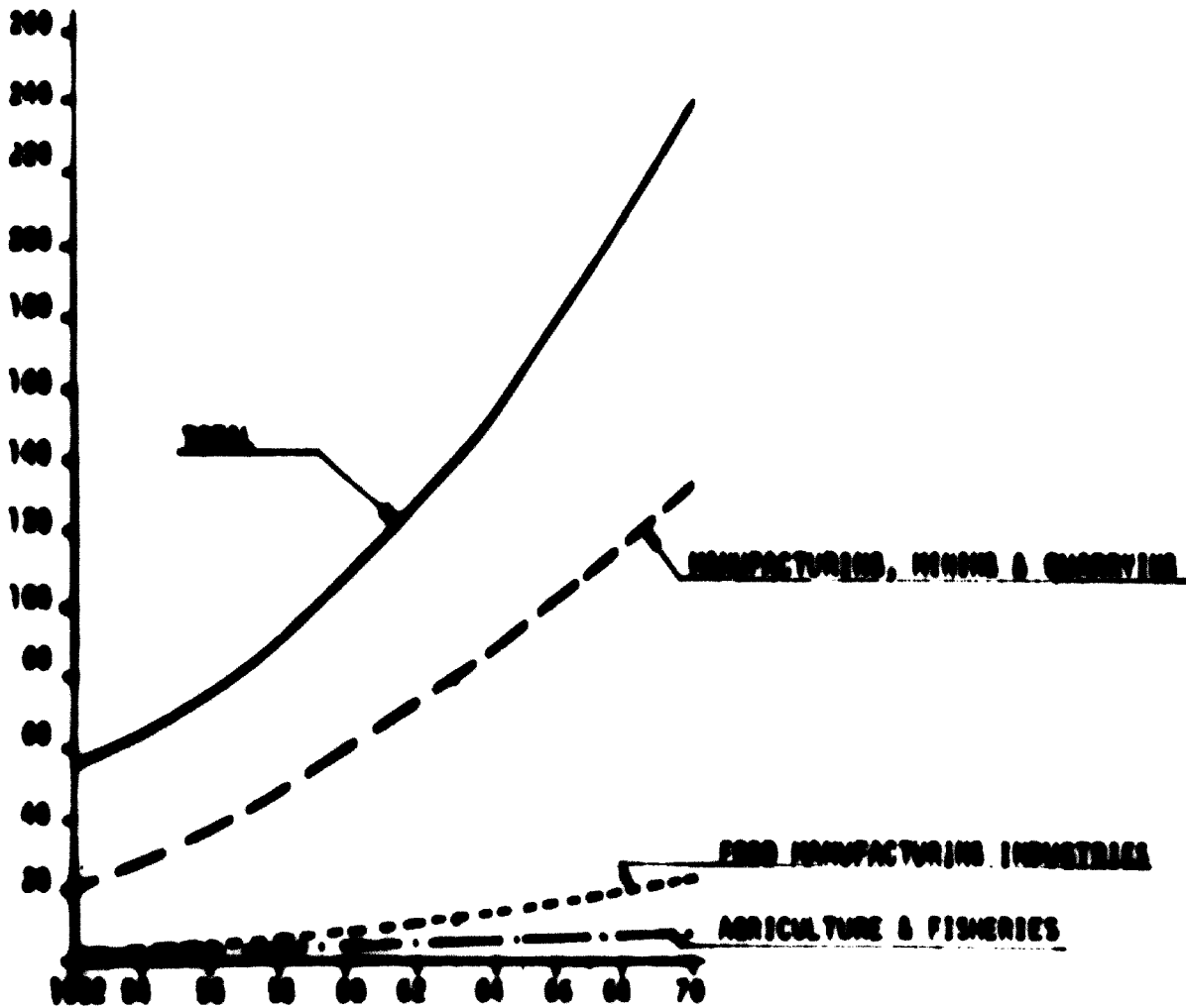
Source: SFRJ Stat. YRBK 72

**INVESTMENT IN FIXED ASSETS BY END USE AND TYPE**  
**(Million Dollars)**

	Total	Construction Works	E q u i p m e n t				Other	Paid but Unrecorded Advances
			Total	Locally Produced Equipment	Imported Equipment			
1967	19,000.0	10,011.6	6,577.0	4,472.8	2,104.2	2,792.4	587.8	
1971	41,400.9	23,133.8	12,236.4	7,898.1	4,338.3	5,427.6	683.4	
Manufacturing, Mining and Quarrying	13,171.3	5,358.4	5,661.1	2,812.3	2,848.8	1,936.8	215.0	
Food Manufacturing Industries	87.0	351.4	447.8	287.8	168.0	61.7	16.2	

Source: SFRJ Stat. YR8X 72

**FIXED ASSETS OF ECONOMIC ORGANIZATIONS OF THE SOCIAL SECTOR**  
**Purchase Value at End of Year - billion dinars - 1986 prices**



**PRIVREDNE ORGANIZACIJE PREMA VELIČINI GODIŠNH PROMETA U 1970**

**ECONOMIC ORGANIZATIONS ACCORDING TO VALUE OF FIXED ASSETS IN 1970**

Ukupna broj privrednih organizacija	Osnovna sredstva u hiljadama dinara						Preko 150000			
	15-50	50-150	150-500	500-1500	1500-5000	5000-15000				
2,374	18	29	69	193	566	615	498	230	136	Industrija i rudarstvo
189	-	-	2	14	27	51	60	30	4	Preduzeta industrija
2,026	70	188	375	669	626	232	128	60	15	Poljoprivreda i ribarstvo
257	-	3	4	13	36	61	71	26	13	Poljopr.- i ml. imb. i drvna
13	-	-	1	4	2	4	1	1	-	Seoske i druge Poljoprivredne udruge
1,008	22	43	165	364	333	130	28	-	-	Poljoprivredne udruge
540	46	133	192	76	36	9	2	-	-	Ostale poljoprivredne ribarstvo
44	2	6	10	7	7	7	1	-	-	Poljoprivreda
84	-	1	3	5	15	21	25	12	2	Vodoprivreda

**Fixed Assets - Thousand Dinars**

Source: SFRJ Stat. Yearbook 72



**PRIVREMENE ORGANIZACIJE PONA VALENE NEPO-OKONCANA U 1979.**

**ECONOMIC ORGANIZATIONS ACCORDING TO VALUE OF NET PRODUCT IN 1979**

Ulogan broj od privremeno nih organizaci zacija	Neto-prodakt u hiljadama dinara								Preko 150000			
	15-50	50-100	100-150	150-500	500-1500	1500-5000	5000-15000	15000-50000				
Under	Nett Product - Thousand Dinars								Over			
15	15-50	50-150	150-500	500-1500	1500-5000	5000-15000	15000-50000	50000-150000	150000			
Manufacturing, Mining & Quarrying	2,374	10	3	18	46	205	629	726	534	166	37	Industrija i rudarstvo
Food Manufacturing Industries	189	-	-	2	5	17	44	57	48	16	-	Prehrambena industrija
Agriculture and Fisheries	2,026	9	38	182	472	560	665	205	85	10	7	Poljoprivreda i ribarstvo
Agricult.-Industrial Comb. Establish- ments and Farms	257	-	1	2	7	19	53	85	75	9	6	Poljopr.- ind. kom. i dobra
Rural working cooperatives	13	-	1	-	1	4	3	4	-	-	-	Seljackske radne zadruge
Agricultural Cooperatives	1,088	7	14	51	221	309	326	75	5	-	-	Poljoprivredne zadruge
Other Agricultural Organizations	540	-	16	123	232	126	38	3	2	-	-	Ostale poljopr. organizacije
Fisheries	44	1	6	5	9	9	9	5	-	-	-	Ribarstvo
Water Economy	84	1	-	1	2	13	27	38	4	1	1	Vodoprivreda

Source: SFRJ Stat. YRBK 72

# SECTION 1

PRIVREDNE ORGANIZACIJE PREMA BROJU ZAPOSLENIH U 1970

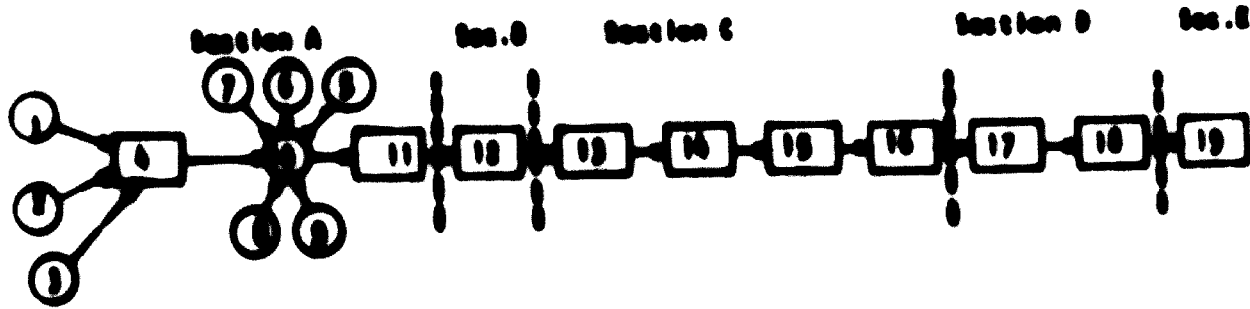
ECONOMIC ORGANIZATIONS ACCORDING TO NUMBERS EMPLOYED IN 1970

Broj zaposlenih  
1970  
1970

Ukupni broj privrednih organizacija	M u m b e r s E m p l o y e d											over 2000
	Under 6	7-15	16-29	30-60	61-125	126-250	251-500	501-1000	1001-2000	2000		
2,374	25	55	61	150	378	522	474	347	221	141		
84	1	-	1	7	9	22	15	18	9	2	Industrija i rudarstvo	
47	-	-	3	4	4	9	10	8	3	10	Elektroenergija	
5	-	-	1	-	-	-	1	-	1	2	Ugalj i koks	
13	1	-	-	-	1	-	-	-	-	10	Nafta	
26	-	-	-	-	1	1	1	7	11	5	Crna metalurgija	
85	-	-	-	6	17	20	20	8	9	5	Obojena metalurgija	
331	-	3	4	2	44	80	76	48	39	35	Nemetali	
20	-	-	-	1	3	5	4	2	2	3	Metalna industrija	
77	-	-	1	3	8	17	18	11	10	9	Brodogradnja	
142	-	2	4	11	30	38	20	15	12	10	Elektroindustrija	
233	-	5	6	29	71	61	40	16	3	2	Hemijska industrija	
254	1	1	-	7	41	63	55	51	28	7	Gradjevinski materijali	
40	-	-	1	1	3	7	7	12	6	4	Drvena industrija	
328	-	-	2	4	21	26	96	80	43	22	Industrija papira	
91	-	-	1	1	14	26	23	13	12	1	Industrija kože	
15	-	-	-	-	2	2	3	2	3	3	Industrija gume	
189	2	4	7	12	29	36	45	29	18	7	Prehrambena industrija	
308	18	33	35	53	65	56	25	15	7	1	Grafička industrija	
37	-	1	-	3	5	12	7	4	3	2	Industrija duvana	
16	2	5	-	4	3	1	1	-	-	-	Filmska industrija	
14	-	1	-	1	3	2	2	3	1	1	Rudarska istraživanja	
19	-	-	-	1	4	4	5	5	-	-	Raznovrsna industrija	
2,026	312	326	322	383	306	163	112	55	33	14	Poljoprivreda i ribarstvo	
257	5	5	5	17	37	47	52	46	30	13	Poljop.-ind.kombinati i dobra	
13	1	-	-	4	2	3	3	-	-	-	Seljačke radne zadruge	
1,088	68	137	225	300	235	82	37	3	1	-	Poljoprivredne zadruge	
540	230	170	81	38	12	4	4	1	-	-	Ostale polj.organizacije	
44	6	9	10	11	2	2	4	-	-	-	Ribarstvo	
84	2	5	1	13	18	25	12	5	2	1	Vodoprivreda	

**SPECIALTY BREADS LINE**

**10) PROCESS DESCRIPTION**



**Section A  
DOUGH PREPARATION**

1. Scourer
2. Water
3. Dry Flour
4. Mixing & Fermenting
5. Pumpkinseed Flour
6. Clear Flour
7. Salt
8. Yeast
9. Water
10. Sour Dough
11. Mixing

**Section B  
FERMENTATION**

12. Fermenting

**Section C  
DOUGH  
TREATMENT**

13. Dividing
14. First Proofing
15. Molding
16. Final Proofing

**Section D  
BAKING AND  
COOLING**

17. Baking
18. Cooling

**Section E  
PACKAGING**

19. Slicing and Packaging

# SECTION 2

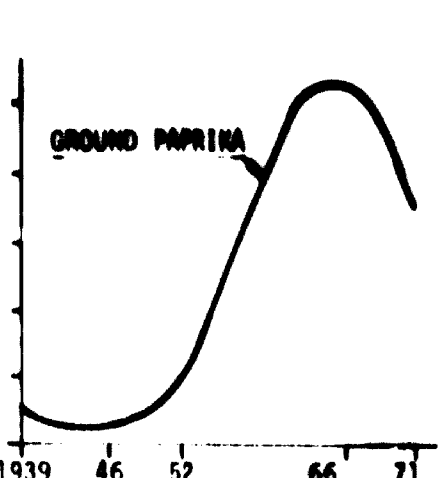
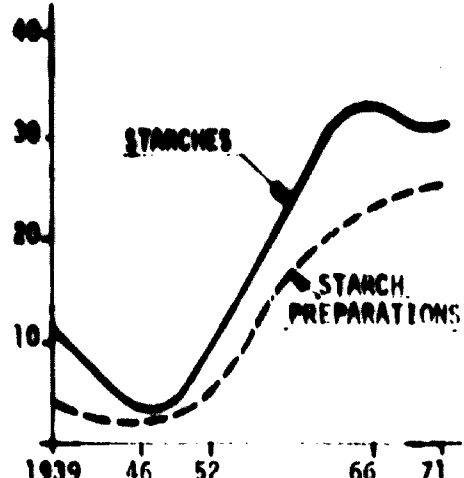
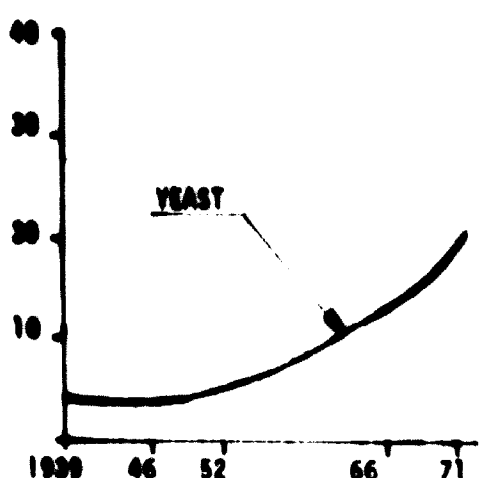
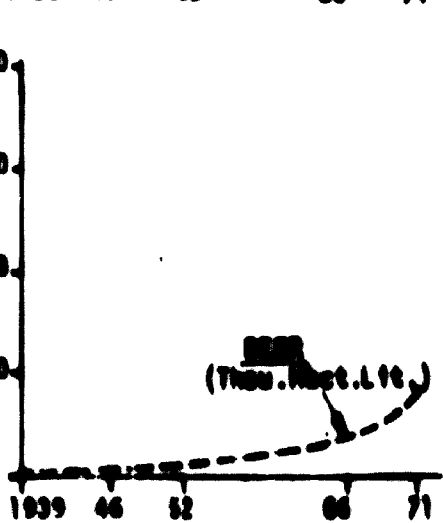
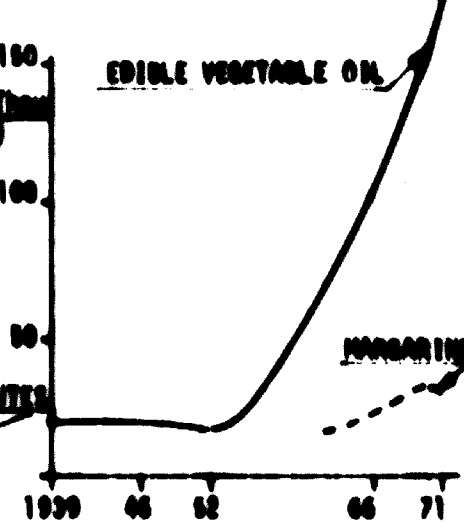
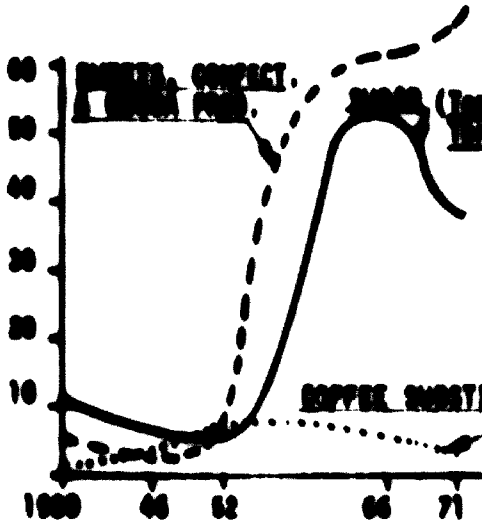
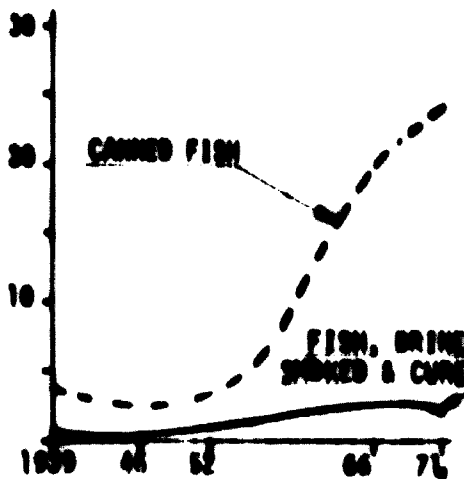
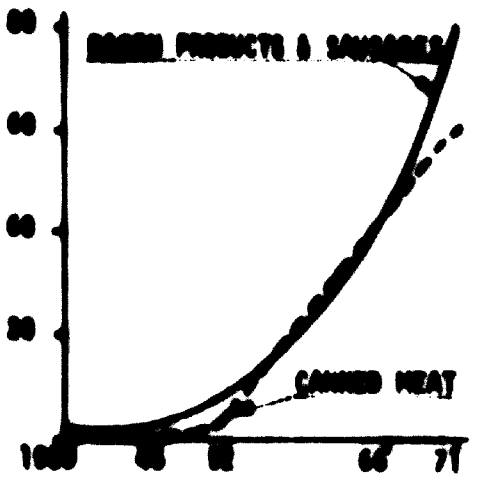
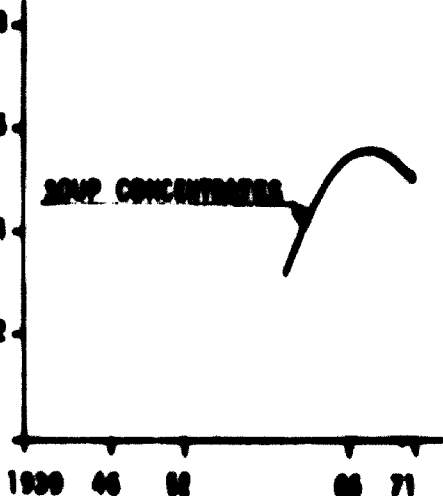
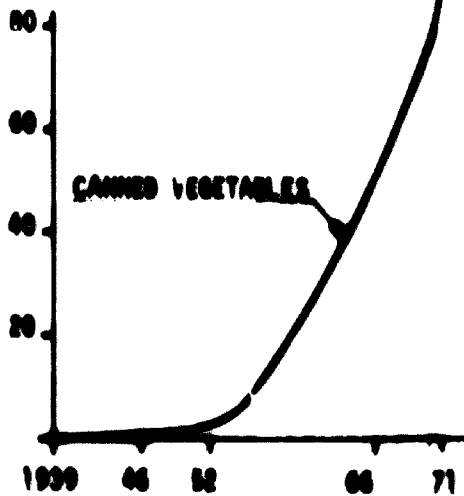
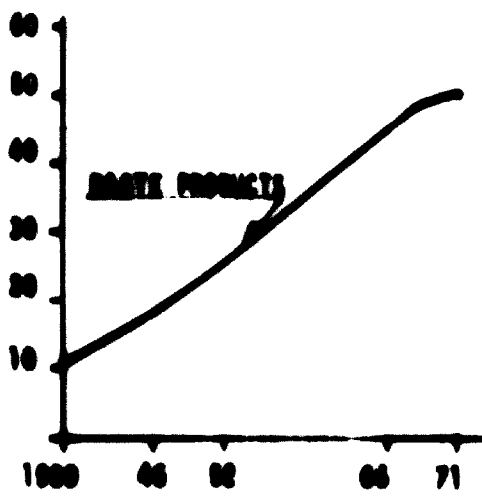
## PRIVREDNE ORGANIZACIJE PREMA BROJU ZAPOSLENOG OSOBLJA - 1970 ECONOMIC ORGANIZATIONS ACCORDING TO NUMBERS EMPLOYED IN 1970

Ukupni broj preduzeća  
h organizacija  
6 7-15 16-29 30-60 61-125 126-250 251-500 501-1000 1001-2000 2000  
B r o j z a p o s l e n i h

	Total No. of Econ. Organiz.	N u m b e r s E m p l o y e d								over 2000	
		Under 6	7-15	16-29	30-60	61-125	126-250	251-500	501-1000		1001-2000
Manufacturing, Mining & Quarrying	2,374	25	55	61	150	378	522	474	347	221	141
Electric Energy	84	1	-	1	7	9	22	15	18	9	2
Coal and Coke	47	-	-	-	3	4	9	10	8	3	10
Crude Petroleum	5	-	-	-	1	-	-	1	-	1	2
Ferrous Metallurgy	13	1	-	-	-	1	-	-	-	1	10
Non-Ferrous Metallurgy	26	-	-	-	-	1	1	1	7	11	5
Manuf. of Non-Metallic Products	85	-	-	-	6	17	20	20	8	9	5
Manufacture of Metals	331	-	3	4	2	44	80	76	48	39	35
Shipbuilding	20	-	-	-	1	3	5	4	2	2	3
Manuf. of electr. machinery, apparat. appliances and supplies	77	-	-	1	3	8	17	18	11	10	9
Manuf. of Chemicals & Chem. Prods.	142	-	2	4	11	30	38	20	15	12	10
Building Materials	233	-	5	6	29	71	61	40	16	3	2
Manufacture of Wood	254	1	1	-	7	41	63	55	51	28	7
Manuf. of Paper and Paper Prods.	40	-	-	-	1	3	7	7	12	6	4
Manufacture of Textiles	328	-	-	2	4	21	60	96	80	43	22
Manufacture of Leather	91	-	-	1	1	14	26	23	13	12	1
Manufacture of Rubber Products	15	-	-	-	-	2	2	3	2	3	3
Food Manufact. Industries	189	2	4	7	12	29	36	45	29	18	7
Printing, Publ. & Allied Industries	308	18	33	35	53	65	56	25	15	7	1
Tobacco Manufacturers	37	-	1	-	3	5	12	7	4	3	2
Motion Picture Production	16	2	5	-	4	3	1	1	-	-	-
Mining Explorations	14	-	1	-	1	3	2	2	3	1	1
Misc. Manufacturing Industries	19	-	-	-	1	4	4	5	5	-	-
Agriculture & Fisheries	2,026	312	326	322	383	306	163	112	55	33	14
Agric. Industr. Combined	257	5	5	17	17	37	47	52	46	30	13
Establishments & Farms	13	1	-	4	4	2	3	3	-	-	-
Rural Working Cooperatives	1,088	68	137	225	300	235	82	37	3	1	-
Agricultural Cooperatives	540	230	170	81	38	12	4	4	1	-	-
Other Agric. Organizations	44	6	9	10	11	2	2	4	-	-	-
Fisheries	84	2	5	1	13	18	25	12	5	2	1
Water Economy											

Source: SFRJ Stat. YRBK 72

**FOOD PROCESSING INDUSTRY - MANUFACTURED GOODS**  
(THOU. TONS)



## a) Raw Fruit Juices

	1965		1966		1967		1968		1969	
	aps.	%	aps.	%	aps.	%	aps.	%	aps.	%
Bosna i Hercegovina	-	-	221	13,1	703	43,0	433	18,7	691	11,3
Crna Gora	-	-	-	-	42	2,6	-	-	-	-
Hrvatska	472	10,7	671	39,4	541	33,0	414	17,9	1667	27,2
Slovenija	138	3,0	193	11,4	193	11,8	205	8,8	3430	55,9
Srbija	3811	87,0	611	36,1	153	9,6	1256	54,6	344	5,6
Total	4421	100,0	1696	100,0	1632	100,0	2308	100,0	6132	100,0

## b) Natural Fruit Juices

Bosna i Hercegovina	1113	24,9	306	8,7	500	7,9	345	1,7	1974	7,7
Crna Gora	635	14,2	-	-	-	-	908	4,5	234	0,9
Hrvatska	275	6,1	207	5,9	1243	19,7	1442	7,2	38	0,2
Makedonija	392	8,8	701	20,1	1299	20,5	875	4,4	1666	6,5
Slovenija	1134	25,3	1813	52,2	2408	38,1	13564	67,4	15686	61,6
Srbija	926	20,7	452	13,1	872	13,8	2972	14,8	5912	23,1
Total	4475	100,0	3479	100,0	6322	100,0	20106	100,0	25510	100,0

## c) Sweetened Fruit Juices

Bosna i Hercegovina	25	0,4	103	1,2	134	1,4	402	7,5	568	6,0
Crna Gora	-	-	774	9,3	961	10,3	-	-	-	-
Hrvatska	-	-	258	3,1	156	1,7	-	-	162	1,7
Makedonija	167	2,5	-	-	-	-	73	1,4	-	-
Slovenija	1017	15,4	782	9,4	71	0,8	1297	24,1	4460	46,0
Srbija	5411	81,7	6373	77,0	7990	85,8	3599	67,0	4519	46,3
Total	6620	100,0	8290	100,0	9312	100,0	5371	100,0	9709	100,0

## d) Tomato Juice

Makedonija	-	-	57	36,0	-	-	24	19,0	-	-
Srbija	106	100,0	101	64,0	109	100,0	102	81,0	137	100,0
Total	106	100,0	158	100,0	109	100,0	126	100,0	137	100,0

## e) Other Vegetable Juices

Bosna i Hercegovina	-	-	-	-	-	-	225	100,0	592	100,0
Srbija	-	-	82	100,0	2	100,0	-	-	-	-
Total	-	-	82	100,0	2	100,0	225	100,0	592	100,0

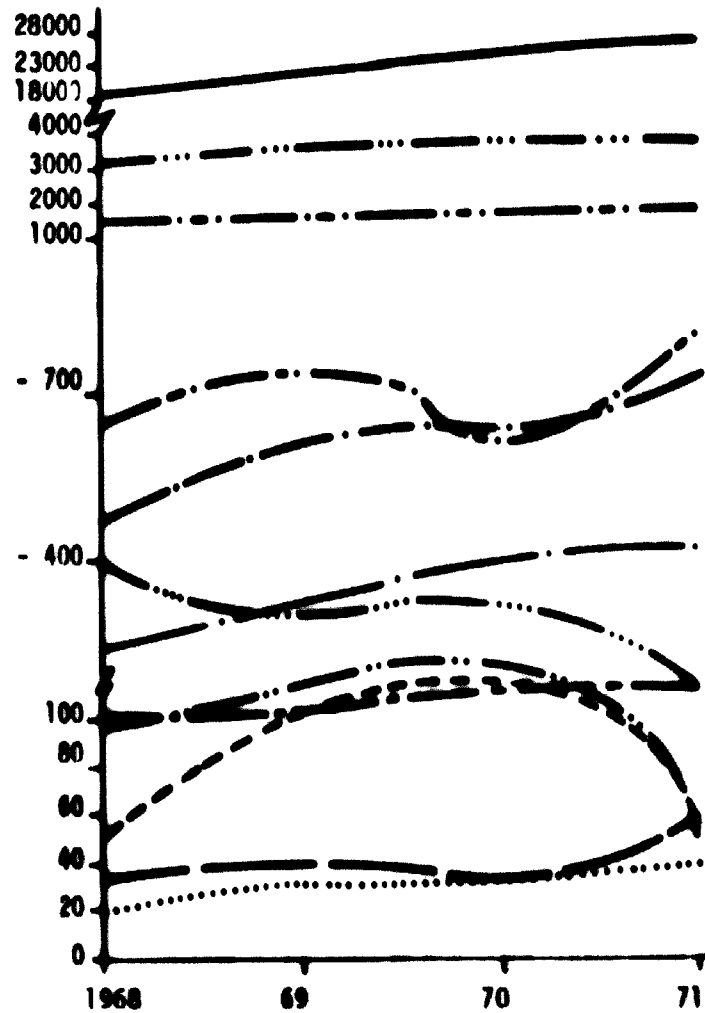
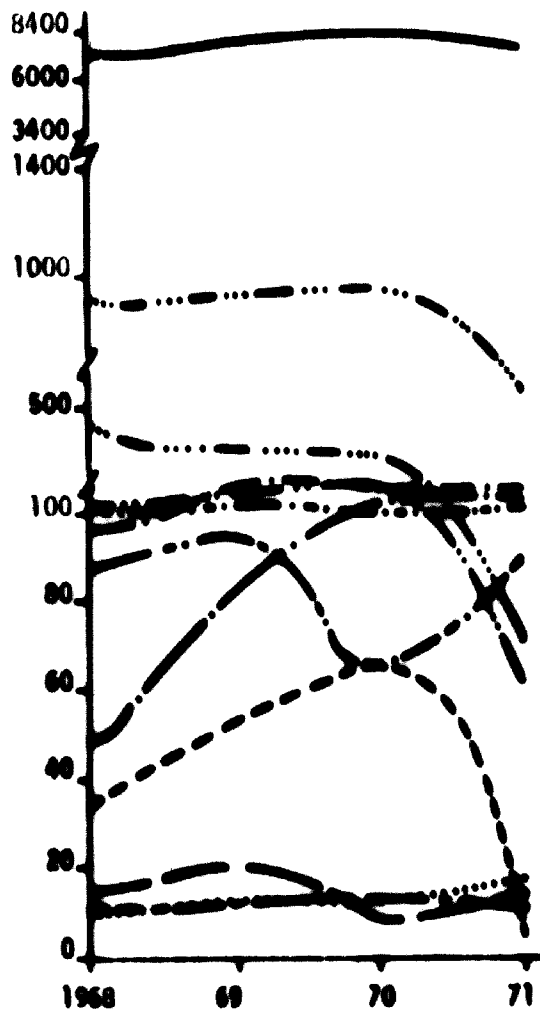
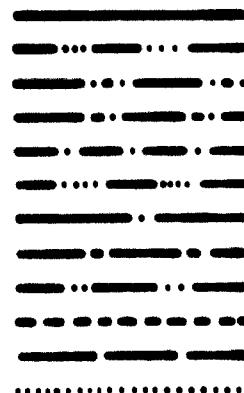
## f) Artificial Soft Drinks (In hl)

Bosna i Herc.	499	0,2	2079	0,6	2784	0,7	3552	0,7	14173	2,1
Crna Gora	6802	2,3	7531	2,3	8424	2,1	7408	1,5	18024	2,7
Hrvatska	121536	41,7	126486	38,1	165247	40,9	151006	30,7	180207	27,0
Makedonija	20877	7,2	24020	7,3	33230	8,2	46201	9,4	60552	9,0
Slovenija	64816	22,2	70906	21,4	81290	20,1	87611	17,8	113213	16,9
Srbija	76925	26,4	100210	30,3	113164	28,0	195826	39,9	283011	42,3
Total	291455	100,0	331232	100,0	404139	100,0	491604	100,0	669180	100,0

**EXPORTS BY COMMODITY SECTIONS AND DIVISIONS OF THE SITC**

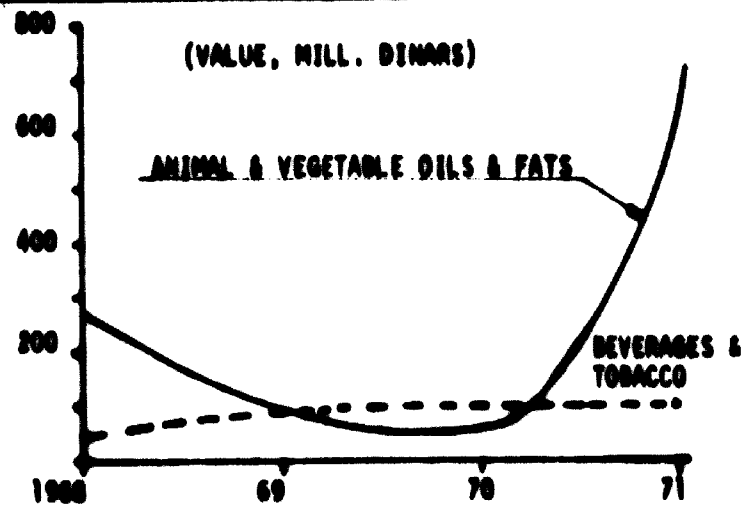
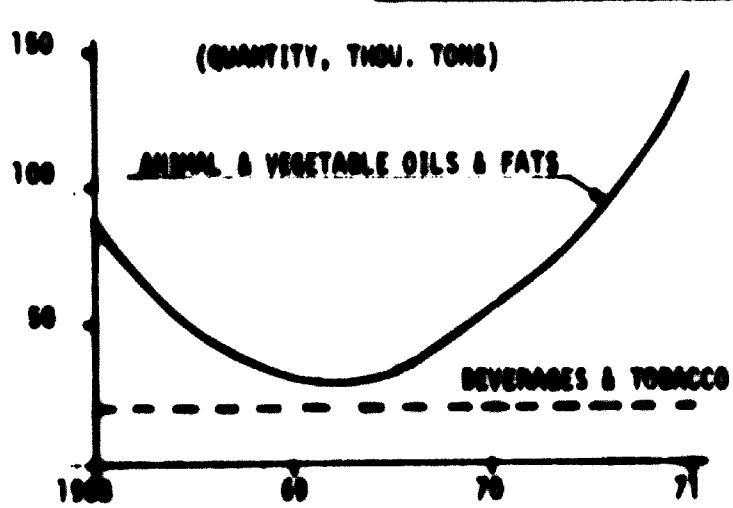
(QUANTITY, THOUSAND TONS)

(VALUE, MILLION DINARS)

**TOTAL****FOOD****MEAT & MEAT PREPARATIONS****LIVE ANIMALS****FRUIT & VEGETABLES****CEREALS & CEREAL PREPARATIONS****BEVERAGES****FISH & FISH PREPARATIONS****FEEDSTUFF FOR ANIMALS****MISC. PROCESSED FOODS****ANIMAL & VEGETABLE OILS & FATS****DAIRY PRODUCTS & EGGS****UKUPNO****PROIZVODI ZA HRANU****MESO I PRERADE OD MESA****ZIVE ZIVOTINJE****VOĆE I POVRĆE****ZITARICE I PRERADE OD ZITARICA****PIĆA****RIBE I RIBLJE PRERADJEVINE****SIĆNA HRANA****OSTALI PROIZVODI ZA HRANU****ZIVOTINJSKA I BILJNA ULJA I MASTI****MLEČNI PROIZVODI I JAJA**

Source: SFRJ STAT. YRBK 72

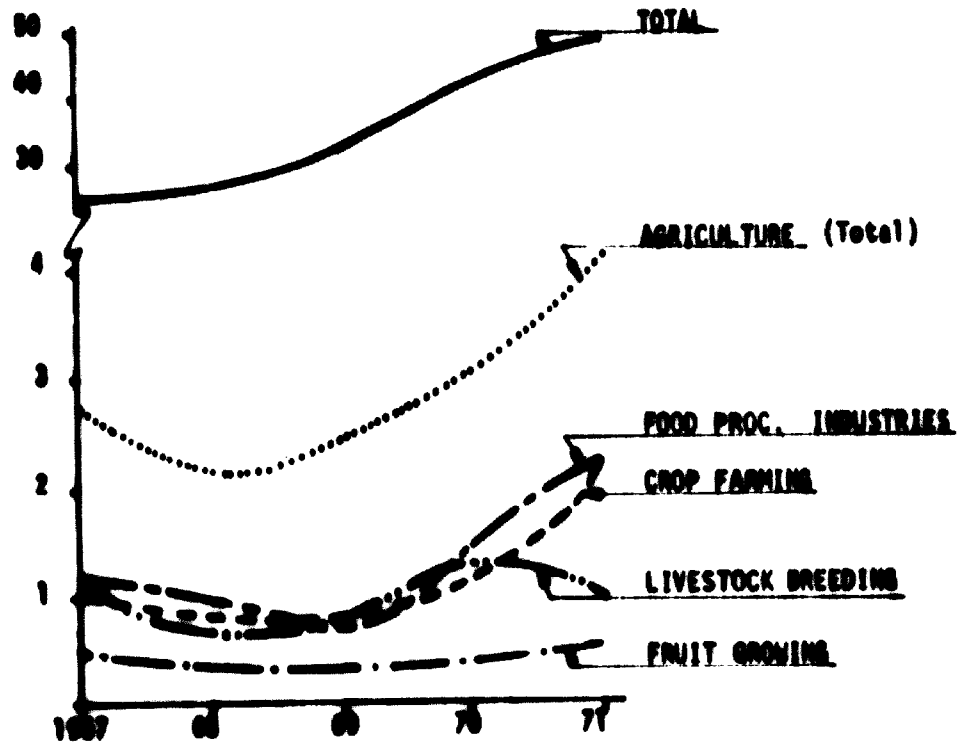
IMPORTS BY COMMODITY SECTIONS AND DIVISIONS OF THE SITC



SOURCE: SPAJ STAT. YEAR 72

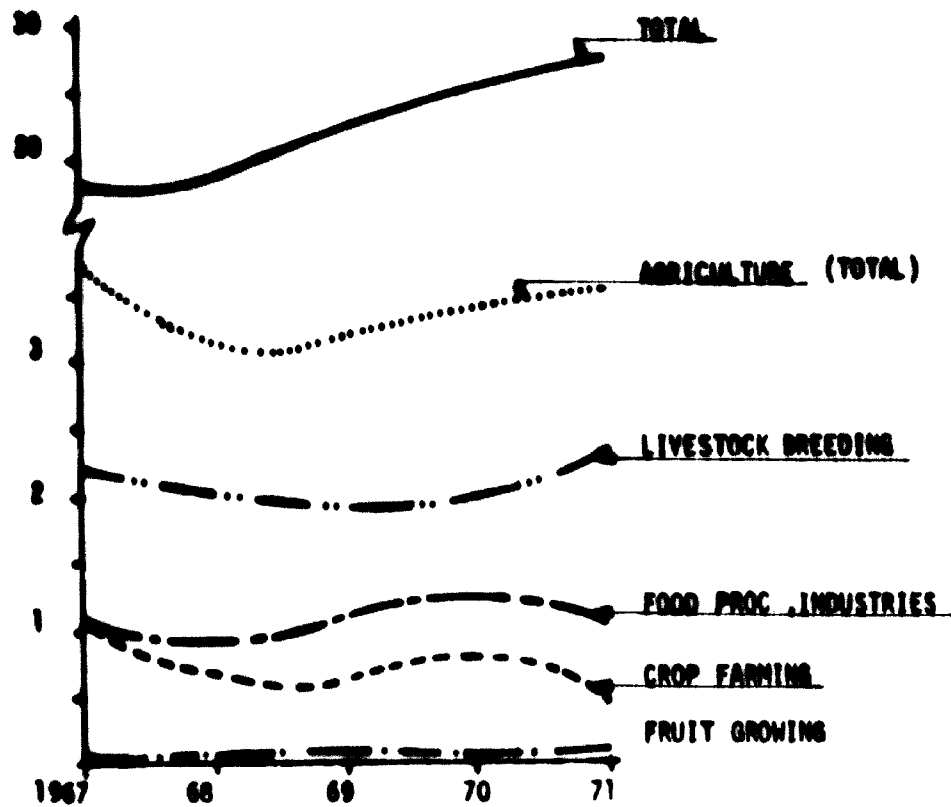


**IMPORTS BY BRANCHES OF ECONOMIC ACTIVITIES**  
(Billion Dinars)



Source: SFRJ Stat. YRDK 72

**EXPORTS BY BRANCHES OF ECONOMIC ACTIVITIES**  
(Billion Dinars)



Source: SFRJ Stat. YRDK 72

PRINCIPAL ARTICLES IMPORTED: ANALYSIS BY COUNTRIES OF ORIGIN - 1971  
VALUE - Thousand Dinars

<b>WHEAT</b>	586,278	<b>PIŠENICA</b>
U.S.A.	412,608	SAD
Others	173,670	Ostale zemlje
<b>RICE</b>	45,131	<b>PIRINAC</b>
Egypt	27,853	Egipat
Italy	8,777	Italija
Others	8,791	Ostale zemlje
<b>CITRUS &amp; SUB-TROPICAL FRUIT</b>	389,493	<b>JUŽNO VOĆE</b>
Egypt	84,258	Egipat
Greece	29,969	Grčka
Guinea	12,058	Gvineja
Italy	37,037	Italija
Israel	76,746	Israel
Others	179,425	Ostale zemlje
<b>SUGAR</b>	182,161	<b>ŠEĆER</b>
Cuba	24,709	Kuba
Bulgaria	66,277	Bugarska
France	50,808	Francuska
Others	40,367	Ostale zemlje
<b>COFFEE</b>	541,393	<b>KAVA</b>
Brazil	262,490	Brazil
India	106,776	Indija
Colombia	53,644	Kolumbija
Others	118,483	Ostale zemlje
<b>RAW BOVINE HIDE</b>	148,818	<b>KRUPIA SIROVA KOŽA</b>
Argentina	4,216	Argentina
Holland	41,169	Holandija
U.S.A.	31,776	SAD
Others	71,657	Ostale zemlje
<b>OIL-SEEDS</b>	112,837	<b>ULJANO SEMENJE</b>
Ethiopia	6,356	Etiopija
U.S.A.	84,770	SAD
S.S.S.R.	3,257	SSSR
Others	18,454	Ostale zemlje

ISVOZ I UVOZ ROBE ŽELEZNICOM  
u hilj. tona

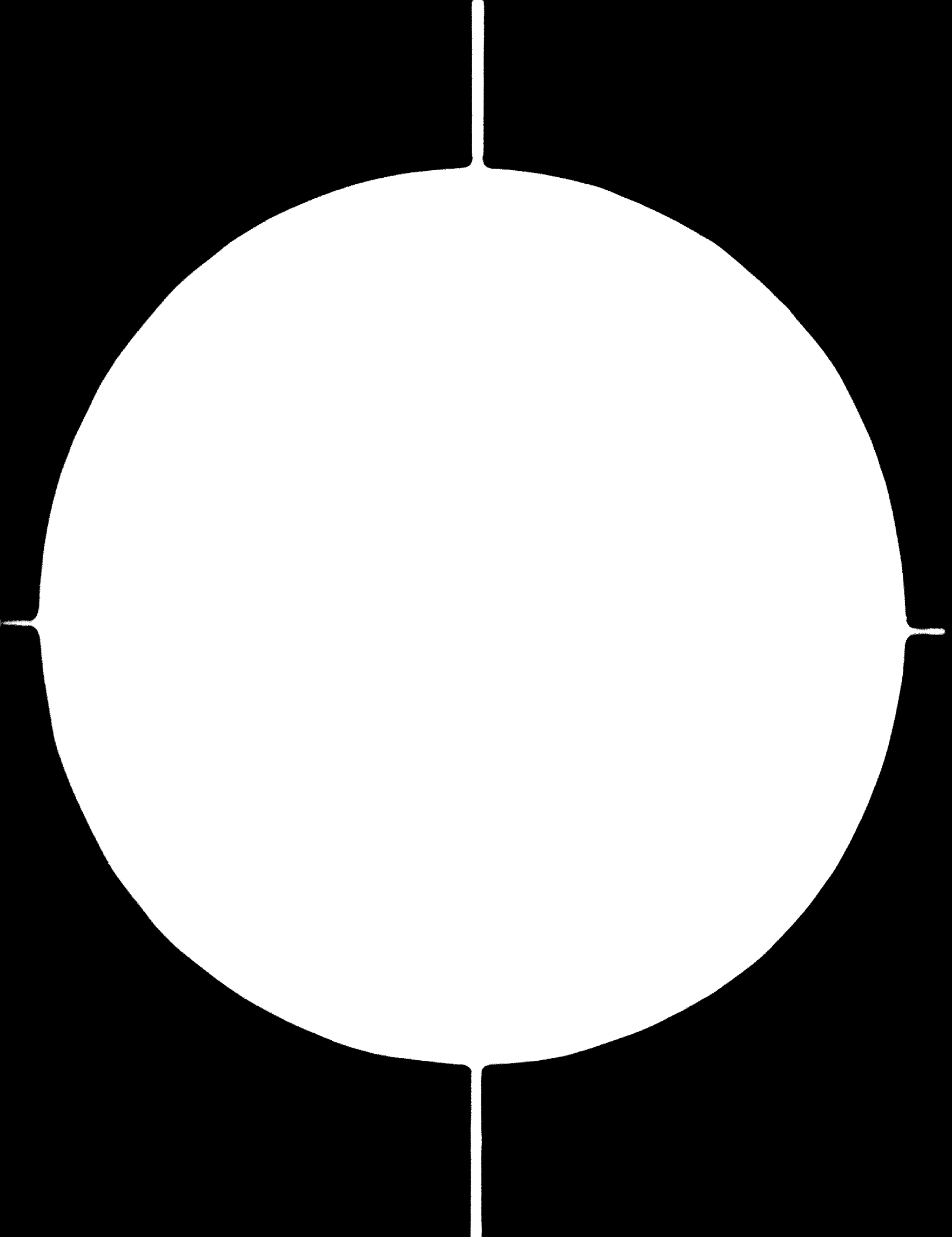
EXPORTS AND IMPORTS OF GOODS BY RAILWAY  
Thousand Tons

	1969		1970		1971		Ukupno
	isvoz	uvoz	isvoz	uvoz	isvoz	uvoz	
	1969	1970	1971	1971	1971	1971	
	Exports	Imports	Exports	Imports	Exports	Imports	
Total	3,704	5,267	4,057	6,294	3,779	7,630	
Austria	381	315	514	594	501	510	Austrija
Bulgaria	230	148	168	206	208	412	Bugarska
Czechoslovakia	203	1,182	239	1,171	229	1,271	Čekoslovačka
France	53	64	63	102	71	103	Francuska
Greece	126	264	103	280	129	721	Grčka
Holland	32	39	26	54	25	54	Holandija
Italy	1,210	317	1,252	458	959	831	Italija
Hungary	239	856	417	697	391	784	Mađarska
East Germany	140	177	137	238	170	261	Nemačka DR
Poland	143	316	131	278	162	357	Poljska
Roumania	395	658	447	705	408	931	Rumunija
West Germany	250	366	283	503	285	484	SR Nemačka
SSSR	159	229	174	684	226	638	SSSR
Great Britain	19	13	16	16	10	14	Velika Britanija
Other Countries	124	323	87	308	5	259	Ostale zemlje

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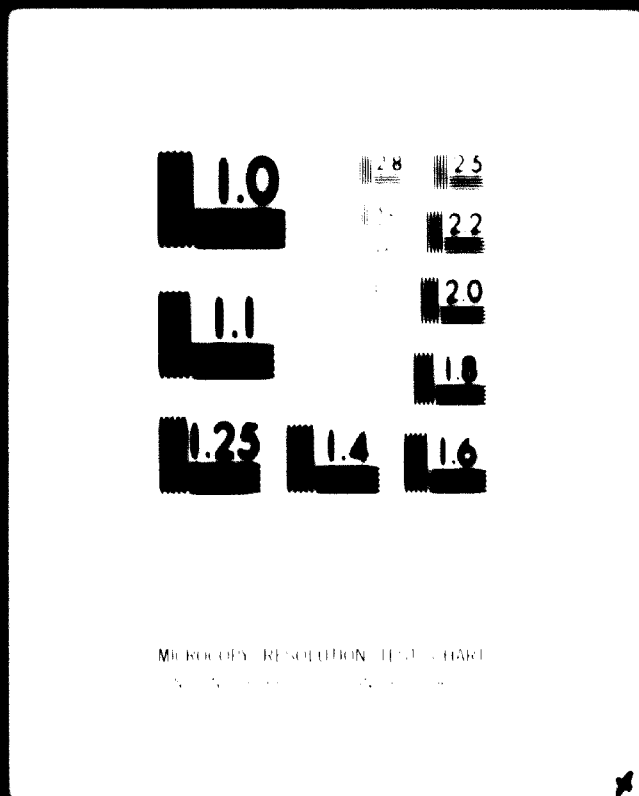


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**STATISTICAL CHARACTERISTICS FROM BUREAU OF ECONOMIC RESEARCH**  
**1970**

**EXTERNAL TRADE ORGANIZATIONS ACCORDING TO MEMBERS EMPLOYED IN 1970**  
**Values - in Millions Dollars**

Year	B r o w n s o n P o e l e r i h										Total	Newly established organizations
	15-20	20-60	61-125	125-250	251-500	500-1000	1000-2000	2000-3000	3000-4000	4000-5000		
Number	15	16	16	15	15	15	15	15	15	15	15	4
Employed	143	16	2,228	6,702	10,732	14,000	10,587	16,005	16,005	16,005	16,005	16,005
Realization (Sale)	57,000.8	1,610,004.9	2,184.7	9,000.0	17,987.9	11,812.5	5,012.3	9,004.3	9,004.3	9,004.3	9,004.3	9,004.3

SFRJ Stat. WMBK 72

**SECTION 1**



**UNITED STATES FEDERAL BUREAU OF INVESTIGATION**

**STATISTICAL DATA ON INVESTIGATION OF SUBJECTS, 1962-1971**

Year	No. of Organizations		No. of Persons Employed		Persons Employed		Persons Employed		Persons Employed		Persons Employed	
	Actual	Estimated	Actual	Estimated	Actual	Estimated	Actual	Estimated	Actual	Estimated	Actual	Estimated
1962	2,200	1,200	60,000	70,000	147,000	70,000	14,700	17,000	100	100	1,100	1,200
1971	1,200	900	60,000	100,000	200,100	100,000	90,000	90,000	600	600	...	...

Source: FBI Statistical Reports, 1972



INDICATORS OF SITUATION AND OF OPERATION RESULTS OF TRADE ENTERPRISES IN 1970

INDICATORS OF SITUATION AND OF OPERATION RESULTS OF TRADE ENTERPRISES IN 1970

	Prosечно korišćena poslovna (osovna i obrtna sredstva I svesni osobni osobni	Stepen o tpisano sti ulup nih sred vini sred u (zrakoj i t	Ostvareni dohodak			Ispladeni me sečni neto lični dohoci po zaposle nom
			po I sa poslan- je u di n.	Prava pro srbno kor išćenim u kupnim i osovnim o brtnim sr edstvima	Stopa inte- rne akumul tivnosti re d.ory. (akum ulacija koj om raspolas e r.o.prama prod. osredet.	
I n c o m e						
	Total Assets (Fixed & Working) per one Employed Person Dinars	Actual Value of Fixed Assets as a % of Purchase Value	Per one Employed Person	As a % of Total Assets	Allocations for Funds of Enterprises as a % of Total Assets	Monthly nett Personal Incomes per one Employed Person
<b>RETAIL TRADE</b>						
TOTAL	56,344	28	36,317	62,7	13,4	1,190
Food Products	38,986	29	28,986	74,4	11,3	1,134
Meat & Meat Preparations	39,286	29	29,849	76,2	8,4	1,181
Fruit & Vegetables	49,961	26	26,252	50,6	7,3	1,027
Food & Household Goods	38,884	29	29,898	76,6	12,6	1,152
Milk & Bread	27,078	37	26,074	92,6	12,8	1,085
Other Food Products	34,961	27	31,078	88,9	16,7	1,169
<b>WHOLESALE TRADE</b>						
TOTAL	106,484	27	46,426	42,7	8,6	1,338
Food Products	89,037	29	32,268	36,2	6,8	1,243
Cereals & Flour	112,961	27	29,380	26,0	3,0	1,069
Fruit & Vegetable	41,296	34	29,736	72,0	16,3	1,085
Food & Household Goods	71,793	31	34,138	47,6	8,7	1,377
Alcoholic Drinks	118,669	25	32,981	27,8	3,9	1,164
Livestock & Poultry	120,741	18	19,831	16,4	2,7	906
Other Food Products	67,886	38	36,876	64,7	13,9	1,483

Source: SFRJ Stat. VRK 72

SECTION 1



**STATISTIČKI PREGLED I BILANJE POSLOVNIH PODUZEĆA U 1979**

**SITUATION AND OPERATIONAL RESULTS OF TRADE ENTERPRISES IN 1979**

	Osobovani dobitak po 1 os poslan- ga u di %	Prima pro cedno kor ličnim u kupnim i stavim o brnim ar stavim	Stopa inter- ne efikas- tivnosti sa d. org. (stan uclatje koj on raspodel e r. o. prema proc. osoblj.	Izplaćeni na osobni račun lični dobitak po zaposle- nom	Učelak bruto lič- nih dobitaka u dohodku koji se podeljuje rad. organizaciji	
<b>Income</b>						
Actual value of assets at base value	Per one Employed Person	As a % of Total Assets	Allocations for Funds of Enterprises as a % of Total Assets	Monthly net Personal Income per one Employed Person	Share of Gross Personal Income as a Percentage of Income which is distributed by an Enterprise	
	36,317	62.7	13.4	1,100	71.0	<b>TRGOVINA NA MOLO</b>
	28,886	74.4	11.3	1,126	70.2	<b>USPOVO</b>
	29,889	76.2	8.4	1,101	69.6	Preduzetništvo proizvodnja
	25,262	64.6	7.3	1,027	70.6	Mašin i građevinarstvo
	29,888	76.5	12.5	1,102	77.5	Vodna i gasna
	25,074	62.6	12.8	1,088	69.6	Životinjska nam. i kad. poslo.
	31,078	68.9	16.7	1,100	76.2	Mašin i ličim
						<b>TRGOVINA NA VELIKO</b>
	45,426	42.7	8.6	1,200	66.6	<b>USPOVO</b>
	32,288	36.2	6.8	1,200	79.2	Preduzetništvo proizvodnja
	29,380	28.0	3.8	1,000	69.3	Štampanstvo i knjižarstvo
	29,736	72.0	16.3	1,088	74.2	Vodna i gasna
	34,138	47.6	8.7	1,377	68.0	Životinjska nam. i kad. poslo.
	32,981	27.8	3.8	1,184	70.8	Alkoholna pićina
	19,831	16.4	2.7	886	70.8	Mašin i ličim
	36,876	64.7	13.8	1,400	70.1	Opšti poslo. proizvodnja

**SECTION 2**



**PROMET U TRGOVINI NA VELIKO PO OTVORANIMA  
u ml. dinars**

**TURNOVER IN WHOLESALE TRADE: ANALYSES BY TRADE BRANCHES  
Million Dinars**

	1961	1971	
<b>TOTAL TURNOVER</b>			<b>UKUPAN PROMET</b>
Total	16,387,3	93,285,6	Ukupno
Kind of Organizations			Vrste organizacija
Wholesale Trade Enterprises	11,854,9	52,212,4	Trgovinska poduzeća na veliko
Retail & Wholesale Trade Enterprises	620,9	6,764,5	Trgovinska poduz.na veliko i malo
External Trade Enterprises, Export-Import Storages of Producing Enterprises	2,847,5	22,140,7	Spoljnotrgovinska pod.izvoz-uvoz
Other Organizations	781,8	9,551,3	Stovarišta proizvodjačkih poduz.
	282,2	2,616,6	Ostale organizacija
Trade Branches			Trgovinske struke
Enterprises for Sales of Food Products	2,347,3	17,543,7	Poduzeća za promet preh.r.proiz.
Cereals & Milled Products	894,8	3,582,7	Žitaricama i mliječnim proizvodima
Vegetables & Fruit	176,5	1,367,2	Povrćem i voćem
Food & Household Goods	340,7	5,406,5	Životnim namirnicama i kućni.potr.
Alcoholic and Non-Alcoholic Beverages	308,0	2,147,4	Alkoholnim i bezalkoholnim pićima
Livestock, Meat and Preparations	168,7	1,894,8	Stokom,mesom i preradjevinama
Other Food Products	458,6	3,145,0	Ostalim prehramb.proiz.
Enterprises for Sales of Non-Food Products	11,844,4	64,765,5	Poduzeća za promet neprehram.proiz. vodima
Stationery	507,6	2,157,1	Kancelarijskim materijalima i priborom
Textiles, Knitted Goods and Made-Up Clothing	1,351,3	4,138,3	Tekstilom, trikotažom i konfekcijom
Hardware and Metalware	4,720,8	30,080,2	Gvoždjarskom robom
Motor Vehicles & Accessories	745,7	5,705,4	Motornim vozilima i priborom
Building Materials	788,0	4,054,2	Gradjevinским materijalima
Waste	...	1,057,8	Otpacima
Hides & Skins (Undressed) Leather Waste, Wool, Hair & Similar	196,7	1,391,1	Sirovama kožom i kožnim otpacima, vunom, dlakom i dr.
Other Non-Food Products	3,534,3	16,181,3	Ostalim neprehram.proizvodima
Enterprises Selling Miscellaneous Products	2,195,5	10,976,4	Poduzeća za promet mešovitim robom

Source: SFRJ Stat. YRBK 72

PRODAVNICE - 1971RETAIL TRADE - 1971

	<u>Radnje</u>	<u>Poduzeća</u>	
	<u>No. of Shops</u>	<u>No. of Employees</u>	
Total	68,062	235,192	Ukupno
Trade Branches			Trgovinske struke
Enterprises and Shops for Sales of Food Products	16,954	44,091	Za promet prehramb. proizvodima
Meat & Meat Preparations	4,607	8,707	Mesom i preradjevinama
Vegetables, Fruit and Preparations thereof	1,305	4,298	Povrćem, voćem i preradjevinama
Food & Household Goods	4,384	18,695	Životnim namirnicama i kućnim potreb.
Milk & Dairy Products, Bread and Baked Fancy Goods	4,520	6,166	Mlekom i mlečnim proizvodima Hlebom i pecivom
Other Food Products	2,138	6,225	Ostalim prehramb. proizvodima
Department Stores	97	10,834	Robne kuće
Of Total: Self-Service Shops	2,389	22,134	Od ukupnog: samousluge

Source: SFRJ Stat. YRBK 72

PROMET U TRGOVINI NA MALO PO STRUKAMA  
u milionima dinara

TURNOVER IN RETAIL TRADE: ANALYSES BY TRADE  
BRANCHES - Million Dinars

	1961	1971	
TOTAL	13,282,0	91,052,7	UKUPNO
TRADE BRANCHES			TRGOVINSKE STRUKE
Enterprises & Shops for Sales of Food Products	2,448,0	15,763,4	Poduzeća i radnje za promet preh. proizvodima
Meat & Meat Preparations	651,8	4,173,9	Mesom i preradjevinama
Vegetables, Fruit and Preparations thereof	230,1	1,313,1	Povrćem, voćem i preradjevinama
Food & Household Goods	721,8	6,171,4	Životnim namirnicama i kućnim potre
Milk & Dairy Products, Bread & Baked Fancy Goods	450,3	2,030,7	Mlekom i mlečnim proiz. hlebom i pecivom
Other Food Products	393,9	2,074,3	Ostalim prehrambenim proizvodima
Department Stores	611,0	4,114,3	Robne kuće-kao poduzeća
Of Total: Self-Service Shops	...	8,303,6	Od ukupnog: samousluge

Source: SFRJ Stat. YRBK 72

## FOOD TRADE SALES

	Trgovina na malo		Trgovina na veliko				
			Ukupno	Prodaja ostalim potrošačima			
	Retail Trade		Wholesale Trade		Sales to Other Consumers		
	1968	1971	1968	1971	1968	1971	
Wheat and Rye, tons	25,658	28,105	463,593	364,390	109,453	68,734	Pšenica i raž, tona
Maize, tons	122,189	126,685	461,915	232,111	108,094	64,115	Kukuruz, tona
Rice, tons	46,633	54,863	61,119	39,258	11,435	5,074	Riža, tona
Wheat Flour, tons	796,423	923,538	1,174,734	1,188,912	147,708	131,600	Pšenično brašno, tona
Paste Products, tons	60,800	72,511	38,752	40,799	5,563	4,671	Testenine, tona
Other Cereals and Flour, tons							Ostali proizvodi od žita i brašna, tona
Products, tons	82,835	113,333	121,518	155,112	19,443	7,304	
Fresh Meat, tons	199,280	242,291	67,406	81,469	16,088	23,061	Sveže meso, tona
Smoked Meat Products	76,538	92,029	26,124	33,114	6,911	7,136	Suvomesnati proizvodi, tona
Fresh Fish, tons	16,901	27,243	7,857	11,027	1,844	3,216	Sveža riba, tona
Dried Fish and Fish Preparations, tons	7,421	11,264	4,251	3,555	1,029	561	Suva riba i preradjevine, tona
Animal Fats, Edible, t.	51,653	47,971	27,196	20,516	5,314	3,059	Životnjske jestive masnoće t.
Veget. Fats, Edible, t.	99,415	149,299	54,247	53,352	8,225	9,232	Biljne jestive masnoće, tona
Fresh Milk, Thou. Lt.	203,427	265,770	64,727	86,489	8,520	10,585	Sveže mleko, hilj. lit.
Dairy Products, Tons	27,511	31,802	15,251	19,000	2,532	3,176	Mlečni proizvodi, tona
Potatoes, tons	92,806	114,085	84,968	87,858	25,785	21,116	Krompir, tona
Beans, tons	18,778	21,477	24,274	18,549	9,592	3,513	Pasulj, tona
Other Fresh Veget. ts.	111,649	141,729	89,512	98,664	27,500	32,339	Ostalo sveže povrće, tona
Apples, tons	48,205	66,454	33,515	52,834	10,311	12,326	Jabuke, tona
Other Fresh Fruit, ts.	121,739	167,431	186,597	286,806	25,623	31,856	Ostalo sveže voće, tona
Sugar, tons	375,795	456,697	192,805	248,552	31,349	32,806	Šećer, tona
Salt, tons	187,653	209,841	178,848	128,039	13,318	12,640	So, tona
Coffee Beans, Green and Roasted, tons	20,696	29,616	38,963	45,464	6,175	4,778	Kafa u zrnu, sirova i pržena t.
Cocoa & Cocoa Prod. ts.	21,628	27,075	6,717	9,673	971	1,128	Kakao i proiz. od kakaa, tona
Marmelade, tons	20,803	29,172	11,407	11,365	2,429	2,120	Marmelada, tona
Other Fruit Prepar. ts.	21,268	39,675	20,223	26,791	4,374	3,706	Ostale preradjevine od voća, t.
Tomato Puree, tons	4,023	5,285	2,413	4,131	550	787	Paradajz-pire, tona
Other Vegetable Preparations, tons	26,694	45,363	14,769	35,144	4,162	7,375	Ostale preradjevine od povrća, t
Wine, Thou. Ltrs.	75,536	91,362	125,540	156,860	44,587	48,361	Vino, hilj. lit.
Beer, Thou. Ltrs.	182,832	334,580	204,380	246,792	82,078	63,668	Pivo, hilj. lit.
Brandy, Thou. Ltrs.	19,356	27,524	27,979	44,724	7,690	7,202	Rakija, hilj. lit.
Other Alcoholic Drinks, Thou. Ltrs.	17,947	26,463	23,765	34,566	9,142	5,844	Ostala alkoholna pića, hilj. lit.
Fodder & Litter., tons	276,677	374,695	560,151	1,437,091	86,764	22,468	Stočna hrana, tona

Source: SFRJ Stat. YRBK 72

PURCHASED QUANTITIES OF AGRICULTURAL PRODUCTS IN 1971 (in tons)  
 KOLIČINE OTKUPLJENIH POLJOPRIVREDNIH PROIZVODA u 1971. (u tonama)

	SFRJ	Bozna i Hercegovina	Crna Gora	Hrvatska	Mako- donija	Slovenija	SRBIJA	
<b>Žitarice</b>								<b>CEREALS</b>
Pšenica i raž	1 908 592	46 594	58	307 538	96 990	16 190	1 441 222	Wheat and Rye
Ječam (bez pivarskog)	30 294	1 499	53	4 527	3 358	1 027	19 830	Barley
Ovas	16 928	5 455	63	3 167	33	703	7 507	Oats
Kukuruz u zrnu	886 045	27 291	1	270 531	2 139	4 976	581 107	Maize
Pirinač (oljušten)	6 374	—	—	—	6 374	—	—	Rice
<b>Industrijske bilje</b>								<b>INDUSTRIAL CROPS</b>
Šećerna repa, vagoni	210 132	789	—	49 496	12 875	—	146 972	Sugar Beet, Waggon
Suncokret	262 400	228	—	14 112	6 645	—	241 415	Sunflower
Konoplja (scabljika)	48 067	2 405	—	9 944	—	—	35 718	Hemp
Pamuk	2 122	—	—	—	2 122	—	—	Cotton
Duvan	40 149	4 755	—	5 356	22 251	—	7 787	Tobacco
Hmelj	3 544	—	—	134	—	2 272	1 138	Hops
<b>Povrće</b>								<b>VEGETABLES</b>
Pasulj	16 685	1 080	48	2 507	1 223	386	11 471	Beans
Krompir	177 922	6 112	1 254	32 008	2 302	34 766	101 480	Potatoes
Crni luk (glavice)	22 757	855	106	2 493	6 194	1 316	11 793	Onion (bulbs)
Sladak kupus	39 084	4 679	821	14 633	3 204	3 004	12 713	Sweet Cabbage
Paradajz	64 656	1 444	222	14 571	26 811	3 370	18 238	Tomatoes
Paprika	53 664	1 195	1 283	815	27 857	—	22 514	Paprika
<b>Voće</b>								<b>FRUITS</b>
Jabuke za jelo	77 747	3 159	95	22 540	16 091	8 474	27 388	Table Apples
Grožđe za jelo	43 757	2 864	723	1 304	28 499	70	10 297	Table Grapes
Grožđe za preradu	112 670	4 281	59	15 450	21 222	8 445	63 213	Grapes for Processing
Sveže šljive	14 402	4 280	39	372	—	1 040	8 671	Fresh Plums
Suve šljive	5 154	2 625	2	—	—	—	2 527	Prunes
<b>Alkoholna pića</b>								<b>ALCOHOLIC DRINKS</b>
Vino, hilj. lit.	161 830	3 349	339	35 968	30 072	16 389	75 713	Wine, thou.ltrs.
Meka rakija, hilj. lit.	24 540	—	15	140	—	—	24 405	Soft Brandy, thou. ltrs.
Ljuta rakija, hilj. lit.	6 026	390	55	409	1 177	10	3 985	Strong Brandy, thou.ltrs.
<b>Šteka</b>								<b>LIVESTOCK</b>
Mesnate svinje	304 581	7 376	191	58 247	2 879	19 049	216 819	Pig Meat
Masne svinje	43 243	2 584	326	11 494	767	2 262	25 810	Pig Fat
Goveda i junad za klanje	331 081	18 300	3 150	67 996	6 229	59 707	175 699	Cattle & Heifers f.slaughter.
Telad	41 008	10 926	606	10 871	1 142	7 012	10 951	Steers (Calves)
Ovce	9 978	1 781	957	496	1 881	—	4 863	Sheep
Jagnjad	27 182	3 649	2 517	1 775	9 394	—	9 767	Lambs
<b>Živina i jaja</b>								<b>POULTRY EGGS</b>
Živina	54 476	797	3	13 426	634	31 695	7 921	Poultry
Jaja, mil. kom.	924,8	5,5	7,0	252,8	108,7	53,0	100,8	Eggs (Mill.No.)
<b>Mleko i mlečni proizvodi</b>								<b>MILK PRODUCTS</b>
Sveže mleko, mil. lit.	594,5	31,5	5,0	163,6	20,7	140,8	232,9	Fresh Milk (Mill.Ltrs.)
Mlečni proizvodi, mil. din.	215,0	18,6	2,7	46,9	14,0	0,0	140,8	Dairy Products (Mill.Din.)
<b>Koža i vuna</b>								<b>HIDES AND WOOL</b>
Neprana vuna	760	65	20	110	295	—	270	Unwashed Wool
Sirova goveda i teleća koža	5 719	1 581	335	1 366	374	447	1 616	Raw Cattle & Calf Hides
Sirova svinjska koža	3 288	—	105	238	71	1 506	1 368	Raw Pig Hide
Suva ovčja i jagnjeća koža	2 472	609	241	395	255	—	972	Dry Sheep & Lamb Hide
<b>Ostali proizvodi</b>								<b>OTHER PRODUCTS</b>
Ogrevno drvo, hilj. pr. m	726	45	32	200	11	277	161	Wood for Heating (thou.
Tehnčko drvo, hilj. m <sup>3</sup>	1 098	26	14	93	1	821	143	Lumber, (thou.m <sup>3</sup> )
Ostalo mil. din.	518,5	89,0	11,3	85,5	28,5	78,5	225,9	Others (mill.din.)

**TURNOVER - ANALYSES BY GROUPS OF PRODUCTS - Million Dinars**

	Trgovina na malo		Trgovina na veliko		UKUPAN PROMET
	Retail Trade		Wholesale Trade		
	1961	1971	1961	1971	
<b>TOTAL SALES</b>					
Total	13,282,0	91,070,2	14,396,8	92,882,6	Ukupno
Food	3,959,7	29,086,6	2,317,1	16,140,9	Prehrana
Fodder	46,0	539,1	60,8	2,452,4	Stočna hrana
Tobacco	503,0	3,881,2	399,3	2,690,9	Duvan
Textiles	2,739,4	14,297,5	1,676,1	6,524,8	Tekstil
Leather	860,1	4,281,5	338,9	2,607,5	Koža i guma
Fuel	310,0	1,066,9	78,7	(520,0)	Ogrev
Metal Manufactures	1,348,5	9,520,2	4,008,2	26,629,5	Metalni proizvodi
China, Glass and Ceramics	162,0	1,340,9	220,4	2,008,1	Porculan, staklo i keramika
Electrotechn. Supplies	549,6	4,753,5	1,370,6	9,101,5	Elektrotehnički materijal
Chemical Products	510,8	2,779,9	984,6	5,742,4	Hemijski proizvodi
Plastic Matter Prods.	92,9	497,5	84,6	1,022,1	Proizvodi od plastičnih masa
Paper & Paper Prods.	482,7	2,176,2	303,1	1,921,2	Papir i proizvodi
Wood Manufactures	464,3	4,804,7	134,3	2,069,3	Drveni proizvodi
Liquid Fuels and Lubricants	394,4	5,363,2	565,4	3,239,1	Tečna goriva i masiva
Building Materials	440,5	4,206,1	627,5	5,894,6	Gradjevinaki materijal
Raw Materials and Waste	-	-	366,3	2,147,9	Sirovine i otpaci
Other Products	418,0	2,475,2	860,9	2,170,2	Ostali proizvodi

Source: SFRJ Stat. YRBK 72

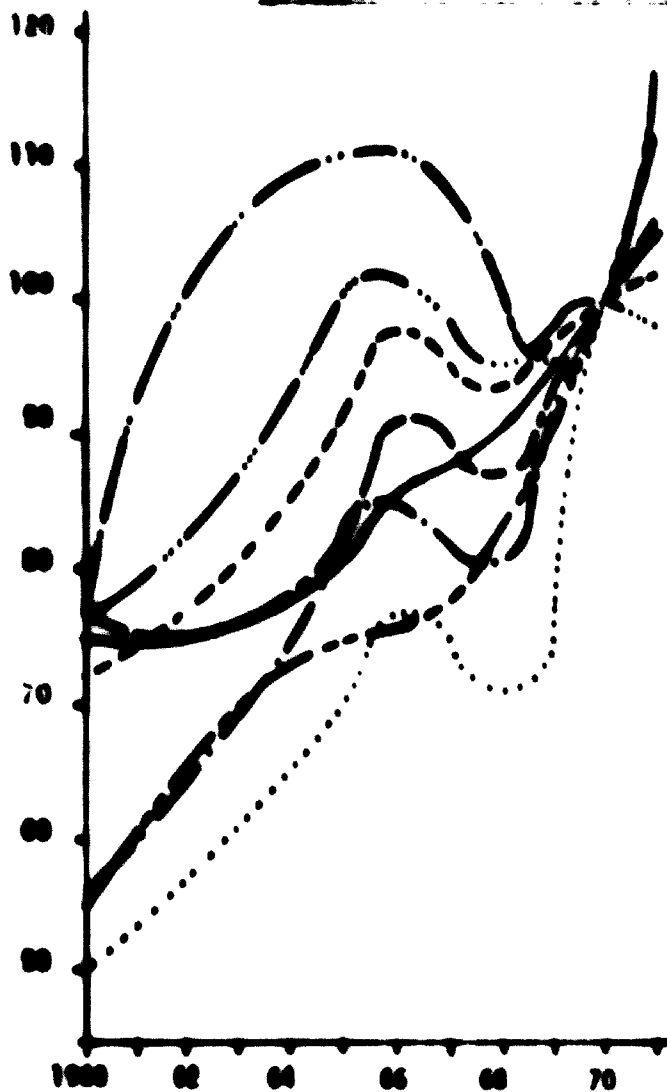
**AVERAGE MONTHLY QUANTITIES OF PURCHASED ARTICLES OF FOUR-PERSON WORKERS' HOUSEHOLDS - Kilograms**

	1967	1971
Bread and Baked Goods	32,7	30,2
Flour and Semolina	7,8	6,0
Paste Products	1,4	1,3
Rice	1,0	0,9
Meat and Fish	8,9	10,0
Meat and Fish Preparations	2,4	2,6
Lard	2,3	1,5
Edible Oil, Litres	2,6	2,9
Other Fats	0,3	0,2
Milk, Litres	24,6	24,1
Dairy Products	2,3	2,2
Eggs, Number	33,9	38,6
Potatoes	11,3	9,3
Beans	1,5	1,2
Other Fresh Vegetables	18,5	17,7
Vegetable Preparations	1,1	1,3
Apples	4,5	4,1
Grapes	0,7	1,4
Other Fresh Fruit	11,6	7,9
Fruit Preparations	0,8	1,0
Sugar	5,6	5,1
Wine, Litres	1,8	1,8
Brandy, Litres	0,6	0,5

Source: SFRJ Stat. YRBK 72

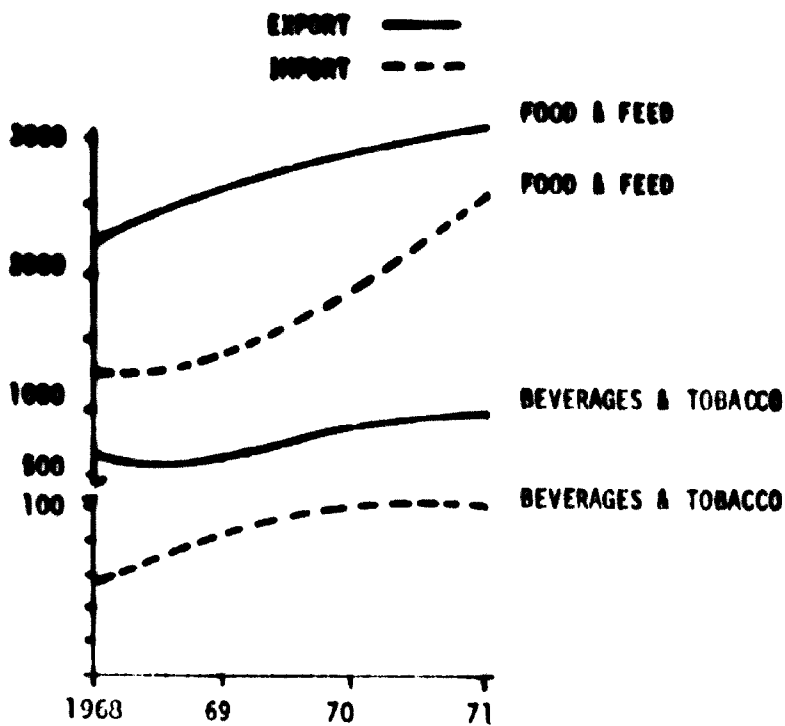
**INDEX NUMBERS OF EXPORT PRICES**

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Source: SFRJ Stat. YRBK 72

**EXPORTS AND IMPORTS OF FOOD, FEED, BEVERAGES AND TOBACCO**  
(Value, Million Dinars)



Source: SFRJ Stat. YRBK 72



## PROMET II TRGOVINI NA MALO PO ARTIKLIMA u 1971.

	Jedinica mere	SFRJ	Bosna i Hercegovina	Crna Gora	Hrvatska	Makedonija	Slovenija	SBRILJA	
<b>Prehrana</b>									
Pšenica i raž (bez semena)	tona	28 105	4 988	1 288	6 190	3 396	8 511	3 732	tons
Kukuruz u zrnu (bez semena)	"	126 685	38 023	9 983	32 746	4 384	16 077	25 472	"
Ostale žitarice	"	17 153	3 165	314	2 878	5 275	2 335	3 186	"
Pirinač	"	54 863	8 525	1 319	12 544	4 201	5 772	22 502	"
Pšenično brašno	"	923 538	305 933	36 005	135 112	108 941	48 486	289 061	"
Ostali proizv. mlevenja žitarica	"	38 089	5 775	2 099	17 469	925	6 443	5 377	"
Beli hleb i sve vrste peciva	"	282 462	23 555	7 069	86 213	13 602	56 143	95 880	"
Polubeli i crni hleb	"	722 625	66 246	19 854	156 893	81 274	67 159	331 199	"
Testenine	"	72 511	10 444	1 686	29 928	2 689	11 124	16 640	"
Ostali proizvodi od brašna	"	58 091	8 573	1 590	14 903	3 911	8 957	20 157	"
Svinjsko i praseće meso	"	60 851	2 068	1 036	20 694	2 024	12 415	22 614	"
Teleće i juneće meso	"	64 704	10 022	2 244	24 659	3 612	5 773	18 394	"
Goveđe meso	"	59 339	8 153	1 723	12 295	1 547	27 360	8 261	"
Ovčje i jagnjeće meso	"	20 267	4 503	1 545	4 694	2 281	150	6 494	"
Meso ostalih domaćih životinja	"	2 570	610	0 5	1 414	69 8	250	226	"
Meso domaće i divlje živine	"	34 447	2 347	631	13 067	1 310	9 822	7 270	"
Meso divljači, sve vrste	"	113	—	2 1	66 0	8 2	36 0	0 3	"
Sirovo salo i slanina	"	11 623	433	104	3 131	671	1 953	5 331	"
Ost. nepomen. neprer. proizvodi	"	17 034	906	135	3 465	535	5 319	6 674	"
Soljena, sušena i dimljena slanina	"	17 449	2 107	544	5 753	468	1 688	6 889	"
Suvo i dimljeno meso, sve vrste	"	14 900	1 575	481	5 401	399	3 120	3 924	"
Kobasičarski proizvodi	"	59 680	4 806	1 147	16 742	3 407	11 355	22 223	"
Mesne konzerve, sve vrste	"	27 120	3 935	775	8 700	1 338	3 195	9 177	"
Morska, jezerska i rečna riba	"	27 243	1 948	574	8 707	2 659	1 828	11 527	"
Soljena, sušena i dimljena riba	"	11 264	1 326	508	2 804	664	1 616	4 346	"
Jestiva životinjska i živinska mast	"	47 971	10 034	2 605	11 957	627	6 468	16 280	"
Jestiva biljna ulja i masti	"	149 299	28 228	2 937	34 949	13 506	17 617	52 062	"
Margarin	"	15 964	2 160	889	4 708	692	2 301	5 214	"
Sveže i kondenzovano mleko	hilj. lit.	265 770	29 039	4 292	70 595	18 668	56 309	86 867	thou. lit
Buter, maslo i kajmak	tona	11 662	1 932	318	2 779	329	2 752	3 552	tons
Sirevi, sve vrste	"	20 140	2 322	883	4 547	2 731	3 193	6 464	tons
Jaja (bez jaja u prahu)	hilj. kom.	328 976	46 729	16 808	81 795	45 861	42 018	95 765	thou.No.
Krompir	tona	114 085	17 305	4 739	40 804	3 094	15 230	32 913	tons
Pasulj	"	21 477	5 731	992	4 440	2 046	1 513	6 755	"
Sveži kupus i keli	"	37 342	7 688	1 230	10 358	1 730	3 178	13 158	"
Sveži paradajz	"	37 247	5 452	478	9 237	4 923	4 181	12 976	"

## SALES IN RETAIL TRADE - ANALYSIS BY COMMODITIES IN 1971 (contd.)

## PROMET U TRGOVINI NA MALO PO ARTIKLIMA u 1971 (nastavak)

	Jedinica mere	SFRJ	Bosna i Hercegovina	Crna Gora	Hrvatska	Makedonija	Slovenija	Srbija	
Sveža paprika	tona	23 451	3 512	510	5 725	4 777	2 304	6 623	Fresh Peppers tons
Crni i beli luk	"	21 926	2 965	705	6 231	1 175	2 731	8 119	Onion & Garlic "
Ostalo sveže i smrznuto povrće	"	21 763	1 970	110	5 540	1 446	5 503	7 106	Other Fresh & Frozen Veg. t
Paradajz-pire	"	5 285	817	125	2 336	80,4	894	1 033	Tomato Puree "
Konzerve povrća	"	27 409	4 367	599	10 124	1 263	1 379	9 757	Vegetable Cans "
Ukiseljeno povrće, sve vrste	"	17 874	2 218	286	5 983	225	4 251	4 911	Pickled Veg. all kinds "
Sveže jabuke sve vrste	"	66 454	8 767	1 913	21 716	2 784	5 474	25 800	Fresh Apples all kds. "
Sveže i smrznuto, grožđe	"	34 194	4 095	1 110	8 218	7 783	4 290	8 698	Fresh & Frozen Grapes "
Orasi, lešnici i bademi bez ljuske	"	2 070	246	140	358	72,0	274	900	Nuts, Hazel & Almonds (clean) "
Južno voće	"	100 261	10 318	1 753	29 788	5 342	14 237	38 823	Citrus tons
Ostalo nepomenuto sveže i smrznuto voće	"	30 906	3 452	589	10 486	2 426	4 715	9 228	Other Fresh & Frozen Fruit tons
Marmelada, pekmezi i džemovi	"	29 172	5 302	1 189	9 887	1 010	2 931	8 853	Marmelades, Jams "
Sokovi od voća, sirovi i koncentrovani	"	27 998	4 302	525	6 897	1 491	3 314	11 469	Fruit Juices, Raw and Concentrated "
Suvo voće, sve vrste	"	6 291	787	235	1 572	555	842	2 300	Dried Fruits "
Ostale nepomenute prerađevine od voća	"	5 386	496	35,1	1 298	80,5	1 088	2 387	Other Processed Fruit "
Šećer u prahu, kocki i kristalu	"	456 697	66 625	9 784	128 991	24 724	54 695	171 878	Sugar (all kinds) "
Bombone i slatkiji od šećera	"	36 482	4 568	672	9 548	3 134	3 977	14 583	Sweets "
Čokolada sve vrste	"	23 469	2 890	521	5 909	1 718	2 639	9 832	Chocolates "
Kakao	"	3 606	238	37,9	1 339	234	367	1 390	Cocoa "
Sirova, pržena i mlevena kafa	"	29 616	6 806	1 038	7 429	610	2 927	10 806	Coffee, all kinds "
Kuhinjska so	"	209 841	34 323	4 643	56 765	14 614	13 718	85 778	Salt "
Začini	"	5 876	691	151	1 174	380	617	2 863	Spices "
Čajevi i lekovito bilje, sve vrste	"	2 737	225	31,4	647	413	444	977	Tea (all kinds) "
Prirod., obično i kvalitetno vino	hilj. lit.	83 192	5 000	1 055	32 116	2 198	18 734	24 089	Wine thou. Lit.
Ostala vina	"	8 170	785	175	2 905	254	1 448	2 603	Other Wines "
Pivo	"	334 580	49 634	7 482	90 827	24 775	31 437	130 425	Beer "
Prirodna rakija	"	27 524	4 986	706	4 973	1 749	1 914	13 196	Brandy, Natural "
Ostala alkoholna pića	"	26 463	4 067	799	9 764	776	4 470	6 587	Other Alcohol Drinks "
Sirovi špirit, etil-alkohol do 80°	"	1 963	234	3,4	778	26,6	183	738	Alcohol, Ethyl "
Vinsko, voćno i ostalo sirće	"	23 533	769	430	7 610	1 903	4 994	7 827	Vinegar "
Limunada, oranžada, kokta	"	58 155	5 587	1 916	15 910	8 914	6 313	19 515	Soft Drinks "
Prirodna i veštačka mineralna voda	"	245 312	21 949	2 382	82 242	21 306	31 831	85 602	Natural & Artificial Mineral Water "
<b>Stočna hrana</b>									<b>FEEDSTUFF</b>
Suvo seno, sve vrste	tona	13 352	6 286	602	570	848	59,0	4 987	Hay tons
Zrnasta i druga stočna hrana	"	32 698	8 334	1 370	9 564	5 157	2 986	5 287	Feed grains "
Ostala stočna kabača hrana	"	13 407	4 995	4,1	3 150	2 468	170	2 620	Other Feedstuffs "
Proizvodi za stočnu hranu prehrambene industrije	"	315 238	56 807	7 417	77 565	24 436	36 657	112 356	Food Industry By-Products for Animal Feed "

4.a. YUGOSLAVIA - AGRICULTURE

GENERAL DATA ON DEVELOPMENT OF SOCIAL AGRICULTURAL HOLDINGS

Broj gazdinstava 1)	Površina u hilj. ha	Zaposleni na oseb. lje u h ilj. 3)	Osnovna sredstva 4) 7)	Investicije 5) 7)	Indeks proizvodnje 1955=100	Društveni proizvod 6) 7)	Neto proizvod 6) 7)	Lična prima 6) 7)	Otkup	Traktori	Uslovna grla i stoke
No. of Holdings	Area, Thou. Hect.	Persons Employed, Thou.	Assets 4) 7)	Investment 5) 7)	Index of Product, 1955=100	Social Product 6) 7)	Nett Product 6) 7)	Personal Receipts 6) 7)	Author. Purchase	Tractors	Livest. Head Av. Weight
M I L L I O N D I N A R S											
1961	4,133	239	5,690,6	841,3	252	1,041,4	808,7	510,4	1,236,4	32,965	488,736
1962	3,600	257	7,298,3	942,2	308	1,501,8	1,226,1	607,0	1,626,1	35,287	475,242
1963	3,156	259	8,524,2	1,088,4	356	1,861,1	1,535,1	724,1	2,030,6	38,184	409,020
1964	2,725	281	9,941,9	1,466,8	411	2,374,3	2,035,0	906,5	2,596,6	40,204	507,772
1965	2,559	284	11,369,9	1,701,8	411	3,630,5	3,247,2	1,352,0	3,856,3	40,340	496,742
1966	2,327	267	16,351,8	1,887,7	493	4,469,5	4,045,0	1,743,7	4,887,4	38,785	480,934
1967	2,238	256	18,315,5	1,727,7	504	4,350,0	3,776,6	1,732,4	5,396,0	34,782	463,549
1968	2,164	243	19,354,5	1,904,3	507	6,659,0	5,840,0	2,718,0	5,205,7	31,326	388,516
1969	2,073	208	19,424,7	1,886,2	544	7,594,5	6,626,2	3,128,3	5,583,0	29,153	387,679
1970	1,929	202	20,247,0	2,512,9	525	8,543,6	7,498,1	3,420,7	5,871,0	27,815	443,987
1971	1,817	201	...	...	641	...	...	...	8,437,7	25,747	454,741

1) Including agricultural combined establishments, estates and farms, peasant working co-operatives and agricultural organizations with economy/agricultural holding/.

2) Including land forming a part of social agricultural organizations. Utilized area/own + taken on lease - let out/.

3) At 31 December on the basis of annual report of social agric.holdings

4) Active fixed assets only.

5) Prior to 1965 the data were presented according to the annual report and from 1966-1968 according to the Social Auditing Accounting Service.

6) Including agricultural industry within social agric. organizations.

7) Data include, besides agric. holdings, agric. organizations without economy/institutions for plant and livestock protection and institutions for agricultural production improvement/.

Source: SFRJ Stat. YRBK 72

1) Obuhvaćeni su poljoprivredni kombinati, dobra i farme, seljačke zadruge i poljopriv. organizacije s ekonomijom (poljoprivrednim gazdinstvom)

2) Obuhvaćeno je zemljište unutar društvenih poljoprivrednih organizacija. Ko rišćena površina (vlastita+uzeta u zakup+data u zakup).

3) Stanje 31.XII na osnovu godišnjeg izvještaja društvenih poljoprivrednih o

4) Iskazana su samo aktivna osnovna sredstva.

5) Do 1965. podaci su prema kompleksnom godišnjem izvještaju a od 1966-1968. pr ema Službi društvenog knjigovodstva.

6) Obuhvaćena je poljoprivredna delatnost u okviru društ. poljop. organizacija.

7) Pored poljoprivrednih gazdinstava obuhvaćene su i poljoprivredne organ. bez ekonomije (ustanove za zaštitu bilja i stoke i ustanove za unapredje- nje poljoprivredne delatnosti).

Source: SFRJ Stat. YRBK 72

STRUKTURA POLJOPRIVREDE U 1971.

STRUCTURE OF AGRICULTURE IN 1971

Broj gazdinstava u hilj. tona val. 1969.	Računa snaga u hilj. tona lj. 1969.	Društveni proizvod 1970	Vrednost otpada 1970	Traktori	Ulovna grla stoke u hilj.	Obrada površina u hilj. ha.	Zemljište obilje u hilj. ha.	Pšenica u hilj. tona proiz. u hilj. tona	Rukovanje u hilj. tona proiz. u hilj. tona				
										No. of Holdings 1969	Manpower Thou. 1969	Social Product 1970	Value of Purchase
in Mill. Dinars													
Total	2,601,625	5,308	31,311.6	17,851	64,793	5,138	10,125	2,382	5,604	1,989	7,442	886	Ukupno
Social Holdings of Individuals	2,073	208	9,577.3	8,438	25,747	455	1,484	1,484	1,975	1,350	1,324	525	Društvena gazdinstva
Structure	2,599,552	5,219*	21,734.3	9,413	39,016	4,683	8,641	898	3,629	639	6,118	361	Individualna gazdinstva
	100	100	100	100	100	100	100	100	100	100	100	100	Struktura
Social Holdings of Individuals	0.1	4	31	47	40	9	15	62	35	68	18	59	Društvena gazdinstva
	99.9	96	69	53	60	91	85	38	65	32	82	41	Individualna gazdinstva

\* Agriculturalists and females who work mainly or periodically on holding. Estimated data.

\* Poljoprivrednici i žene koji pretežno ili povremeno rade na gazdinstvu.

POKAZATELJI RAZVOJA POLJOPRIVREDNIH GOSPODARSTAVA

INDICATORS OF DEVELOPMENT OF AGRICULTURAL HOLDINGS

Indeks proizvodnje 1955=100 uk- pro	društve- na gazdi netva	individual na gazdi netva	društve- na gazdi netva	individual na gazdi netva	učešća u otpu	T r i a k t o r i		Djeloma glra stoke u hilj.		Obrambiva pov.u hiljadara				
						uk- pro	individual na gazdi netva	uk- pro	individual na gazdi netva	uk- pro	individual na gazdi netva	uk- pro	individual na gazdi netva	
1966	153	493	132	44	56	50,965	38,785	12,180	5,739	481	5,258	10,200	1,442	8,770
1967	151	504	130	48	52	46,962	34,782	12,180	5,790	464	5,326	10,200	1,453	8,750
1968	146	507	123	49	51	43,506	31,326	12,180	5,790	388	5,402	10,200	1,468	8,720
1969	160	544	135	48	52	68,199	29,153	39,046	4,997	388	4,609	10,200	1,467	8,720
1970	154	525	130	44	56	66,861	27,815	39,046	5,213	444	4,769	10,153	1,489	8,664
1971	164	641	133	47	53	64,793	25,747	39,046	5,138	455	4,683	10,125	1,484	8,641

Source: SFRJ Stat. YRBK 72

NOVČANA PRIMA NA SEOSKIH DOMAĆINSTAVIMA (1970)  
 Prosek po anketiranom domaćinstvu u dinarima  
 CASH RECEIPTS OF AGRICULTURAL HOUSEHOLDS (1970)  
 Average per Interviewed Household - Dinars

	Uku- pno		O d g a z d i n s t v a		V a n g a z d i n s t v a		ostalo lo		
	sve- ga	ostalo	katere- tvo	vošara stvo i vinog- radnja.	rad u pre- duzećima i zadrug.	preost- ništvo i kućna razna		ostala prima ja od lo	
	Total	All	F r o m H o l d i n g				Other	Other	
			Crop Farming	Fruit Growing & Viti- culture	Live- stock Breed- ing	All	Work in Enterpris. and Cooperat.	Receipts from Work	
Total	14,213	5,551	1,071	506	3,688	8,662	5,675	1,085	1,424
Under 2 Hect.	12,901	2,336	459	269	1,439	10,565	7,557	1,064	1,386
2-3	13,048	4,375	1,023	380	2,782	8,673	5,629	1,034	1,643
3-5	14,206	6,302	1,172	661	4,184	7,904	4,831	1,258	1,374
5-8	15,402	8,665	1,853	766	5,619	6,737	4,255	844	1,282
Over 8 Hect.	17,880	10,703	1,640	716	7,793	7,177	3,783	1,200	1,533

Source: SFRJ Stat. YEAR 72

NOVČANA IZDAVANJA SREBNIH DOMAĆINSTVA (1970)  
 Program za poboljšanje domaćinstva u domaćinstvu

CASH EXPENDITURE OF AGRICULTURAL HOUSEHOLDS (1970)  
 Expenditures for Improved Household - Diners

Ukupno Total	Za godinu dana i u prvih šest meseci For holding and For Ancillary Activities				O n H o u s e h o l d				Ostalo Other	
	Agric. Produce	Centr. from Agric.	Gross Invest- ment	Ancill. Activities	All	Food	Tobacco and Drinks	Clothing and Footwear		Rest Fuel & Light
11,779	4,413	1,461	737	2,110	115	7,306	2,203	1,201	906	2,202
Under 2 Mest. 2-3	10,796	3,057	301	1,642	161	7,799	2,043	1,006	1,073	2,114
3-5	9,917	3,151	507	1,304	57	6,706	2,006	1,308	977	1,936
5-8	11,700	4,700	866	2,215	60	7,000	1,904	1,231	913	2,270
Over 8 Mest.	13,410	6,236	1,199	2,900	79	7,114	1,826	1,310	927	2,451
	14,706	6,825	1,329	3,000	190	7,900	2,000	1,353	966	2,992

Source: SFRJ Stat. Year 72



**1970-1972 SURVEY RESULTS - (1970)**  
**Panel 10 - Agricultural Machinery Owners**  
**NET INCOME OF AGRICULTURAL MACHINISTS (1970)**  
**Amount per Individual Household - Panel**

	Household Net Income		Sagittarius		Via Sagittarius	
	In Cash	Concept. of cash Products	In Cash	Concept. of cash Products	In Cash	Concept. of cash Products
<b>Total</b>	16,405	11,200	6,600	4,112	7,400	7,100
Under 2 Mact.	13,400	10,400	4,400	3,200	5,100	4,800
2-3	16,407	10,200	7,400	4,415	7,172	6,500
3-5	16,700	11,100	9,000	5,200	6,800	6,400
5-8	19,100	12,400	13,200	6,400	5,800	5,400
Over 8 Mact.	21,200	14,000	16,000	8,500	6,200	5,400

Source: SRSJ Stat. Table 72

**REPORT ON THE POLYVALENT LABOR MARKET - 1971.**

**TABLE 1. POLYVALENT LABOR MARKET - 1971**

Category	Total Persons Employed	Polyvalent (study)				Economists	
		Studied in detail & polyvalent	Substantive in 1/2	Substantive in 1/4	Substantive in 1/8	With Faculty and Higher School	With Secondary School
<b>TOTAL</b>	1,022	281,200	7,302	9,126	2,256	1,232	8,020
<b>AGRICULTURAL MECHANICS</b>	277	85,505	4,522	5,000	905	705	4,140
<b>AGRICULTURAL CO-OPERATIVE</b>	900	29,695	1,632	2,730	302	319	2,983

Source: SFMJ Stat. Year 72

**EXPORT FROM INDONESIA OF IMPORTANT ARTICLES TO COUNTRIES**

	Quantity in tons					Value in '000 Din.						
	1968	1969	1970	1971	1968	1969	1970	1971	1968	1969	1970	1971
<b>LARGE LIVEST./</b>												
Greece/	44560	34345	24268	41378	376916	324731	257639	424467				
Italy/	12681	2418	3734	12748	89998	18323	33212	129852				
Other/	28966	29126	19823	24492	266831	284660	218863	255126				
	2913	2881	1511	4138	20155	22348	13964	63489				
<b>HORSES/</b>												
France/	31685	58196	27821	39948	198466	338869	198889	326784				
Italy/	8900	11894	8897	18947	93894	76296	64288	98892				
Other/	22152	37401	18199	28236	135131	241438	129842	227887				
	1233	1761	725	357	7781	13175	7249	3772				
<b>FRESH MEAT EXCEPT POULTRY</b>												
Czechoslovakia/	94851	99612	71187	79688	1099783	1172274	1231994	1384528				
Greece/	-	-	6112	18867	-	-	92294	117362				
Italy/	16492	9782	9831	9978	189955	138451	149818	167152				
Great Britain/	39714	45985	35416	36599	561853	722179	782298	778987				
Other/	28198	15047	1319	962	199942	25286	19413	19845				
	10287	28878	18589	22890	148433	294438	272671	309892				
<b>CANNED MEAT</b>												
U.S.A./	19776	23798	25365	19628	348116	416198	514255	411770				
S.S.S.R./	5990	5221	5873	5786	138874	122491	159462	141881				
Great Britain/	7	4659	6184	2110	170	69953	98826	35462				
Other/	10311	9225	10828	8782	176429	169879	218885	189886				
	3468	4693	3280	2990	41443	54775	42762	58841				

KOOPERACIJA S INDIVIDUALNIM POLJOPRIVREDNIM GAZDINSTVIMA

SOCIAL SECTOR CO-OPERATION WITH AGRICULTURAL HOLDINGS OF INDIVIDUALS

1965 1966 1967 1968 1969 1970 1971	Zadrugeci <sup>1)</sup>			K o o p e r a c i j e			1965 1966 1967 1968 1969 1970 1971	
	u- pro	mu- ki	ženski	u- pro	u rata- reću	u voćarstvu i vi- nozrnatstvu 2)		u stočarstvu
Numbers of Co-operatives <sup>1)</sup>								
	Total	Male	Female	Youth	Total	In Crop Farming	In Fruit Growing and Viticulture 2)	in Livestock Breeding
	1,421,026	977,019	444,007	116,998	1,231,348	914,349	31,429	392,489
	1,345,019	896,803	448,216	117,431	1,240,784	952,292	35,096	349,627
	775,135	551,869	223,266	63,096	1,088,267	872,439	26,403	278,593
	840,767	...	...	...	1,082,000	801,621	51,155	312,069
	...	...	...	...	955,816	778,778	31,997	293,757
	...	...	...	...	925,077	702,279	32,966	316,531
	...	...	...	...	863,527	644,109	27,301	330,909

1) Including members of agricultural co-operatives and rural working co-operatives. Since 1966, the figure taken over from political statistics.

2) Including co-operators of agricultural co-operatives in other kinds of long-term planting.

1) Obuhvaćeni su članovi poljoprivrednih zadruga i selj-  
ačkih radnih zadruga. Od 1966. preuzet podatak iz poli-  
tičke statistike.

2) Obuhvaćeni i kooperanti poljoprivrednih zadruga u os-  
talim vrstama dugoročnijih zasadâ.

DRUŠTVENA POLJOPRIVREDNA GAZDINSTVA<sup>1)</sup>

		SFRJ	Bosna i Hercegovina	Crna Gora	Hrvatska	Makedonija	Slovenija	Srbija	
<b>Gazdinstva</b>	1970	1 925	183	40	301	239	132	980	<b>HOLDINGS</b>
	1971	1 817	160	36	377	215	120	901	
<b>Zaposlene osoblje</b>									<b>EMPLOYED PEOPLE</b>
<b>U poljopriv. delatnosti</b>	1970	131 067	6 095	934	25 026	14 562	9 922	73 720	<b>In Agricultural Activities</b>
	1971	129 300	6 300	1 060	24 285	15 126	9 401	73 120	
<b>Poljoprivredni stručnjaci</b>	1970	16 233	1 130	211	2 669	1 777	1 443	9 083	<b>Specialized Farmers</b>
	1971	16 514	1 104	204	2 660	1 800	1 392	9 274	
<b>Poljopr. zemljište u ha</b>	1970	2 157 150	176 200	31 499	393 403	470 019	85 413	991 556	<b>LAND IN HA</b>
	1971	2 195 969	175 366	31 217	407 439	495 231	81 526	1 005 190	
<b>Oranice i bašte</b>	1970	1 181 011	60 207	3 901	200 357	114 593	23 269	690 604	<b>Fields and Gardens</b>
	1971	1 197 200	50 805	2 324	293 670	115 109	23 771	703 609	
<b>Voćnjaci</b>	1970	42 654	7 719	737	4 733	6 264	4 636	10 565	<b>Orchards</b>
	1971	42 347	7 704	752	4 047	6 016	4 495	10 533	
<b>Vinogradi</b>	1970	27 901	1 216	574	4 006	7 676	3 223	11 206	<b>Vineyards</b>
	1971	28 064	1 204	600	3 090	8 459	3 143	10 760	
<b>Zemljište uzeto u zakup</b>	1970	30 306	99	53	7 307	1 129	3 064	26 574	<b>Rented Land</b>
	1971	33 111	77	—	5 530	2 785	1 515	23 196	<b>New Land</b>
<b>Osvajane nove površine</b>	1970	3 194	237	20	717	1 271	4	945	<b>Purchased Land</b>
	1971	12 790	720	—	236	10 564	100	1 162	
<b>Otkupljeno zemljište</b>	1970	19 063	292	—	3 926	1 000	205	13 400	<b>Purchased Land</b>
	1971	11 919	76	—	2 371	1 275	175	8 022	
<b>Pšenica</b>									<b>Wheat</b>
<b>Ukupan prinos u t</b>	1970	1 422 220	34 904	1 177	322 014	160 342	20 225	875 566	<b>Total Yield in t</b>
	1971	1 974 725	45 010	510	420 076	154 746	24 904	1 320 671	<b>Yield per ha in quintal</b>
<b>Prinos po ha u q</b>	1970	29,1	21,9	19,6	31,4	27,5	30,6	29,0	
	1971	40,6	36,4	24,9	45,2	25,0	42,1	42,2	
<b>Kukuruz</b>									<b>Maize</b>
<b>Ukupan prinos u t</b>	1970	1 044 903	32 506	69	493 030	5 725	17 442	536 131	<b>Total Yield in t</b>
	1971	1 324 261	35 209	206	500 930	12 573	19 522	755 653	<b>Yield per ha in quintal</b>
<b>Prinos po ha u q</b>	1970	55,0	46,4	27,5	54,8	50,0	51,3	55,9	
	1971	53,0	39,3	31,8	53,6	51,5	44,4	55,2	
<b>Stoka</b>									<b>Livestock</b>
<b>Goveda ukupno</b>	1970	346 522	16 012	2 560	90 457	11 730	41 362	176 393	<b>Cattle, Total</b>
	1971	353 547	15 059	2 272	96 445	12 737	47 757	179 277	
<b>Krave i steone junice</b>	1970	101 957	6 662	1 534	16 375	5 405	13 640	50 341	<b>Cows &amp; Heifers</b>
	1971	98 606	6 600	1 414	14 690	5 806	12 510	57 570	
<b>Svinje ukupno</b>	1970	1 040 065	55 543	3 732	275 670	19 166	89 575	596 371	<b>Pigs, Total</b>
	1971	1 072 949	50 423	5 189	207 010	23 975	85 274	612 270	
<b>Krmače i suprasno nazimice</b>	1970	90 924	5 931	579	16 004	2 513	8 774	56 243	<b>Sows</b>
	1971	80 821	6 316	433	16 422	2 606	7 092	55 152	
<b>Ovce ukupno</b>	1970	241 655	22 633	4 204	22 161	159 624	—	33 033	<b>Sheep, Total</b>
	1971	230 455	16 679	3 406	20 939	159 539	—	29 012	
<b>Ovce za priplod</b>	1970	109 353	16 746	2 932	17 721	120 693	—	23 261	<b>Ewes</b>
	1971	177 471	12 623	3 239	16 777	124 092	—	20 740	
<b>Konji ukupno</b>	1970	4 999	543	34	530	962	204	2 710	<b>Horses, Total</b>
	1971	4 093	375	20	363	803	206	2 230	
<b>Kobile i izrebrne omice</b>	1970	1 301	141	—	117	169	55	819	<b>Mares</b>
	1971	1 099	74	2	92	155	42	734	
<b>Prodaja goveda u t</b>	1970	140 681	3 595	367	63 254	1 421	13 305	50 739	<b>Sales of Cattle in t</b>
	1971	165 634	5 203	240	69 715	1 907	20 661	67 901	
<b>Prodaja svinja u t</b>	1970	153 942	5 770	564	53 549	2 137	11 079	80 042	<b>Sales of Pigs in t</b>
	1971	191 764	8 011	592	70 205	2 651	13 950	96 340	
<b>Kravlje mleko u hilj.lit.</b>	1970	334 514	19 290	4 282	55 215	10 776	44 630	192 306	<b>Cow Milk in 000 l.</b>
	1971	312 134	19 700	3 709	44 100	10 391	42 230	183 924	
<b>Po kravi muzari lit.</b>	1970	3 764	3 133	2 992	3 914	3 074	3 693	3 020	<b>Lit. of Milk per Lactation</b>
	1971	3 692	3 475	2 831	3 014	3 790	3 631	3 715	
<b>Poljoprivredne mašine</b>									<b>AGRICULTURAL MACHINERY</b>
<b>Traktori</b>	1970	27 402	1 449	155	5 194	2 420	1 107	17 069	<b>Tractors</b>
	1971	25 747	1 256	139	4 592	2 407	1 015	16 250	
<b>Kombajni ukupno</b>	1970	11 050	406	24	2 264	846	342	7 096	<b>Combines, Total</b>
	1971	11 266	447	21	1 942	849	300	7 707	
<b>Traktorske sejalice sa strna lita</b>	1970	4 730	249	20	795	510	180	2 960	<b>Sowing Machines (Tractor Driven)</b>
	1971	4 579	263	20	693	523	164	2 916	
<b>Traktorske košalice svih vrsta</b>	1970	2 344	166	32	425	135	309	1 277	<b>Mower Tractors</b>
	1971	2 103	160	30	376	126	229	1 102	
<b>Utrošak veštačkih đubriva u t</b>	1970	824 377	43 204	2 606	230 041	62 970	34 770	441 090	<b>Usage in Fertilizers in t</b>
	1971	825 413	39 706	1 803	242 962	47 655	32 156	461 131	

<sup>1)</sup> Poljoprivredni kombinati, dobra i farme, seljačke radne zadruge, poljoprivredne zadruge i ostala društvena poljoprivredna gazdinstva. Za 1971. godinu prethodni podaci.

1) Agricult. Kombinats, Estates and Farms, Farmers' Coops, Agric. Coops and other Social Agricult. Holdings. For 1971 Previous Data.

ZEMLJIŠTE PO KATEGORIJAMA KONČENJA (in thou. hectares)

Kategorija	1961-1970	1970	1971	SFRJ	Bosna i Hercegovina	Crna Gora	Hrvatska	Makedonija	Slovenija	Srbija	Agricultural Area
Poljoprivredna površina	14 010	2 619	570	3 391	1 419	936	5 888				
	14 095	2 636	531	3 368	1 367	946	5 849				
	14 985	2 985	534	3 344	1 351	925	5 886				
Oronina	7 482	1 198	65	1 582	688	287	3 885				
	7 497	1 196	65	1 588	583	275	3 888				
	7 485	1 146	63	1 576	545	276	3 889				
Žita	5 309	798	42	1 049	338	145	2 917				
	4 935	765	37	1 006	304	141	2 711				
	5 049	882	36	1 044	368	141	2 803				
industrijske bilje	393	21	1	35	68	4	252				
	418	15	1	48	65	4	277				
	388	13	0	53	66	4	252				
Povrno bilje	990	97	10	153	42	61	227				
	636	104	11	153	51	57	248				
	636	105	11	151	51	56	262				
Svežina hrane bilje	793	94	6	287	31	71	304				
	816	122	6	281	29	65	308				
	810	126	9	198	29	66	300				
Voćnjaci	435	68	9	69	19	34	236				
	484	73	9	78	28	36	246				
	457	74	10	78	19	37	247				
Vinoigradi	241	5	1	98	24	21	128				
	254	5	2	85	26	21	115				
	252	5	2	84	26	21	114				
Livade	1 928	488	114	467	47	299	688				
	1 948	481	112	488	47	323	687				
	1 951	485	115	488	45	318	688				
Pašnjaci	4 511	941	379	1 143	724	292	1 882				
	4 473	995	339	1 147	689	287	1 816				
	4 395	948	341	1 121	694	271	1 808				

Source: SFRJ Stat. YRBK 72

POVRŠINA I PROIZVODNJA - 1971

AREA AND PRODUCTION - 1971

	Požeta površina u hilj.ha	Proizvođnja u hilj.to.	Prinos po ha
	Area Harvested Thou.Hect.	Production Thou. Tons	Yield Quintals per Hect.

CEREALS			
	Požeta površina u hilj.ha	Proizvođnja u hilj.to.	Prinos po ha
	Area Harvested Thou.Hect.	Production Thou. Tons	Yield Quintals per Hect.
Bread Cereals <sup>1)</sup>	2,057	5,756	28,0
Wheat	1,929	5,604	29,1
Rye	110	134	12,2
Meslin	14	17	11,7
Maize	2,422	7,443	30,8
Barley	280	464	16,5
Oats	265	312	11,8
Rice	8	36	46,0

INDUSTRIJSKO BILJE			
	Požeta površina u hilj.ha	Proizvođnja u hilj.to.	Prinos po ha
	Area Harvested Thou.Hect.	Production Thou. Tons	Yield Quintals per Hect.
Hemp for Fibre <sup>2)</sup>	16,0	91,0	57,0
Sugar Beet	84,7	2,961,0	350,0
Flax for Fibre <sup>2)</sup>	2,0	5,0	24,0
Cotton	11,6	10,0	8,7
Tobacco	49,1	44,0	8,9
Sunflower	183,1	347,0	19,0
Hops	3,7	4,4	11,8
Rape-Seed	9,1	18,4	20,2
Soybeans	4,8	4,2	8,7
Castor Oil Plant	0,3	0,5	16,0
Poppy Seed <sup>5)</sup>	3,4	2,1	6,3
Sorghum	6,4	10,8	17,0

FODDER CROPS			
	Požeta površina u hilj.ha	Proizvođnja u hilj.to.	Prinos po ha
	Area Harvested Thou.Hect.	Production Thou. Tons	Yield Quintals per Hect.
Lucerne <sup>9)</sup>	362,0	1,892	51,0
Clover <sup>9)</sup>	231,0	992	39,0
Vetch <sup>10)</sup>	21,7	61	28,0
Cow Peas	3,7	11	30,0
Meadows	1,933,0	3,321	17,0
Pastures <sup>11)</sup>	4,351,0	1,533	3,5
Moha	3,0	11	36,0
Forage Beet <sup>12)</sup>	35,1	670	152,0

STOČNO KRMO BILJE			
	Požeta površina u hilj.ha	Proizvođnja u hilj.to.	Prinos po ha
	Area Harvested Thou.Hect.	Production Thou. Tons	Yield Quintals per Hect.
Lucerka <sup>9)</sup>	362,0	1,892	51,0
Detelina <sup>10)</sup>	231,0	992	39,0
Grahovica	21,7	61	28,0
Stočni grašak	3,7	11	30,0
Livade	1,933,0	3,321	17,0
Pašnjaci	4,351,0	1,533	3,5
Mohar	3,0	11	36,0
Stočna repa <sup>12)</sup>	35,1	670	152,0

VEGETABLE CROPS			
	Požeta površina u hilj.ha	Proizvođnja u hilj.to.	Prinos po ha
	Area Harvested Thou.Hect.	Production Thou. Tons	Yield Quintals per Hect.
Potatoes <sup>6)</sup>	326,0	2,952	89,0
Beans	39,7	173	10,0
Peas	16,0	18	11,0
Onions & Garlic <sup>7)</sup>	55,3	306	55,0
Cabbage <sup>8)</sup>	43,0	585	108,0
Paprika	38,0	294	87,0
Tomatoes	33,6	355	106,0
Melons & Water Melons	40,4	418	103,0

POVRŠNO BILJE			
	Požeta površina u hilj.ha	Proizvođnja u hilj.to.	Prinos po ha
	Area Harvested Thou.Hect.	Production Thou. Tons	Yield Quintals per Hect.
Krompir <sup>6)</sup>	326,0	2,952	89,0
Pasulj	39,7	173	10,0
Grašak	16,0	18	11,0
Crni i beli luk	55,3	306	55,0
Kupus i kelj	43,0	585	108,0
Paprika	38,0	294	87,0
Paradajz	33,6	355	106,0
Dinje i lubenice	40,4	418	103,0

1)Wheat, rye, meslin and spelt. 2)Yield of dry unretted stalk. 3)Yield of seed and fibre shown together. 4)The area refers to poppy for seed and pitch: production of seed. 5)Yield of stalk. 6)The harvested area and the yield per hect. refer to the pure crop only, and production to the pure crop and interplanted crop together 7)The harvested area and the yield per hect. refer to the main crop and production to the main and stubble crop. 8)The area and production of green and industrial paprika are given together while the yield per hect. is shown for the green paprika only. 9) The harvested area and the yield of hay per hect. refer to the pure crop, while production of hay includes the pure and sub-crop together. 10)Data on harvested areas, production and the yield per hect. refer to hay. 11)The harvested area and the yield of hay per hect. refer to the main crop. Production of hay for the main and stubble crop is shown together. 12)The harvesting area and the yield per hect. refer to the forage beet and production for the forage beet and turnip is shown together.

1)Pšenica,raž,napolica i krupnik. 2)Proizvođnja suve nemočene stabljike. 3)Proizvođnja semena i vlakna zajedno. 4)Površina maka za seme i smolu: proizvodnja semena. 5)Proizvođnja stabljike. 6)Požeta površina po ha. iskazani su samo za čist usev, a proizvodnja za čist usev i međjusev zajedno. 7)Požeta površina i prinos po ha. iskazani su za glavni usev, a proizvodnja za glavni i postimi usev. 8)Površina i proizvodnja industrijske i zelene paprike iskazana je zajedno, a prinos po ha. samo za zelenu papriku. 9)Požeta površina i prinos po ha. iskazani su samo za čist usev, a proizvodnja sena za čist usev i podusev zajedno. 10)Podaci o početim površinama, proizvodnji i prinosu po ha. za seno. 11)Požeta površina i prinos sena po ha. iskazani su za glavni usev. Proizvođnja sena iskazana je za glavni i postimi usev zajedno. 12)Požeta površina i prinos po ha. iskazani su za stočnu repu, a proizvodnja za stočnu repu i repu ugarinjaču zajedno.

HARVESTED AREA OF CEREAL CROPS (in hectares)  
**POŽETA POVRŠINA RATARSKIM USEVA (u hektarima)**

		SRJ	Bozna i Hercegovina	Crna Gora	Hrvat- ska	Mako- donija	Slove- nija	Srbija	
Pšenica	□ 1961—70	1 957 535	222 829	7 235	398 686	146 842	55 725	1 128 018	Wheat
	1970	1 831 236	201 851	6 990	407 653	136 701	59 612	1 041 089	
	1971	1 928 810	198 962	6 192	404 150	140 466	60 113	1 118 919	
Raž	□ 1961—70	147 113	14 767	1 561	20 374	49 683	12 367	40 451	Rye
	1970	112 819	10 198	1 160	14 771	36 825	10 556	30 509	
	1971	109 563	9 466	1 132	14 362	37 371	9 326	37 916	
Jačam	□ 1961—70	347 647	83 877	11 887	99 588	50 889	14 188	128 981	Barley
	1970	279 688	71 666	10 664	49 765	43 881	11 655	92 128	
	1971	288 287	69 926	10 198	51 997	42 328	10 826	94 940	
Ovas	□ 1961—70	386 742	96 233	5 394	52 201	19 972	13 987	119 838	Oats
	1970	232 748	86 425	4 552	40 748	18 741	11 152	121 128	
	1971	264 568	86 791	4 597	39 915	16 748	9 726	106 791	
Kukuruz	□ 1961—70	2 468 035	261 782	15 873	518 422	58 887	44 313	1 481 638	Maize
	1970	2 282 225	223 411	13 254	509 894	54 831	48 968	1 408 647	
	1971	2 422 273	318 723	13 629	523 247	53 283	47 679	1 466 792	
Konoplja za vlakno	□ 1961—70	26 584	2 852	71	6 889	352	24	26 396	Hemp for Fibre
	1970	17 952	1 591	35	3 878	193	9	13 854	
	1971	16 843	1 564	31	2 953	179	7	11 388	
Lan za vlakno	□ 1961—70	4 687	1 881	22	1 678	17	186	1 844	Flax for Fibre
	1970	2 218	725	19	869	—	25	588	
	1971	2 848	873	21	647	—	19	488	
Pamuk	□ 1961—70	10 325	—	—	—	10 192	—	133	Cotton
	1970	13 543	—	—	—	13 433	—	110	
	1971	11 641	—	—	—	11 534	—	107	
Šećerna repa	□ 1961—70	88 729	2 248	—	21 888	4 578	72	60 831	Sugar Beet
	1970	88 137	1 217	—	20 811	4 376	7	59 526	
	1971	84 726	1 811	—	20 848	4 823	6	58 828	
Duvan	□ 1961—70	52 877	6 138	511	3 244	27 582	—	15 182	Tobacco
	1970	53 358	5 888	398	4 538	28 672	—	13 658	
	1971	49 189	5 148	261	4 599	27 127	—	11 962	
Hmelj	□ 1961—70	3 857	—	—	54	—	2 415	1 388	Hops
	1970	3 757	—	—	57	—	2 489	1 241	
	1971	3 753	—	—	59	—	2 454	1 240	
Suncokret	□ 1961—70	158 379	2 818	—	14 188	10 385	199	122 926	Sunflower
	1970	194 452	758	—	11 384	13 682	149	168 567	
	1971	183 184	325	—	10 358	16 972	156	155 381	
Krompir <sup>1)</sup>	□ 1961—70	321 848	54 249	6 831	188 822	8 586	58 523	95 989	Potatoes <sup>1)</sup>
	1970	329 364	54 788	7 195	182 523	9 956	47 898	108 815	
	1971	325 586	57 748	7 173	99 619	9 592	48 195	106 179	
Pasulj <sup>2)</sup>	□ 1961—70	26 518	11 996	391	5 878	3 647	1 221	13 377	Beans <sup>1)</sup>
	1970	39 331	12 422	421	5 847	4 287	1 256	15 898	
	1971	39 783	12 328	412	5 628	4 582	1 173	15 738	
Kupus i kelj <sup>2)</sup>	□ 1961—70	28 526	8 666	873	9 988	1 339	2 845	14 824	Cabbage & Kale <sup>2)</sup>
	1970	42 317	9 686	969	10 297	1 818	2 679	16 948	
	1971	43 351	9 857	968	10 396	1 888	2 665	17 585	
Lucerka <sup>1)</sup>	□ 1961—70	329 118	23 451	4 974	62 664	10 165	17 853	218 883	Lucerne <sup>1)</sup>
	1970	362 228	32 244	6 453	68 785	13 128	17 484	224 214	
	1971	362 276	34 949	6 249	67 319	13 969	17 868	222 722	
Detelina <sup>1)</sup>	□ 1961—70	225 133	33 483	212	78 881	866	25 511	87 888	Clover <sup>1)</sup>
	1970	233 313	40 453	464	75 898	977	24 889	92 265	
	1971	231 886	41 385	478	74 817	1 289	23 674	89 171	
Livado	□ 1961—70	1 922 394	485 773	112 911	463 374	46 992	296 984	596 368	Meadows
	1970	1 932 878	394 516	113 616	458 896	46 512	322 964	605 169	
	1971	1 933 520	405 517	114 282	451 886	44 957	309 601	608 877	

<sup>1)</sup> Požeta površina čistog useva. Harvested area  
<sup>2)</sup> Požeta površina glavnog useva. Harvested area of the main



PRODUCTION OF AGRICULTURAL CROPS (in thou. tons)  
 PROIZVODNJA RATARSKIH USEVA (u hiljadama тона)

		SFRJ	Bosna i Hercegovina	Crna Gora	Hrvat- ska	Maka- donija	Slove- nija	Srbija	
Pšenica	1961-70	4 044	330	12	906	259	125	2 412	Wheat
	1970	3 790	273	12	858	303	134	2 210	
	1971	5 604	390	13	1 227	300	159	3 907	
Raž	1961-70	761	17	2	27	45	10	52	Rye
	1970	127	11	1	10	26	16	45	
	1971	134	12	1	23	37	15	46	
Jačam	1961-70	542	89	13	86	61	26	267	Barley
	1970	482	76	12	61	64	21	160	
	1971	464	74	11	66	52	21	219	
Ovas	1961-70	377	95	6	71	14	22	129	Oats
	1970	309	85	5	50	14	10	137	
	1971	312	95	5	59	11	15	127	
Kukuruz	1961-70	6 481	527	24	1 540	89	136	4 168	Maize
	1970	6 933	547	19	1 724	100	146	4 309	
	1971	7 443	666	20	1 700	100	134	5 020	
Konoplja za vlakno <sup>1)</sup>	1961-70	223	0	0	41	0	0	174	Hemp for Fibre <sup>1)</sup>
	1970	106	5	0	15	0	0	86	
	1971	91	5	0	17	0	0	69	
Lan za vlakno <sup>1)</sup> u tonama	1961-70	10 967	3 211	44	4 992	30	247	2 482	Flax for Fibre <sup>1)</sup>
	1970	5 087	1 704	50	2 784	—	71	1 201	
	1971	4 986	1 340	45	2 414	—	34	1 153	
Pamuk <sup>2)</sup> u tonama	1961-70	8 039	—	—	—	7 047	—	92	Cotton <sup>2)</sup> (in tons)
	1970	11 966	—	—	—	11 067	—	99	
	1971	10 000	—	—	—	9 965	—	115	
Šećerna repa	1961-70	2 093	56	—	705	126	2	1 924	Sugar Beet
	1970	2 940	20	—	779	165	0	1 974	
	1971	2 961	21	—	730	159	0	2 023	
Duvan <sup>3)</sup>	1961-70	47	7	0	3	26	—	14	Tobacco <sup>3)</sup>
	1970	49	7	0	5	24	—	12	
	1971	44	5	0	6	22	—	11	
Hmelj u tonama	1961-70	5 246	—	—	87	—	3 064	2 095	Hops (in tons)
	1970	5 252	—	—	107	—	3 431	1 714	
	1971	4 410	—	—	147	—	2 577	1 686	
Suncokret	1961-70	253	3	—	24	10	0	216	Sunflower
	1970	264	1	—	17	16	0	230	
	1971	347	0	—	22	20	0	305	
Krompir <sup>4)</sup>	1961-70	2 059	341	41	905	66	682	824	Potatoes <sup>4)</sup>
	1970	2 964	374	45	870	83	622	970	
	1971	2 952	341	41	824	84	596	1 066	
Pasulj <sup>4)</sup>	1961-70	194	20	1	41	10	9	95	Beans <sup>4)</sup>
	1970	180	20	2	32	13	7	99	
	1971	171	25	1	30	13	6	96	
Kupus i bolj <sup>5)</sup>	1961-70	551	77	9	134	26	68	237	Cabbage & Kale <sup>5)</sup>
	1970	619	77	10	146	28	70	270	
	1971	505	80	10	114	44	52	205	
Lucerka <sup>6)</sup>	1961-70	1 043	105	23	349	63	100	1 194	Lucerne <sup>6)</sup>
	1970	2 106	153	34	380	85	100	1 354	
	1971	1 072	120	23	307	87	87	1 200	
Drozdina <sup>6)</sup>	1961-70	1 044	119	7	444	4	155	321	Clover <sup>6)</sup>
	1970	1 136	160	3	440	4	130	411	
	1971	992	115	2	363	5	110	309	
Livade	1961-70	3 707	521	137	1 110	103	900	936	Meadows
	1970	4 052	550	177	1 115	107	961	1 134	
	1971	3 321	366	109	922	96	794	1 037	

<sup>1)</sup> Proizvodnja suve nemožane stabljike.

<sup>2)</sup> Proizvodnja semena i vlakna zajedno.

<sup>3)</sup> Proizvodnja presušenog lista, netermensiran.

<sup>4)</sup> Čist usjev i međusjev zajedno.

<sup>5)</sup> Glavni i posadni usjev zajedno.

<sup>6)</sup> Čist usjev i podusjev zajedno.

- 1) Production of dry stalks  
 2) Production of seed and fibre shown together  
 3) Production of dried non-fermented leaves

- 4) Sole crop and interplanted crop shown together  
 5) Main and stubble crop shown together  
 6) Pure crop and subcrop shown together

ZASEJANE POVRŠINE VAŽNIJIH USEVA 1971  
U hiljadama hektara

AREAS SOWN WITH MAJOR CROPS - 1971  
Thousand Hectares

Wheat	1,931	Pšenica
Rye	110	Rai
Barley	282	Jačam
Oats	266	Ovas
Maize	2,430	Kukuruz
Hemp	16	Konoplja
Sugar Beet	85	Šećerna repa
Sunflower	184	Suncokret
Tobacco	50	Duvan
Potatoes	328	Krompir
Beans	40	Pasulj
Peas	16	Grahak
Cabbage and Kale	44	Repas i kelj
Lucerne	364	Lucerka
Clover	234	Detelina
Vetch	22	Grahorica

Source: SFRJ Stat. YRBK 72

VOĆA I PROJEKCIJA I PROJEKCIJA VOĆA - 1971

FRUIT TREES AND PRODUCTION OF FRUIT - 1971

Stabla u hilj.				
Uku- pno	Sposobna za rod	Proizvodnj a u hilj, tona	Prinos po stablu kg	
Trees - Thousands				
Total	Trees of Bearing Age	Production Thou. Tons	Yield per Tree - Kg.	
Apples	22,308	17,151	327.0	19 Jabuke
Pears	9,610	8,042	111.6	14 Kruške
Quinces	1,135	944	12.9	14 Dunje
Plums	84,206	72,170	817.0	11 Šljive
Cherries	4,531	3,773	59.1	16 Trešnje
Sour Cherries	6,752	4,287	47.2	11 Višnje
Apricots	1,975	1,636	16.9	10 Kajsije
Peaches	5,486	4,541	61.5	14 Breskve
Walnuts	3,425	2,647	33.6	13 Orasi
Olives	4,738	4,433	15.6	4 Masline
Figs	1,788	1,602	17.5	11 Šakve
Citrus Fruits	150	110	1.6	15 Agrumi

Source: SFRJ Stat. YRBK 72

FRUIT TREES AND PRODUCTION OF FRUIT  
VOĆNA STABLA I PROIZVODNJA VOĆA

	SFRJ	Bosna i Hercegovina	Crna Gora	Hrvatska	Makedonija	Slovenija	Srbija
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VOĆNA STABLA SPOSOBNA ZA ROD u hiljadama - FRUIT TREES - TREES OF BEARING AGE (in thou.)

Jabuke	Ø 1961—70	13 968	1 620	140	1 009	1 095	3 190	6 031	Apples
	1970	16 433	1 706	169	2 091	1 534	3 292	7 561	
	1971	17 151	1 834	172	2 135	1 692	3 337	7 901	
Kruške	Ø 1961—70	6 622	1 090	115	814	469	900	3 226	Pears
	1970	7 674	1 168	139	892	563	1 039	3 873	
	1971	8 042	1 226	141	905	606	1 150	4 006	
Šljive	Ø 1961—70	66 273	11 709	1 031	5 766	1 105	956	45 706	Plums
	1970	72 316	12 724	1 100	6 141	1 292	963	50 096	
	1971	72 170	12 906	1 090	6 342	1 352	1 000	49 472	
Trešnje	Ø 1961—70	3 429	721	50	679	120	349	1 507	Cherries
	1970	3 702	818	54	722	140	324	1 644	
	1971	3 773	845	56	734	142	318	1 670	
Višnje	Ø 1961—70	3 108	160	30	1 185	26	35	1 672	Sour Cherries
	1970	4 183	219	34	1 392	49	33	2 376	
	1971	4 287	226	35	1 475	31	30	2 490	
Kajsije	Ø 1961—70	1 665	43	6	162	241	30	1 175	Apricots
	1970	1 631	50	7	165	234	42	1 133	
	1971	1 636	51	7	172	232	42	1 132	
Breskve	Ø 1961—70	3 517	164	40	591	245	429	2 040	Peaches
	1970	4 330	245	65	633	286	494	2 615	
	1971	4 541	281	100	600	261	496	2 715	
Orasi	Ø 1961—70	2 446	525	37	418	135	205	1 126	Walnuts
	1970	2 601	550	39	435	129	206	1 234	
	1971	2 647	562	39	440	130	206	1 262	
Maslina	Ø 1961—70	4 506	5	511	4 002	—	60	—	Olives
	1970	4 542	5	490	3 902	—	65	—	
	1971	4 433	5	487	3 879	—	62	—	
Smokve	Ø 1961—70	1 692	220	226	1 191	10	45	—	Figs
	1970	1 640	224	274	1 113	12	37	—	
	1971	1 602	229	261	1 070	12	30	—	

PROIZVODNJA VOĆA - PRODUCTION OF FRUIT

Jabuke u hilj. тона	Ø 1961—70	267	25	2	40	36	60	104	Apples (thou. tons)
	1970	277	19	2	53	50	46	100	
	1971	327	32	2	57	63	34	139	
Kruške u tonama	Ø 1961—70	90 175	14 492	1 430	11 761	8 834	12 232	41 410	Pears (tons)
	1970	111 930	15 346	1 532	12 024	12 870	11 009	59 061	
	1971	111 667	16 502	2 316	12 756	11 500	12 596	55 029	
Šljive u hilj. тона	Ø 1961—70	827	146	11	77	25	9	559	Plums (thou. tons)
	1970	896	173	7	70	30	4	602	
	1971	817	125	10	77	24	5	560	
Trešnje u tonama	Ø 1961—70	53 793	11 164	712	9 117	3 054	5 599	24 147	Cherries (tons)
	1970	53 002	13 004	555	1 193	3 409	3 627	24 054	
	1971	59 166	14 467	749	9 951	3 434	3 649	26 096	
Višnje u tonama	Ø 1961—70	31 577	1 321	247	10 431	402	230	10 930	Sour Cherries (tons)
	1970	30 607	1 652	199	13 230	713	153	22 740	
	1971	47 241	2 249	244	17 125	474	143	27 006	
Kajsije u tonama	Ø 1961—70	26 720	501	44	1 964	4 449	460	19 310	Apricots (tons)
	1970	22 512	518	44	1 936	4 753	524	14 737	
	1971	16 907	290	62	1 860	3 294	317	11 076	
Breskve u tonama	Ø 1961—70	43 869	3 037	366	6 945	3 776	5 612	25 133	Peaches (tons)
	1970	56 671	3 770	692	7 357	5 300	5 929	33 543	
	1971	61 100	3 703	1 302	8 132	4 350	7 050	36 875	
Orasi u tonama	Ø 1961—70	33 269	5 945	516	4 597	3 754	1 779	16 670	Walnuts (tons)
	1970	33 945	5 806	422	4 670	3 542	1 596	17 030	
	1971	33 650	5 879	500	4 900	3 350	1 324	17 593	
Maslina u tonama	Ø 1961—70	24 243	23	2 046	21 031	—	343	—	Olives (tons)
	1970	7 762	20	20	7 422	—	202	—	
	1971	15 625	30	1 379	13 942	—	274	—	
Smokve u tonama	Ø 1961—70	21 340	3 815	3 402	13 599	100	336	—	Figs (tons)
	1970	22 272	3 320	4 924	3 426	310	204	—	
	1971	17 552	3 734	3 440	9 906	241	151	—	

WINE PROCESSING OF FRUITS AND GRAPES

		SFRJ	Bosna i Herce- govina	Crna Gora	Hrvatska	Maba- danija	Slovenija	Srbija
Dried Fruit, Tons	1961-70	31,174	10,482	476	3,624	253	535	15,804
	1970	31,194	11,714	338	2,951	346	327	15,517
	1971	21,384	5,596	411	2,877	275	313	11,912
Prunes, Tons	1961-70	24,781	8,913	144	392	154	164	15,014
	1970	26,222	10,659	96	251	194	99	14,923
	1971	16,720	4,502	167	313	186	89	11,303
Brandy, 100 Hectolitres	1961-70	14,118	1,393	154	1,819	735	164	9,853
	1970	14,502	1,553	124	1,948	927	132	9,818
	1971	14,077	1,272	243	1,769	808	144	9,841
Plum Brandy, 100 Hectolitres	1961-70	9,644	1,248	109	798	201	56	7,232
	1970	10,818	1,420	72	888	241	38	8,198
	1971	10,495	1,147	191	805	196	47	8,109
Production of Wine, 100 Hectolitres	1961-70	56,787	1,013	223	22,986	4,127	4,937	22,501
	1970	54,031	1,285	255	24,529	5,572	5,704	16,606
	1971	55,455	1,318	242	23,160	5,910	5,419	19,406

Source: SFRJ Stat. Year 72

CONSUMPTION OF MANUFACTURED FERTILIZERS  
(tons)

SFRJ	Bosna i Hercegovina	Crna Gora	Hrvatska	Makedonija	Slovenija	Srbija
1962	1,434,331	3,563	391,000	67,567	100,770	781,397
1967	2,140,826	6,769	513,436	103,469	106,693	1,274,028
1971	1,747,163	8,931	431,283	66,901	109,211	1,003,928

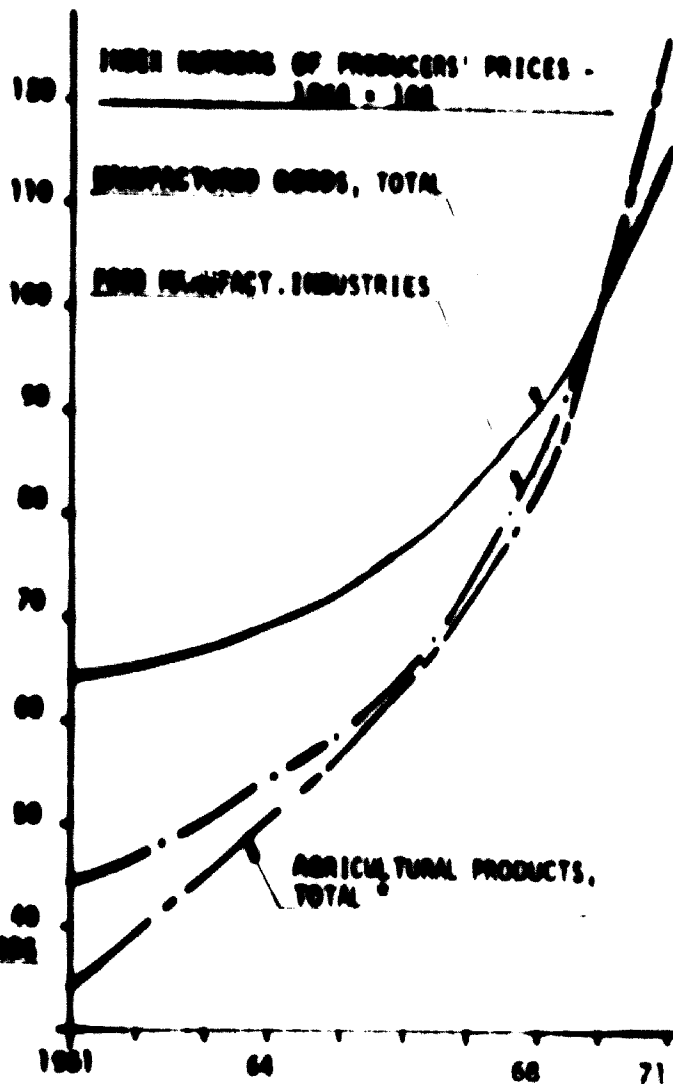
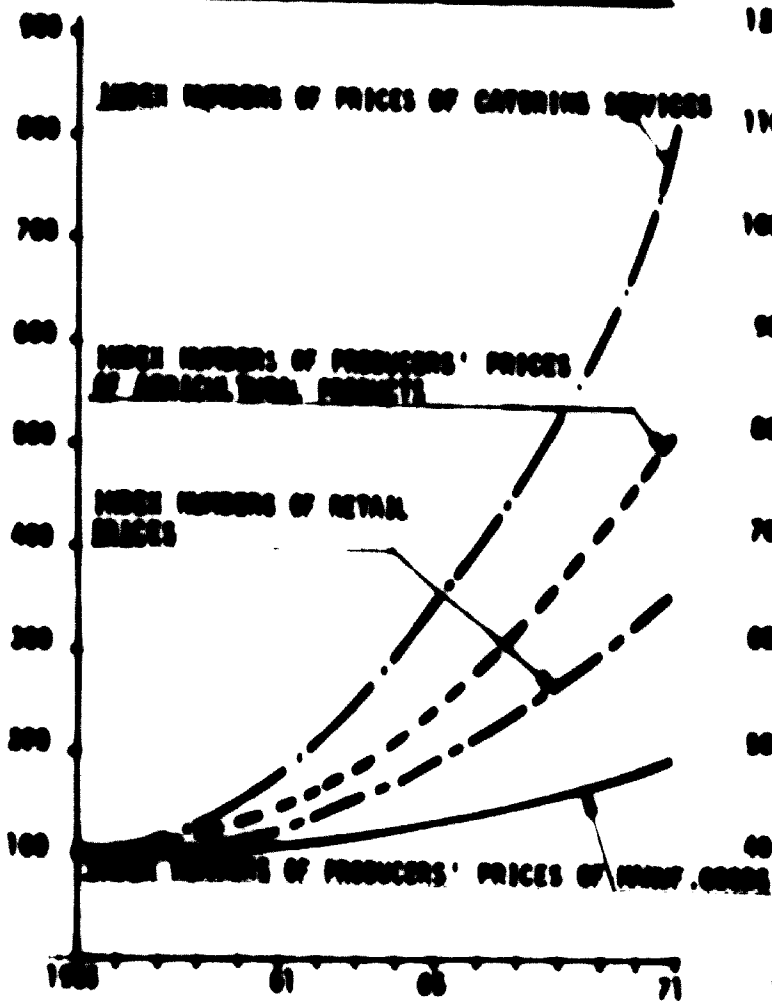
SOURCE: SFRJ Stat. YEAR 72

CONSUMPTION OF MANUFACTURED FERTILIZERS  
(tons)

Total	Nitrogenous Fertilizers	Phosphatic Fertilizers	Potassic Fertilizers	Total	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
1962	1,434,331	634,800	661,143	1,300,308	134,577	111,733	78,081
1967	2,140,826	899,314	971,591	2,069,921	206,929	177,499	131,996
1971	1,747,163	1,007,663	468,320	271,180	333,117	174,637	161,556

SOURCE: SFRJ Stat. YEAR 72

**INDEX OF PRICES OF MANUFACTURED GOODS**



Source: SPWJ Stat. YEAR 72

• Index of producers' prices of agric. products is computed on the basis of prices at which co-operatives and other authorized organizations purchase agricultural products from individual producers and prices at which social holdings sell their agricultural products.

ROFERNCIJA SA INDIVIDUALNIM POLJOPRIVREDNIM GOSPODSTVIMA U STOCARSTVU \*

SOCIAL SECTOR CO-OPERATION WITH AGRICULTURAL HOLDINGS OF INDIVIDUALS IN LIVESTOCK BREEDING\*

1964 1965 1966 1967 1968 1969 1970 1971	G o v e d a						S v i n j e			P i g s			Poultry Total	
	Broj parnika	uš- pro	uš- pro	uš- pro	uš- pro	uš- pro	uš- pro	uš- pro	uš- pro	uš- pro	uš- pro	uš- pro		uš- pro
No. of Co- operators	Total	Fattened Calves	Fattened Heifers	Baby-Beef ov. 350 kg.	Mature Cattle	Total	Bacon	Fattened Pigs for Pork	Fattened Pigs for Fat	Sheep Total	Poultry Total			
444,482	216,987	18,664	107,502	76,932	12,573	1,679,405	103,166	1,464,898	111,341	64,466	2,365,564			
392,489	282,995	51,121	82,449	129,183	12,164	1,776,215	117,351	1,536,643	122,221	65,176	3,345,532			
349,627	335,938	78,057	126,746	118,866	8,848	1,091,319	54,912	975,268	61,132	86,737	6,223,356			
278,593	366,922	135,828	118,540	104,213	8,341	1,077,657	57,900	944,062	75,695	69,098	9,838,093			
312,069	338,353	172,822	75,374	83,461	6,696	957,937	57,632	843,932	56,373	64,178	12,099,602			
293,757	331,574	158,697	69,493	96,361	7,023	935,140	48,356	828,943	57,841	35,152	15,870,971			
318,390	393,619	212,148	62,373	114,227	4,871	1,369,742	71,324	1,211,425	86,993	41,779	23,269,263			
330,989	414,261	236,938	70,840	98,512	7,971	1,693,527	50,833	1,554,147	88,547	61,247	23,901,000			

\* Number of head delivered by holdings of individuals to co-operative on the basis of contract co-operation.

\* Broj grla koja su individualna gospodstva isporučila zadruzi na osnovu ugovora o kooperaciji.





**INDIA PRODUCTION IN AGRICULTURE AND ALLIED ACTIVITIES - 1971**

**LIVESTOCK PRODUCTION AND RELATED ACTIVITIES - 1971**

Produced in million metric tonnes									
	grain	straw	crop	hides	skins	carcasses	by-products	eggs	other
	u. h. l.	u. h. l.	u. h. l.	u. h. l.	u. h. l.	u. h. l.	u. h. l.	u. h. l.	u. h. l.
	thous.	thous.	thous.	thous.	thous.	thous.	thous.	thous.	thous.
Production of Meat (cold storage)									
Cattle									
Head	175,773	2,111	195,200	287	6,619	93,005	68,003	312,130	3,000
Weight									
Thous.									
Cows Milk									
Head									
Weight									
Thous.									
Pigs									
Head									
Weight									
Thous.									
Sheep									
Head									
Weight									
Thous.									
Poultry									
Head									
Weight									
Thous.									
TOTAL									
	953	175,773	2,111	195,200	287	6,619	93,005	68,003	312,130
AGRI-INDUSTRIAL									
COMBUSTIBLES	256	83,100	1,274	119,000	149	3,005	68,700	51,000	272,100
EQUIPMENT OF AGRICULT.									
CO-OPERATIVES	121	25,000	302	30,307	75	1,500	14,101	5,000	29,700

Source: SFPU Stat. VIII 72

**MINNESOTA STATE - 1971**  
**U. S. BUREAU OF AGRICULTURE**  
**BALANCE OF LIVESTOCK AND POULTRY - 1971**  
**Millions of Pounds**

	No. at the Beginning of Year	No. of Livestock Bred	Imports	Exports	Slaughter	Purish-	No. at the End of Year	Stock on hand		Stock on hand at the beginning of year
								Imports	Exports	
Cattle	5,128	2,179	0	126	1,000	89	5,148	900	2,000	190
Pigs	6,002	11,000	0	0	11,000	1,307	6,276	3,220	9,000	4,633
Sheep	8,700	5,772	0	205	5,000	404	8,205	600	4,700	1,631
Poultry	60,000	200,100	0	200	175,000	30,000	60,000	72,000	100,000	50,000

SOURCE: USDA Stat. YEAR 72

## LIVESTOCK AND POULTRY

## STOKA I ŽIVINA

		SFRJ	Bosna i Hercegovina	Crna Gora	Hrvatska	Makedonija	Slovenija	SRBIJA	
<b>Goveda</b>	1970	5 029	990	158	963	282	489	2 147	CATTLE
	1971	5 138	998	157	981	288	507	2 207	
	1972	5 148	954	147	976	302	509	2 261	
<b>Krave i stovne junice</b>	1970	2 786	586	84	623	106	261	1 126	COWS AND HEIFERS
	1971	2 774	588	84	620	106	258	1 117	
	1972	2 786	579	83	613	109	257	1 144	
<b>Svinje</b>	1970	5 544	308	24	1 327	83	449	3 273	PIGS
	1971	6 562	468	28	1 613	106	471	3 875	
	1972	6 216	450	29	1 498	107	445	3 687	
<b>Krmače i suprene nazimice</b>	1970	958	62	4	205	10	56	621	SOWS AND GILTS
	1971	1 120	73	3	238	14	58	734	
	1972	1 106	73	3	225	14	51	739	
<b>Ovce</b>	1970	8 974	1 981	559	973	1 863	31	3 566	SHEEP
	1971	8 703	1 947	563	921	1 828	24	3 419	
	1972	8 326	1 754	510	881	1 903	24	3 253	
<b>Ovce za priplod</b>	1970	6 693	1 381	436	744	1 391	19	2 723	EWES
	1971	6 341	1 332	429	694	1 310	14	2 562	
	1972	6 066	1 249	407	667	1 298	14	2 430	
<b>Konji</b>	1970	1 076	215	29	273	93	45	420	HORSES
	1971	1 048	215	29	266	90	42	405	
	1972	1 015	208	29	250	91	40	397	
<b>Kobile i ždrebene omice</b>	1970	454	63	9	160	29	15	177	MARES
	1971	434	58	9	155	27	13	172	
	1972	418	55	9	148	27	13	166	
<b>Živina</b>	1970	40 854	4 548	466	10 840	2 136	4 178	18 686	POULTRY
	1971	44 954	4 706	493	12 033	2 914	5 488	19 320	
	1972	44 584	4 859	464	11 136	3 096	5 306	19 342	

Source: SFRJ Stat. YRBK 72



INCREASE OF LIVESTOCK AND MEAT PRODUCTION  
Thousand Tons

	1969	1970	1971	
<b>INCREASE IN LIVE WEIGHT</b>				<b>PRIRAST U ŽIVOJ MASI</b>
Cattle, Total	448	492	510	Goveda, ukupno
Slaughtered	517	484	469	Zaklano
Difference between				Razlika uvoza i izvoza
Exports & Imports	34	23	41	
Diff. at end and at				Razlika na početku i kraju godine
beginning of Year	- 103	+ 16	0	
Pigs, Total	643	775	807	Svinje, ukupno
Slaughtered	619	714	825	Zaklano
Difference between				Razlika izvoza i uvoza
Exports & Imports	0	2	0	
Diff. at end and at				Razlika na početku i kraju godine
beginning of Year	+ 24	+ 59	- 18	
Sheep, Total	106	97	100	Ovce, ukupno
Slaughtered	118	103	107	Zaklano
Difference between				Razlika uvoza i izvoza
Exports & Imports	7	4	5	
Diff. at end and at				Razlika na početku i kraju godine
beginning of Year	- 20	- 10	- 12	
Poultry, Total	170	191	187	Živina, ukupno
Slaughtered	167	186	185	Zaklano
Difference between				Razlika uvoza i izvoza
Exports & Imports	0	0	1	
Diff. at end and at				Razlika na početku i kraju godine
beginning of Year	+ 3	+ 5	1	
<b>INCREASE OF MEAT</b>				<b>PRIRAST ISKAZAN U MESU</b>
Cattle	226	251	263	Goveda
Pigs	322	366	385	Svinje
Sheep	51	48	51	Ovce
Poultry	132	148	145	Živina
<b>TOTAL PRODUCTION OF MEAT</b>				<b>UKUPNA PROIZVOĐNJA MESA</b>
Total	806	847	922	Ukupno
Beef	275	245	263	Govedje
Pork	287	339	384	Svinjsko
Mutton	55	48	52	Ovčje
Fowl	120	142	149	Živinsko
Horse Meat	13	17	16	Konjsko
Edible Offal	56	54	59	Isnutrice
<b>PRODUCTION OF MEAT IN THE COUNTRY</b>				<b>PROIZVOĐNJA MESA U ZEMLJI</b>
Total	770	811	880	Ukupno
Beef	258	233	242	Govedje
Pork	287	338	384	Svinjsko
Mutton	51	47	50	Ovčje
Fowl	120	142	148	Živinsko
Horse Meat	1	1	1	Konjsko
Edible Offal	53	50	56	Isnutrice
<b>CRUDE FATS</b>				<b>SIROVE MASNOĆE</b>
Total	184	212	238	Ukupno
Pork	170	201	227	Svinjsko
Beef	14	10	12	Govedje

PRODUCTION OF MEAT AND AVERAGE WEIGHT OF SLAUGHTERED LIVESTOCK  
**PROIZVODNJA MESA I PROSEČNA TEŽINA ZAKLANE STOKE**

	SFRJ	Bosna i Hercegovina	Crna Gora	Hrvatska	Makedonija	Slovenija	Srbija
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Goveđa	PROIZVODNJA MESA <sup>1)</sup> u milj. тона							PRODUCTION OF MEAT <sup>1)</sup> (thou. tons)						
	1970	1971 <sup>2)</sup>	233	22	3	57	6	33	111	Beef	33	111	30	110
Svinjsko	338	304	27	27	3	84	5	31	189	Pork	31	189	33	222
Ovčje	47	50	16	12	2	5	8	0	20	Mutton	0	20	0	21
Žrnina	142	148	15	17	2	34	2	30	99	Poultry	30	99	32	60
Konjsko	1	1	—	—	—	0	—	0	1	Horse Meat	0	1	0	0
Šumsko	50	56	5	5	1	13	1	6	25	Edible Offal	6	25	7	28

Svinjsko	SIROVE MASNOĆE u milj. тона							CRUDE FATS (thou. tons)						
	1970	1971 <sup>2)</sup>	201	18	2	58	3	17	104	Pig Fat	17	104	19	122
Goveđa	10	11	2	2	0	2	0	1	5	Cow Fat <sup>2)</sup>	1	5	2	5

PROSEČNA ŽIVA TEŽINA ZAKLANE STOKE NA KLANJANAMA u 1970. u kg AVERAGE LIVE WEIGHT SLAUGHTERED IN ABATTOIRS IN 1970 (kg.)

Goveđa	PROSEČNA ŽIVA TEŽINA ZAKLANE STOKE NA KLANJANAMA u 1970. u kg							AVERAGE LIVE WEIGHT SLAUGHTERED IN ABATTOIRS IN 1970 (kg.)						
	298	90	152	76	169	300	229	350	346	Cattle	350	346	96	93
Telad	97	14	78	88	91	87	103	103	100	Calves	96	93	103	100
Svinje	103	115	98	91	99	85	103	103	105	Pigs	103	105	103	105
Prasad	115	20	114	145	112	103	103	103	119	Suckling Pigs	103	119	103	119
Mrljave i mesnata	20	17	26	26	26	22	16	20	20	Lean Pigs & Pigs for Port	26	20	20	20
Tovijena	35	35	37	32	32	32	30	43	39	Fattened Pigs	37	39	43	39
Ovce	248	—	—	—	—	213	—	415	241	Sheep	—	241	—	241
Jagnjad	—	—	—	—	—	—	—	—	—	Lambs	—	—	—	—
Ovce i osovci	—	—	—	—	—	—	—	—	—	Ewes & Rams	—	—	—	—
Konji	—	—	—	—	—	—	—	—	—	Horses	—	—	—	—

<sup>1)</sup> Ukupna proizvodnja mesa uključujući i izvozne bezikone svežeg mesa. Iznos žive stoke nije uračunat.  
<sup>2)</sup> Prethodni rezultati.  
 1) Total production of meat, including the exported fresh meat. The exported live animals are not included.  
 2) Previous results.

PROIZVOĐENJA MLEKA I JAJA  
PRODUCTION OF MILK AND EGGS

	Ukupna pro- izvodnja mleka u mi- lilitara		Kravije mleko		Ovčje i ko- zje mleko		J a j a	
	ukupno u mil.lita.		po kravi mlečari li.		ukupno u mil.lita. litara		ukupno u mil.kom. po koko- ški kom.	
	Total Production of Milk Mill.Ltrs.	C o w ' s Total Mill.Ltrs.	M i l k Ltrs. per Milch Cow	Ewe's and Goat's Milk Total Mill.Ltrs.	Ltrs. per Ewe	E g g s Total Mill.No.	Eggs Per Hen	
1962	2,326	2,153	1,078	173	26	1,420	60	
1963	2,272	2,106	1,091	167	26	1,643	63	
1964	2,334	2,171	1,179	163	26	1,733	67	
1965	2,400	2,234	1,184	166	27	1,747	72	
1966	2,615	2,437	1,207	178	28	1,996	81	
1967	2,712	2,529	1,216	184	28	2,126	76	
1968	2,735	2,554	1,196	181	28	2,186	85	
1969	2,723	2,547	1,203	176	28	2,476	90	
1970	2,655	2,490	1,186	165	28	2,781	94	
1971	2,660	2,503	1,159	147	28	2,937	96	

PRODUCTION OF MILK, EGGS AND WOOL - BY REPUBLICS - 1971

	SFRJ	Bosna i Herce- govina	Crna Gora	Hrvatska	Make- donija	Slovenija	Srbija
Production of Milk (Mill. Litr.)	2,660	430	63	633	93	398	1,033
Cows Milk (Mill. Litr.)	2,503	400	50	622	57	398	975
Ltrs. per Milch Cow	1,159	856	823	1,261	901	1,818	1,139
Ewes Milk (Mill.Ltrs)	147	30	12	11	36	0	58
Wool (tons)	11,381	2,466	687	804	2,241	46	5,137
Wool per Ewe (Kg.)	1,4	1,3	1,2	1,2	1,3	2	1,6
Eggs (Mill.)	2,937	270	29	794	341	305	1,199
Eggs per Hen	95	70	75	118	141	110	81

Source: SFRJ Stat. YRSK 72

4. b. BOSANSKA KRAJINA - AGRICULTURE



ASSORTMENT OF CHICKENEDZEN READY-TO-EAT DISHES  
PRODUCED BY P.L.K. SLJEM/ZAGREB

1. BLOCK PACKING - 3 kilos cardboard boxes, for wholesale
1. Debrecin (sausage) goulash
2. Tripe and a special kind of cured bacon (Hamburger)
3. Hearts prepared sourish
4. Hearts and potatoes
5. French beans cooked with sauce condiments and flour fried in lard or oil
6. Peas cooked with sauce condiments and flour fried in lard or oil
7. Stewed lamb and vegetables
8. Beef goulash
9. Beans and a special kind of cured bacon
10. Beans and a special kind of cured bacon and pasta
11. Beans and pork
12. Beans and cabbage
13. Peas and pork
14. Peas and veal
15. Beans and pasta and sausages
16. French beans and pork
17. Barley-groats boiled with beans and a special kind of cured bacon
18. Stewed paprika, onion, tomato, potatoes
19. Sauerkraut and pork
20. Cabbage and pork
21. Meat balls in sauce
22. Pork stew seasoned with red pepper
23. Veal stew seasoned with red pepper
24. Chicken stew seasoned with red pepper
25. Stuffed paprika (with rice and minced meat in tomato sauce)
26. Rolled leaf of sour cabbage stuffed with rice and minced meat
27. Beans Bosnian way
28. Pasta (spaghetti)
29. Beans with sauges

LAND AREAS BY MAJOR 1971 USE  
(in hect.)

	All	Total Area		Area Apt for Agric. Usage				Arable Area		Ploughed Area		Meadows Pastures Area	
		Soc. Sector	Priv. Sector	Soc. Sector	Priv. Sector	Soc. Sector	Priv. Sector	Soc. Sector	Priv. Sector	Soc. Sector	Priv. Sector	Soc. Sector	Priv. Sector
1. Banja Luka	123,169	2,232	120,937	2,232	65,876	1,623	54,669	1,228	49,090	498	15,129		
2. Bos. Dubica	49,900	4,524	45,376	3,933	27,834	3,328	25,943	2,737	20,592	862	5,833		
3. Bos. Gradiska	76,146	9,029	67,117	6,709	44,713	7,698	37,830	5,378	30,334	2,682	10,554		
4. Bos. Novi	55,415	426	54,989	308	30,069	301	24,565	263	21,034	69	8,031		
5. Galinac	36,568	364	36,204	350	17,505	245	12,106	231	10,934	34	5,973		
6. Jajce	39,777	93	39,684	39	16,921	80	11,408	26	6,666	45	9,913		
7. Ključ	84,965	155	84,810	64	31,596	147	22,871	56	13,131	8	17,779		
8. Kotor Varoš	57,270	67	57,203	30	22,630	53	18,118	16	10,588	14	11,904		
9. Laktaši	38,735	1,423	37,312	30	24,305	1,246	21,012	1,122	19,518	177	3,597		
10. Mirković Grad	67,894	820	67,074	530	36,528	321	22,624	-	10,321	779	25,346		
11. Prijedor	83,393	3,569	79,824	3,020	47,811	1,914	42,681	1,372	36,457	279	9,003		
12. Prnjavor	63,110	3,745	59,365	3,399	40,027	2,571	36,606	2,225	32,831	515	5,260		
13. Sanski Most	98,339	829	97,510	642	46,123	395	36,157	208	29,781	324	15,888		
14. Skender Vakuf	36,028	246	35,782	146	16,166	122	12,133	22	5,514	214	10,329		
15. Srbac	44,666	7,506	37,160	5,530	21,353	4,370	16,257	2,594	13,351	2,162	6,104		
<b>Total</b>	<b>955,375</b>	<b>35,028</b>	<b>920,347</b>	<b>28,311</b>	<b>489,457</b>	<b>24,414</b>	<b>385,060</b>	<b>17,478</b>	<b>310,141</b>	<b>8,662</b>	<b>160,148</b>		
<b>Percentage</b>		<b>2.7</b>	<b>97.3</b>	<b>5.5</b>	<b>94.5</b>	<b>5.8</b>	<b>94.2</b>	<b>5.2</b>	<b>94.8</b>	<b>4.8</b>	<b>95.2</b>		

Source: Inst. Stat. B.L.

**TOTAL LAND AREA STRUCTURE**  
(SOCIALLY + PRIVATELY OWNED)  
(In hectares) - 1969

	Total	Arable Land	Orchards	Vine- yards	Meadows	Pastu- res	Fish- eries	Marshes Reed	For- ests	Barren Land
B. Luka	123194	51549	2080	5	3358	10917	-	45	51322	3918
Laktasi	38729	21086	1037	66	381	3278	-	3	10750	2128
Celinac	36546	11304	679	-	538	5315	-	-	17536	1174
Srbac	44654	16327	660	89	3879	5299	419	182	15038	2761
B. Grad	76174	36677	2115	4	7919	4456	-	361	20502	4140
Prnjavor	63111	35098	2128	23	2014	3875	312	29	17332	2300
Sk. Vakuf	36029	7670	246	-	4154	4247	-	-	18854	858
K. Varos	57370	11162	634	-	6582	4321	-	20	33319	1332
M. Grad.	67894	10594	575	-	11911	13859	-	25	29526	1404
Kljuc	84965	13365	686	-	9000	8615	-	-	51805	1494
B. Dub.	49900	22822	1662	-	4502	2705	-	96	15673	2430
Jajce	39776	6759	298	-	4433	5468	-	-	21267	1551
Prijedor	84122	39742	1415	-	2858	4735	810	17	34428	3113
S. Most	98425	30055	566	-	6054	10152	-	-	49249	2349
B. Novi	55416	21521	1067	-	2576	5342	-	4	22524	2382
<b>TOTAL</b>	<b>956305</b>	<b>335231</b>	<b>15848</b>	<b>191</b>	<b>70169</b>	<b>92584</b>	<b>1541</b>	<b>782</b>	<b>406125</b>	<b>33334</b>
-----										
Bos. -Herz.		1170000	68000	5000	412000	951000				
Area Relat. to Bos. - % Herz		28.6	23.3	3.8	17.0	9.7				
SFRJ		7550000	440000	256000	1940000	4480000	71000			

Data supplied by the Statistical Service 1970

**ARABLE LAND ACCORDING TO UTILIZATION**  
(In hectares) - 1969

County Area	Arable Land and Gardens	L a n d i n C r o p					Nur-series	Fallow and Off Tillage Land
		Total	Cereals	Ind. Crop	Veget.	Fodder Crop		
B. Luka	51549	36627	30730	177	1952	3768	-	14921
Laktasi	21086	19945	15592	87	2019	2247	4	1132
Celinac	11304	8716	7311	45	325	1035	-	2588
Srbac	16327	12181	9895	60	1138	1088	-	4131
B. Grad.	36677	33324	26575	650	2647	3452	6	3346
Prnjavor	35098	29731	24394	289	1486	3562	-	5365
Sk. Vakuf	7670	5485	4621	51	605	208	-	2185
K. Varos	11162	10191	8703	50	641	797	-	971
M. Grad	10594	10315	8982	65	956	312	-	279
Kljuc	13365	12125	10534	78	880	633	-	1239
B. Dubica	22822	15751	11890	140	1648	2073	-	6974
Jajce	6759	6740	5604	45	682	409	-	19
Prijedor	39742	31530	26280	158	2693	2399	-	8185
S. Most	30055	27859	22680	154	2563	2472	-	2178
B. Novi	21521	14926	12768	36	1029	1093	-	6575
<b>TOTAL</b>	<b>335731</b>	<b>275456</b>	<b>226559</b>	<b>2085</b>	<b>21264</b>	<b>25548</b>	<b>10</b>	<b>60088</b>
.....								
Bos -Herz.	1170000	989000	760000	19000	102000	108000		
Area Relat. to Bos Herz.	%	28.7	27.8	29.8	10.9	20.8	23.6	
SFRJ	7550000	7060000	5250000	381000	622000	797000	1900	488000

Data supplied by the Statistical Service 1970

LAND IN CROP, YIELD AND PRODUCTION OF SOME MORE IMPORTANT CROPS - 1969

County Area	Lucerne		Red Clover		Other Clovers		Barley		Oats		
	ha	mtc/ha	ha	mtc/ha	ha	mtc/ha	ha	mtc/ha	ha	mtc/ha	
Banja Luka	485	38,3	1335	36,0	1119	24,9	279	11,2	6322	9,6	
Laktasi	325	43,8	866	42,6	349	30,7	107	26,6	2078	9,6	
Celinae	55	35,5	400	33,3	454	33,8	153	-	2006	10,4	
Srbac	269	33,5	414	39,0	62	30,4	19	22,3	534	11,1	
B. Gradista	372	47,4	1475	39,1	278	30,7	85	28,0	2547	11,8	
Prnjavor	30	36,8	2066	25,0	856	29,3	251	11,5	2348	11,3	
St. Vahuf	28	34,6	141	23,7	12		4	8,0	2271	7,7	
K. Varos	120	29,5	252	37,7	406	34,5	140	8,8	2743	9,0	
M. Grad.	90	41,6	105	32,6	40	30,0	12	11,6	1715	9,9	
Kl. Juc	233	46,2	332	41,5	8	28,8	2	11,9	1792	10,4	
B. Dubica	250	35,1	1176	32,6	217	27,2	59	24,6	1131	13,2	
Jajce	139	46,8	140	36,6	5	32,0	2	8,9	1402	9,0	
Priljedor	211	35,5	1456	33,1	262	28,0	73	12,2	2818	11,0	
Sanski Most	581	32,0	1191	38,7	161	26,7	43	13,9	4652	11,6	
Bos. Novi	272	37,0	649	32,9	34	26,6	9	10,8	2028	9,1	
TOTAL	3460	38,4	1330	11998	4128	4263	1238	4517	676	36387	3726
Bos.-Herz.	27600	42	12000	38800	29,9	12800	78700	10,8	8440	94300	9,6
Area Relat. to Bos. Herz.	% 12,5	-	11,1	30,9	-	32,2	5,7	-	8,0	38,5	41,3
SFRJ	350000	53,4	190000	233000	38	98400	313000	14,4	45000	285000	10,4

Data supplied by the Statistical Service 1970

LAND IN CROP, YIELD AND PRODUCTION OF SOME MORE IMPORTANT CROPS - 1969

(contd.)

County Area	P o t a t o		W h e a t		H a i z e				
	Area ha	Yield mtc/ha	Production Carloads	ha	mtc/ha	Carloads	ha	mtc/ha	Carloads
Banja Luka	1137	60,4	687	9403	15,4	1452	14355	14,9	2143
Laktasi	615	51,3	316	5251	18,4	953	7729	16,3	1258
Celinc	217	90,5	194	2292	15,7	360	2905	13,7	398
Srbac	479	55,4	265	2921	23,5	687	6112	21,0	1282
B. Gradiska	1202	75,4	906	10398	22,4	2331	12410	24,3	3022
Prnjavor	834	64,8	540	8855	16,6	1470	12739	17,8	2265
Sk. Vakuf	524	87,2	457	559	8,0	45	748	11,0	82
K. Varos	458	54,0	247	1337	13,8	184	3911	13,5	527
M. Grad	736	58,4	430	1256	11,9	150	3733	14,9	558
Kljuc	558	74,2	414	4127	15,3	633	3967	15,9	629
B. Dubica	700	63,4	444	4544	25,3	1150	6011	21,3	1281
Jajce	553	93,5	517	950	11,4	108	2126	14,4	305
Prijedor	1131	58,0	656	12219	18,7	2280	11074	24,4	2698
Sanski Most	1192	73,6	877	7857	18,6	1463	9807	21,1	2072
Bos. Novi	500	76,9	385	4398	14,9	656	6288	13,9	782
<b>IGIA</b>	<b>10836</b>	<b>73,3</b>	<b>7333</b>	<b>76367</b>	<b>14,9</b>	<b>13922</b>	<b>193915</b>	<b>18,0</b>	<b>19302</b>
Bos.-Herz.	56300	64,6	36600	219000	15,8	34400	343000	15,6	53400
Area Relation to Bos. Herz.	% 19,2	-	20,0	34,9	-	40,4	30,0	-	36,1
SFRJ	333000	86	289000	2010000	21,8	436000	2470000	27,6	681000

Data supplied by the Statistical Service 1970

LAND IN CROP, YIELD AND PRODUCTION OF SOME MORE IMPORTANT CROPS - 1969

County Area	Apple		Pear		Quince		Peach	
	Trees of Bearing Age	Product. Carloads	Trees of Bearing Age	Product. Carloads	Trees of Bearing Age	Product. Carloads	Trees of Bearing Age	Product. Carloads
Banja Luka	44.307	109	25.004	42	2.708	3	29.252	44
Laktasi	20.195	48	7.810	12	990	1	12.240	14
Celinac	7.160	24	3.740	9	145	1	460	1
Srbac	11.495	28	9.358	12	1.832	2	2.190	4
B.Gradiska	45.298	216	59.442	87	2.292	3	26.247	59
Prnjavor	24.360	56	12.390	12	845	2	2.035	1
Sk. Vakuf	3.397	5	3.251	3				
K. Varos	13.894	46	10.574	15	86		142	
M. Grad	13.667	45	6.629	20				
Kljuc	13.280	43	5.106	7	664		12	
Bos.Dubica	15.228	37	9.190	17	1.305	1	1.200	1
Jajce	11.140	19	8.980	10	208			
Prijedor	27.099	82	12.095	32	1.757	2	425	
S. Most	21.840	79	11.787	26	229		310	
Bos. Novi	32.044	77	8.406	14	2.150	2	528	
<b>TOTAL</b>	<b>304.404</b>	<b>914</b>	<b>193.762</b>	<b>318</b>	<b>15.279</b>	<b>17</b>	<b>77.121</b>	<b>124</b>
-----								
Boz.-Herz.	1,670.000	2.110	1,140.000	1,530		n.a.	212.000	273
Area Relat. to Bos.								
Herz. %	18.2	43.3	17.0	20.8			36.4	45.4
SFRJ	15,200.000	30.400	7,550.000	9,880	876.000	1.160	3,850.000	4,850

Data supplied by the Statistical Service 1970

Production Carloads* 1970					
Total		4.376	291	14	
Soc.Sec.		3,803	110	-	
Priv.Sec.		573	181	14	
Production Carloads* 1971					
Total		852	375	16	
Soc.Sec.		247	133	-	
Priv.Sec.		605	242	16	
Forecast Prod.** 1975					
Carloads*	Total	1.450	400	20	
	Soc.Sec.	750	150	-	
	Priv.Sec.	700	250	20	

\* 1 carload = 10 tons

\*\* Earlier forecast of project area authorized without reference to FAO/UNIDO project.

Source: Z.E.P. B.L.

## LAND IN CROP, YIELD AND PRODUCTION OF SOME MORE IMPORTANT CROPS - 1969 (contd.)

County Area	Walnut		Plum		Cherry		Morello	
	Trees of Bearing Age	Product. Carloads	Trees of Bearing Age	Product. Carloads	Trees of Bearing Age	Product. Carloads	Trees of Bearing Age	Product. Carloads
Banja Luka	7.062	9	544.498	1.238	32.825	57	2.778	3
Laktasi	4.140	6	140.384	297	22.960	48	6.260	5
Celinac	4.200	9	68.300	142	5.700	12	218	
Srbac	1.892	3	62.730	81	5.088	4	3.749	2
B. Gradiska	3.418	6	244.230	381	21.114	33	23.290	6
Prnjavor	5.075	7	351.773	641	12.420	20	18.981	11
Sk. Vakuf	1.661	1	60.122	106	640	1		
K. Varos	8.287	9	151.193	328	8.796	13	150	
M. Grad	3.593	6	161.186	336	1.076			
Kljuc	4.688	8	117.287	243	3.459	6	39	
B. Dubica	3.640	6	262.891	417	5.862	16	724	1
Jajce	2.796	6	99.600	185	5.190	9	39	
Prijedor	3.142	4	283.106	513	8.900	20	4.999	8
Sanski Most	4.624	15	204.799	536	5.667	13	196	
Bos. Novi	3.758	4	106.645	161	5.900	8	237	
<b>TOTAL</b>	<b>62.745</b>	<b>98</b>	<b>2,968.803</b>	<b>5.605</b>	<b>145.277</b>	<b>260</b>	<b>61.650</b>	<b>36</b>
Bos.-Herz.	531.000	389	12,100.000	12.600	768.000	1.200	187.000	153
Area Relat. to Bos. Herz. %	12.1	25.7	24.4	44.5	18.9	21.6	32.9	23.5
SFRJ	2,610.000	2.020	69,500.000	72.100	3,570.000	4,960	3,600.000	3,110

Data supplied by the Statistical Service 1970

## Production Carloads\* 1970

Total	2.445	204	43
Sec. Sec.	162	1	2
Priv. Sec.	2.283	203	41

## Production Carloads\* 1971

Total	3.867	287	56
Sec. Sec.	80	-	8
Priv. Sec.	3.787	287	48

Forecast Prod.\*\* 1971  
Carloads\*

Total	5.330	251	80
Sec. Sec.	915	1	30
Priv. Sec.	4.415	250	50

\* 1 carload - 10 tons

\*\* Earlier forecast of project area authorized without reference to FAO/UNIDO project.

Source: Z.E.P. B.L.



VINEYARDS AND GRAPE PRODUCTION - 1969

County Area	Number of Grape-Vines		Production, Carloads
	Total	Bearing	
Banja Luka	14.815	14.175	2
Laktasi	159.100	153.600	17
Srbac	632.500	602.500	78
Celinac			
Bos. Gradiska	40.000	40.000	6
Prnjavor	185.900	155.900	35
Sk. Vakuf			
K. Varos			
M. Grad			
Kljuc			
B. Dubica			
Jajce			
Prijedor	15.600	11.100	2
Sanski Most			
Bos. Novi			
<b>TOTAL</b>	<b>1,047.915</b>	<b>977.275</b>	<b>140</b>
.....			
Bos.-Herz.		31,000.000	3.200
Area Relat. to Bos.- Herz. %		31.5	4.4
SFRJ	1,680.000	1,570.000	127.000

Data supplied by the Statistical Service 1970

Production Carloads\* 1970

Total	93
Sec. Sec.	10
Priv. Sec.	83

Production Carloads\* 1971

Total	105
Sec. Sec.	9
Priv. Sec.	96

Forecast Prod.\*\*

Carloads* 1975	
Total	110
Sec. Sec.	10
Priv. Sec.	100

\* 1 carload = 10 tons

\*\* Earlier forecast of project area authorized without reference to FAO/UNIDO project.

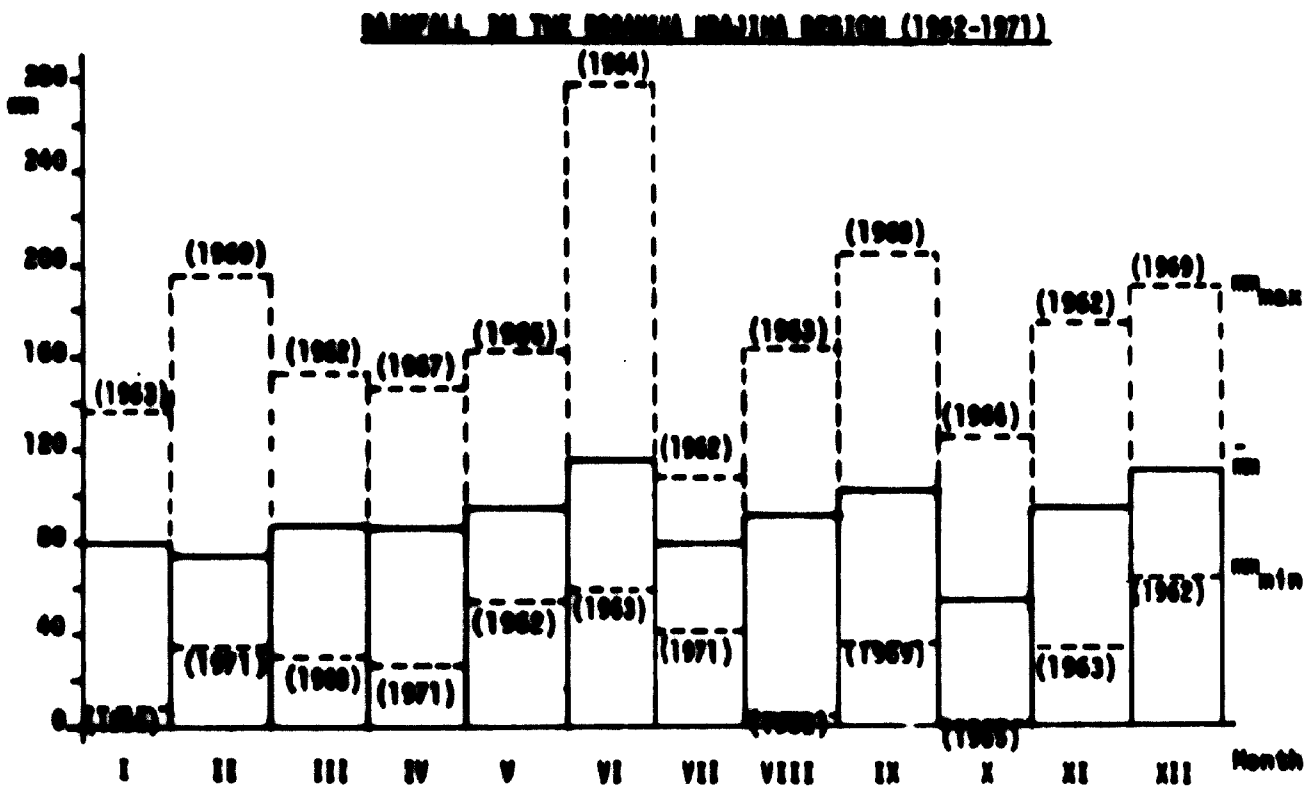
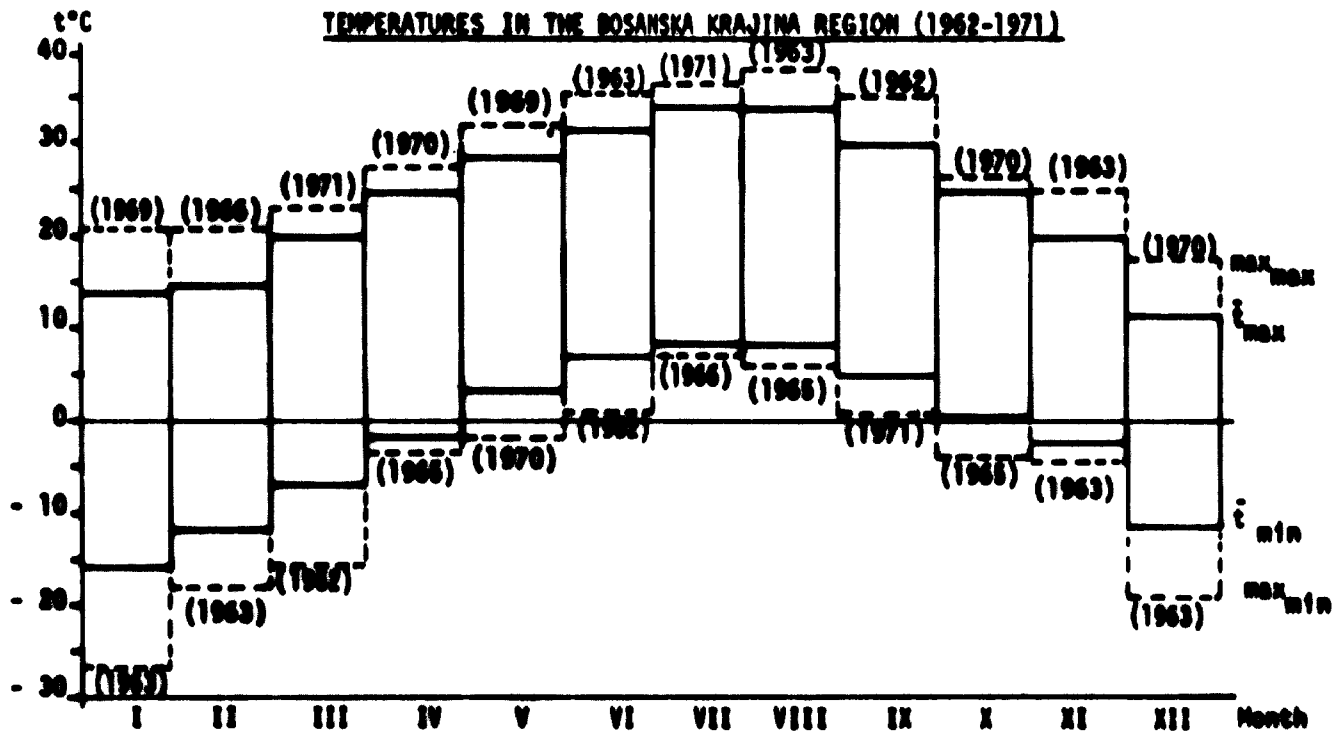
Source: Z.E.P. B.L.

**FERTILIZER UTILIZATION**

(in tons)

County - Area	1 9 6 9		
	Social Sector	Cooperators	Total
Banja Luka	234	4.800	5.034
Laktasi	1.235	194	1.429
Celinac	12	590	602
Srbac	1.367	1.130	2.497
Bosanska Gradiska	3.981	2.510	6.491
Prnjavor	1.347	2.900	4.247
Skender Vakuf	12	100	112
Kotor Varos	50	570	620
Mrkonjic Grad	31	106	137
Kljuc	36	403	439
Bosanska Dubica	1.235	318	1.553
Jajce	20	50	70
Prijedor	1.149	2.279	3.428
Sanski Most	95	1.248	1.343
Bosanski Novi	289	555	844
<b>TOTAL</b>	<b>11.093</b>	<b>17.753</b>	<b>28.846</b>
.....			
Bos.-Herz.			120,745
Area Relation to Bos.Herz.	%		23,9
SFRJ			1,918.420

Data supplied by the Statistical Service 1970



Year	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
Total Rainfall	905	1000	1202	1004	900	905	1120	1200	1130	787

**II PASTIC BAGS - 400 grams**

1. Tripe and a special kind of cured bacon
2. Meat prepared sourish
3. Stewed lamb and vegetables
4. Beef goulash
5. Beans and a special kind of cured bacon
6. Beans and pork
7. Peas and pork
8. Peas and veal
9. French beans and pork
10. Stewed paprika, onion, tomato, potatoes
11. Sauerkraut and pork
12. Meat balls in sauce
13. Pork stew seasoned with red pepper
14. Veal stew seasoned with red pepper
15. Stuffed paprika (with rice and minced meat in tomato sauce)
16. Rolled leaf of sour cabbage stuffed with rice and minced meat
17. Chicken stew seasoned with red pepper
18. Beans Bosnian way

**III ROAST DISHES - 3 kilos, plastic bags**

1. Fried Hamburger-steak
2. Roast-pork
3. Breaded pork chops
4. Roast-veal
5. Breaded veal steak
6. Stuffed veal breast
7. Potato chips
8. Mashed potatoes

PRODUCTION OF CATTLE AND PIGS, LIVE WEIGHT 1969-1971  
(Tons Live Weight)

Commune	1969			1971			Indicator			1969			1971			Indicator Growth Rate
	Sec. Sector	Priv. Sector	All	Sec. Sector	Priv. Sector	All	Index	Growth Rate	Sec. Sector	Priv. Sector	All	Sec. Sector	Priv. Sector	All		
															P	
1. Banja Luka	17	1,316	1,333	11	1,568	1,579	118	8.63	46	1,872	1,918	48	2,221	2,269	118.3	8.6
2. Bos. Dubica	96	526	622	856	599	1,455	234	52.97	55	1,716	1,771	14	1,538	1,552	87.6	- 6.2
3. Bos. Gradiška	440	1,053	1,493	261	1,198	1,459	100	-	1,819	2,184	4,003	2,337	2,392	4,729	118.1	8.6
4. Bos. Novi	24	790	814	135	899	1,034	127	12.7	9	1,248	1,257	75	1,537	1,612	128.2	13.1
5. Celinac	-	395	395	-	549	549	139	17.9	-	624	624	-	513	513	82.2	- 9.5
6. Jajce	27	395	422	-	449	449	106	2.95	11	1,560	1,571	-	171	171	10.8	-70.1
7. Ključ	-	658	658	-	749	749	114	6.77	-	468	468	-	513	513	109.6	4.88
8. Kotor Varoš	-	395	395	-	598	598	151	22.88	-	46	46	-	342	342	743.4	172.7
9. Laktaši	-	526	526	-	597	597	113	6.30	-	780	780	-	1,025	1,025	131.4	14.5
10. Mkonjić	-	790	790	-	879	879	111	5.36	-	614	614	-	513	513	83.5	- 8.3
11. Prijedor	-	1,711	1,711	-	1,498	1,501	88	- 6.19	22	1,248	1,270	1	1,709	1,710	134.6	16.2
12. Prnjavor	-	1,053	1,053	68	1,197	1,265	114	6.77	-	1,560	1,560	-	1,709	1,709	109.5	4.9
13. Sanski Most	-	921	921	-	1,048	1,048	114	6.77	-	936	936	-	854	854	91.2	- 4.6
14. Skender	-	263	263	-	300	300	114	6.77	-	312	312	-	171	171	54.8	-25.8
15. Srbac	-	395	395	-	541	541	137	17.05	-	624	624	-	855	855	137.0	17.1
<b>TOTAL</b>	<b>604</b>	<b>11,187</b>	<b>11,791</b>	<b>1,334</b>	<b>12,669</b>	<b>14,003</b>	<b>119</b>	<b>9.09</b>	<b>1,962</b>	<b>15,792</b>	<b>17,754</b>	<b>2,475</b>	<b>16,063</b>	<b>18,538</b>	<b>104.4</b>	<b>1.98</b>

Source: Inst. of Stat. B.L.

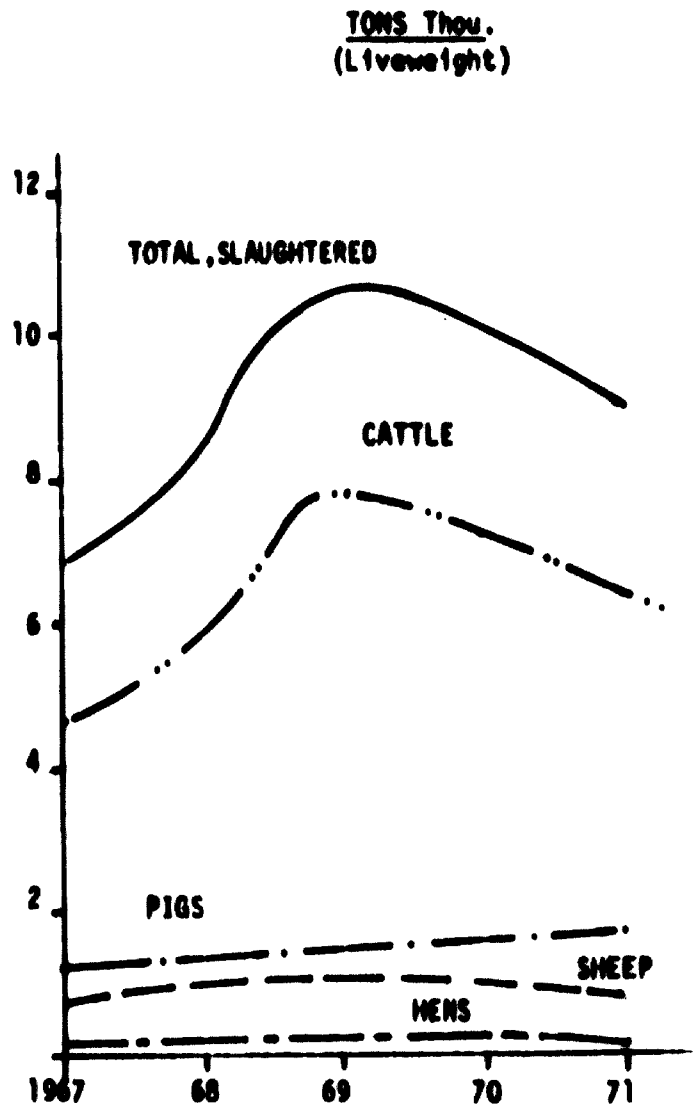
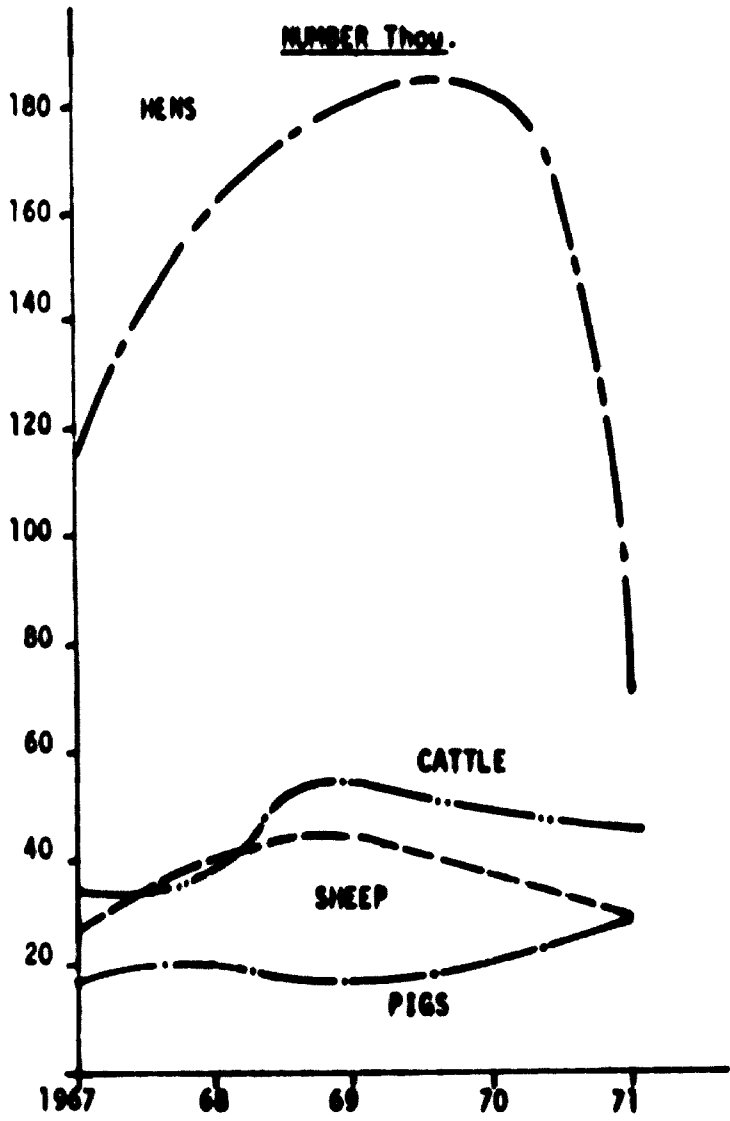
**PRODUCTION OF SHEEP AND POULTRY, LIVE WEIGHT 1969-1971**

(Tons Live Weight)

Commune	1969			1971			1969			1971			Indicator	
	Sec. Sector	Priv. Sector	All	Sec. Sector	Priv. Sector	All	Index	Growth Rate	Sec. Sector	Priv. Sector	All	Index		Growth Rate
1. Banja Luka	-	761	761	-	552	552	72.5	- 14.5	32	234	266	260	97.7	- 1.0
2. Bos. Dubica	-	101	101	-	138	138	136.6	17.0	-	116	116	148	127.5	13.1
3. Bos. Grediška	-	101	101	-	92	92	91.0	- 4.6	-	418	418	494	118.1	8.6
4. Bos. Novi	-	152	152	-	184	184	121.0	10.0	-	175	175	203	116.0	7.7
5. Čelinac	-	152	152	-	91	91	59.8	- 22.5	-	60	60	70	116.6	8.2
6. Jajce	-	152	152	-	138	138	90.7	- 4.6	210	31	241	33	13.6	- 30.0
7. Ključ	-	507	507	-	368	368	72.5	- 14.5	-	100	100	113	113.0	6.3
8. Kotor Varoš	-	245	245	-	230	230	93.8	- 3.1	-	61	61	56	91.8	- 4.1
9. Laktaši	-	51	51	-	46	46	90.1	- 5.1	-	188	188	175	93.0	- 3.6
10. Mirković Grad	-	355	355	-	414	414	116.6	8.2	-	82	82	95	115.8	7.7
11. Prijedor	1	355	355	-	322	322	90.4	- 5.1	1	419	420	448	106.6	3.4
12. Prnjavor	-	101	101	-	91	91	90.0	- 5.1	-	134	134	228	170.1	30.4
13. Sanski Most	-	457	457	-	368	368	80.6	- 10.0	-	90	90	112	124.4	11.4
14. Skender V.	-	253	253	-	368	368	145.4	20.4	-	19	19	26	136.8	17.1
15. Srbac	-	51	51	-	46	46	90.1	- 5.1	-	163	163	170	104.2	2.0
<b>TOTAL</b>	<b>1</b>	<b>3,803</b>	<b>3,804</b>	<b>-</b>	<b>3,448</b>	<b>3,448</b>	<b>91.0</b>	<b>- 4.08</b>	<b>243</b>	<b>2,290</b>	<b>2,533</b>	<b>2,631</b>	<b>104</b>	<b>1.98</b>

Source: Inst. of Stat. B.L.

REVIEW OF SLAUGHTERED LIVESTOCK IN REGION



Source: Inst. Stat. B.L.

**PRODUCTION AND PROCESSING OF MILK**

(thous. litres.)

Commune	1969		1970		1971	
	Produced	Processed	Produced	Processed	Produced	Processed
1. Banja Luka	9,386	5,645	8,801	4,914	9,126	5,229
2. Bos. Dubica	6,968	1,383	5,962	1,200	5,954	1,000
3. Bos. Grediška	20,117	8,161	21,021	10,568	20,808	9,947
4. Bos. Novi	5,066	1,051	5,733	2,679	5,388	2,463
5. Celinac	3,693	805	3,475	1,069	3,973	1,458
6. Jajce	2,933	1,518	2,821	1,457	2,573	1,340
7. Ključ	3,609	1,640	4,105	800	4,874	860
8. Kotor Varoš	3,001	1,250	3,489	1,350	4,330	1,750
9. Laktaši	6,638	3,442	6,638	3,442	6,706	2,994
10. Mirkovjić Grad	5,904	3,268	5,288	2,782	5,803	2,028
11. Prijedor	12,712	4,633	12,091	4,219	9,376	2,550
12. Prnjavor	7,366	3,338	7,891	3,396	7,167	2,600
13. Sanski Most	9,438	3,595	8,456	3,118	7,516	2,769
14. Skender V.	2,770	2,740	2,506	2,323	3,058	2,673
15. Srbac	3,588	478	3,708	345	3,963	1,900
<b>Total</b>	<b>103,269</b>	<b>42,947</b>	<b>101,975</b>	<b>43,666</b>	<b>98,695</b>	<b>41,531</b>
% Delivered for Processing		42		43.5		42.5
B & H (Mill. litres)	446		453		430	
S.F.R.J. (Mill. Litrs)	2,723		2,655		2,650	

1) Total milk produced - not including quantities fed to calves

2) Total milk delivered for processing

Sources: Inst. Stat. B.L.  
SFRJ Stat. YRBK 72



5. SOYBEANS DATA

### World soybean production

Soybeans: Average and production in specified countries and the world, annual 1966-71 1/

	Average 2/ 1,000 acres						Production 1,000 metric tons					
	1966	1967	1968	1969	1970	1971 3/	1966	1967	1968	1969	1970	1971 3/
<b>North America:</b>												
United States 4/	36,546	39,767	41,104	40,982	42,056	42,409	25,269	26,544	30,022	30,653	30,583	31,825
(1,000 bushels)							(928,481)	976,060	1,103,129	1,126,314	1,123,740	1,169,361
Canada	279	290	295	322	335	360	245	220	246	209	283	274
Mexico	124	148	334	420	297	297	108	121	270	300	240	240
<b>South America:</b>												
Argentina	39	43	50	70	64	66	18	20	22	32	27	59
Brazil	1,212	1,513	1,784	2,239	2,940	4,568	595	716	654	1,057	1,332	2,100
Colombia	86	119	116	138	128	163	52	80	87	101	95	120
Paraguay	5/30	5/32	5/35	5/69	94	---	12	18	14	45	52	60
<b>Europe:</b>												
Romania	43	121	121	133	128	297	20	41	47	51	82	---
Yugoslavia	16	17	11	11	17	---	11	9	3	5	5	---
USSR	2,113	2,100	2,110	2,095	2,137	---	586	543	528	434	603	---
<b>Africa:</b>												
Nigeria 6/	135	135	135	96	---	---	15	16	7	34	25	---
Tanzania 7/	7	7	7	---	---	---	2	2	4	4	---	---
South Africa 8/ 8/	23	28	31	33	23	23	3	4	5	7	3	3
<b>Asia:</b>												
Iran	2	12	20	36	5/32	---	3	3	3	4	7	---
Turkey	15	15	19	20	27	30	5	6	8	11	12	13
<b>China:</b>												
Mainland	19,768	20,213	19,768	19,768	19,768	19,768	6,800	6,950	6,480	6,200	6,900	6,900
Taiwan	127	129	122	112	106	---	63	75	73	67	65	70
Cambodia	20	23	12	12	10	---	7	8	4	---	---	---
Indonesia	1,455	1,456	1,673	1,465	1,691	1,730	417	416	420	389	408	391
Japan 5/	417	349	302	254	236	240	199	190	168	136	126	125
Korea, South 5/	682	767	775	754	730	---	161	201	245	229	232	---
Philippines	4	4	4	3	4	4	1	1	1	1	1	1
Thailand	109	144	5/111	5/119	5/127	---	38	53	45	61	62	90
Other countries	1,089	1,048	1,058	1,075	1,115	1,125	245	274	280	284	299	288
Total excluding Romania, USSR, Bulgaria, Hungary, Mainland China, North Korea and North Vietnam 9/	41,385	45,057	46,999	47,220	50,092	51,277	27,235	28,739	32,320	33,369	33,668	35,692
Estimated world total 9/ (1,000 bushels)	64,341	68,480	69,997	70,233	73,168	74,513	34,867	36,530	39,636	40,320	41,529	43,593
							(1,281,143)	1,342,247	1,456,373	1,481,506	1,525,929	1,601,768

1/ Years shown refer to years of harvest. Southern Hemisphere crops which are harvested in the early part of the year are combined with those of the Northern Hemisphere harvested the latter part of the same year. 2/ Figures refer to harvested areas as far as possible. 3/ Preliminary. 4/ Acreage harvested for beans. 5/ Planted area. 6/ Quantities purchased by the Nigerian Marketing Boards for export. 7/ Sales. 8/ European farms only. 9/ Includes estimates for the above countries for which data are not available and for minor producing countries. Foreign Agricultural Service. Prepared or estimated on the basis of official statistics of foreign governments, other foreign source materials, reports of U. S. agricultural attaches and foreign service officers, results of office research and related information.

### Soybean production - United States

Soybeans: Average, yield and production in the United States, 1924-71

Year	Acre planted			Acre harv.		Cropped or plowed under		Average yield per acre harv.		Total prod. for beans	
	Grown alone	Inter-cultured	Equivalent solid	for soy	for hay	for soy	for hay	bu/acre	tons/acre	Thous. bushels	Thous. tons
1924	1847	417	1782	448	1147	187	110	1.13	0.49	4947	1299
25	1339	476	1785	415	1175	195	117	1.01	0.48	4875	1185
1930	3072	796	3473	1074	2062	337	130	0.94	0.39	13929	3522
35	6966	1020	7503	2915	4044	544	168	1.34	0.54	48901	9422
1940	10487	2589	11782	4807	4819	2156	162	1.36	0.54	78045	6450
45	13056	1505	13807	10740	1940	1127	180	1.36	0.54	193167	2451
1950	15048	1184	15640	13807	963	870	217	1.31	0.52	299249	3260
55	15176	955	15655	13615	893	1147	208	1.24	0.50	283777	3161
60	18958	831	16374	14435	1085	854	207	1.10	0.44	298839	3161
65	16394	653	16719	14829	1037	853	182	1.09	0.44	289109	3134
70	18541	643	18872	17047	876	949	200	1.04	0.43	341875	3134
1965	19474	617	19981	18420	705	656	201	1.28	0.51	373682	3134
70	21700	597	21998	20420	524	354	218	1.28	0.51	449231	3134
75	21938	497	22186	20857	444	885	232	1.28	0.51	483425	3134
80	25108	484	25350	23993	472	885	242	1.43	0.58	580250	3134
85	23349	439	23579	22631	351	597	235	1.42	0.57	532899	3134
1990	24440	398	24649	23655	449	545	235	1.44	0.58	555085	3134
1961	27787	332	27981	27003	424	549	252	1.47	0.59	678554	3134
1962	28418	290	28593	27408	475	514	242	1.37	0.55	669186	3134
1963	29462	278	29598	28615	547	471	245	1.38	0.56	699165	3134
1964	31605	234	31794	30793	531	525	228	1.39	0.56	700921	3134
1965	35227	---	---	34449	---	---	---	24.5	---	845608	---
1966	37294	---	---	36546	---	---	---	25.4	---	928481	---
1967	40776	---	---	39767	---	---	---	24.5	---	976060	---
1968	42037	---	---	40104	---	---	---	26.8	---	1103129	---
1969	42198	---	---	40982	---	---	---	27.5	---	1126314	---
1970	42945	---	---	42056	---	---	---	26.7	---	1123740	---
1971	43176	---	---	42409	---	---	---	27.6	---	1169361	---

\*Grown with other crops. †Equivalent solid acreage (acreage grown alone with an allowance for acreage grown with other crops). ‡Preliminary. Source of data: Economic Research Service U. S. Dept. of Agriculture

### World production of fats, oils, and oilseeds

Oils and fats (oil or fat equivalent): Estimated world production, annual 1900-71 and forecast 1972 1/ (1,000 metric tons)

	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911 2/	Forecast 1972
<b>Edible vegetable oils 3/:</b>													
Cottonseed	2,195	2,170	2,190	2,295	2,400	2,505	2,545	2,220	2,155	2,405	2,275	2,365	2,555
Peanut	2,325	2,800	2,800	2,910	3,005	3,290	3,195	3,205	3,310	3,030	3,175	3,610	3,900
Soybean	3,295	3,290	3,850	3,810	3,880	3,995	4,585	5,000	5,215	5,840	5,960	6,155	6,480
Sunflower	1,665	1,930	2,425	2,380	2,290	3,130	3,965	3,495	3,705	3,705	3,780	3,570	3,995
Rapeseed	1,185	1,190	1,215	1,060	1,130	1,460	1,415	1,465	1,850	1,475	1,855	2,415	2,700
Sesame	540	495	550	570	575	610	565	545	600	565	595	715	670
Safflower	110	130	135	205	215	185	200	255	265	175	220	235	305
Olive 4/	1,180	1,345	1,340	925	1,700	1,005	1,235	1,205	1,335	1,385	1,250	1,445	1,565
Corn	175	190	200	215	235	245	255	260	250	270	300	310	310
Total	12,790	13,540	14,785	14,370	15,420	16,335	16,960	17,850	18,690	18,920	19,490	20,810	22,480
<b>Falm oils 5</b>													
Coconut	1,960	2,195	2,035	2,130	2,270	2,135	2,260	2,165	2,150	2,040	2,110	2,400	2,550
Palm kernel 6/	430	425	390	405	410	435	425	355	365	385	410	445	500
Palm 6/	1,285	1,265	1,200	1,350	1,355	1,365	1,420	1,270	1,405	1,570	1,790	2,015	2,250
Bobasse kernel 7/	50	52	60	45	52	54	66	52	65	101	102	107	110
Total	3,723	3,937	3,745	2,930	4,087	4,099	4,171	3,842	3,985	4,096	4,412	4,987	5,410
<b>Industrial oils:</b>													
Linseed	960	1,010	990	1,165	1,065	1,080	1,080	950	785	920	1,140	1,245	870
Castor	275	250	270	285	360	335	325	370	365	368	330	325	345
Oilcica	20	14	25	5	17	12	18	2	29	2	16	0	10
Tung	121	119	114	115	127	149	136	149	123	130	117	128	120
Olive residue 8/	106	111	94	90	124	90	117	134	146	148	115	141	147
Total	1,482	1,502	1,493	1,668	1,703	1,674	1,666	1,608	1,480	1,568	1,718	1,839	1,492
<b>Animal fats</b>													
Butter (fat content)	3,855	3,895	3,970	3,970	4,040	4,300	3,900	4,000	4,050	4,000	3,850	3,900	4,000
Lard 9/	3,730	3,835	3,875	3,905	3,740	3,910	3,930	4,070	4,065	3,960	4,005	4,230	4,120
Tallow and greases	3,050	3,170	3,300	3,600	3,895	3,790	3,900	4,180	4,250	4,255	4,425	4,620	4,770
Total	10,635	10,900	11,145	11,475	11,675	12,000	11,730	12,250	12,365	12,215	12,280	12,750	12,890
<b>Marine oils:</b>													
Whale	380	380	354	267	226	198	115	103	92	76	69	69	60
Sperm whale	111	109	118	135	150	154	146	150	122	130	140	128	120
Fish (including liver)	462	602	669	616	759	786	895	1,112	1,110	914	1,052	1,095	1,100
Total	953	1,099	1,141	1,018	1,135	1,138	1,156	1,365	1,324	1,120	1,261	1,292	1,280
<b>Grand total</b>	<b>29,593</b>	<b>30,978</b>	<b>32,309</b>	<b>32,401</b>	<b>34,020</b>	<b>35,156</b>	<b>35,683</b>	<b>36,912</b>	<b>37,814</b>	<b>37,916</b>	<b>39,181</b>	<b>41,678</b>	<b>43,552</b>

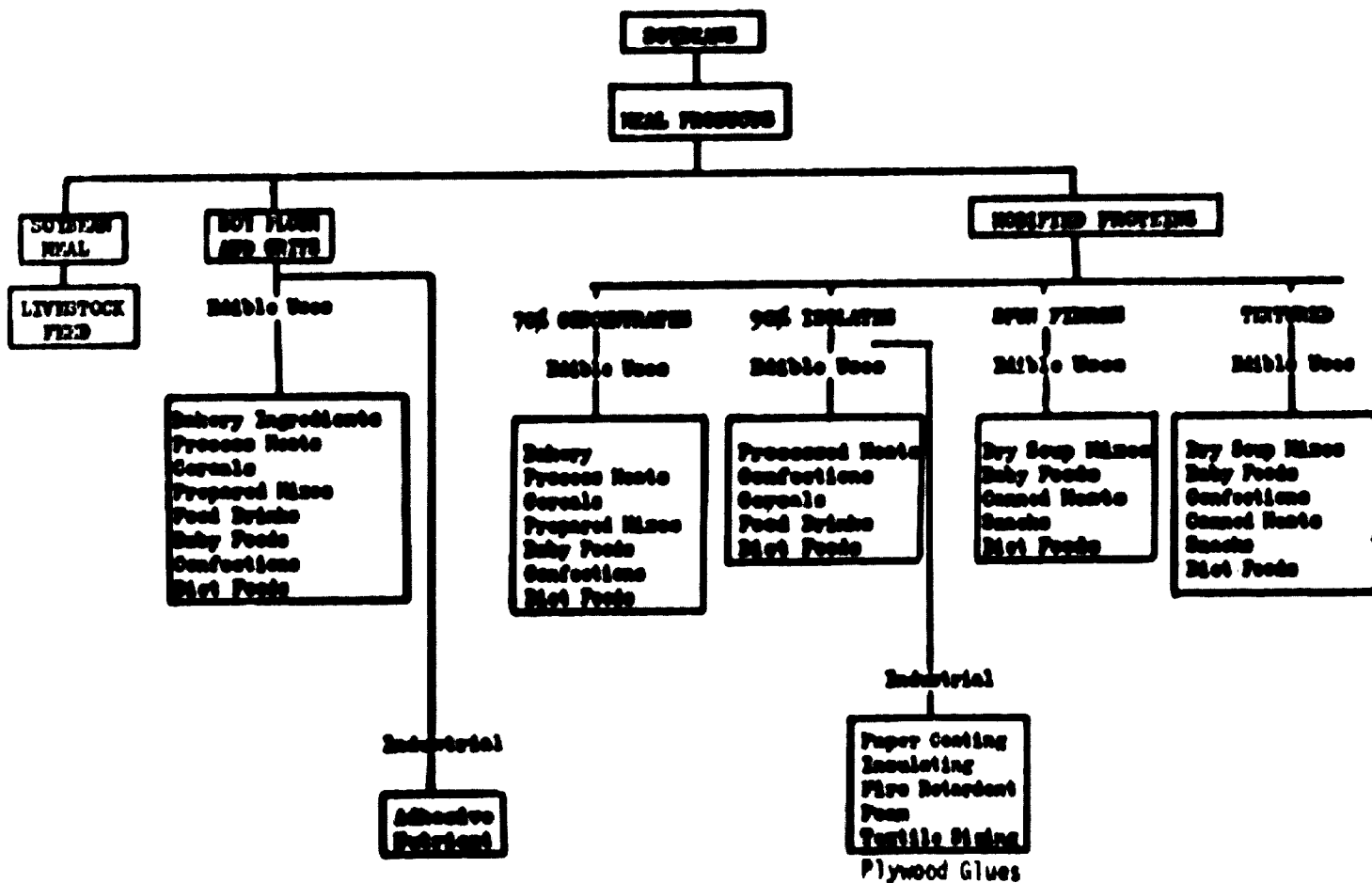
1/ Years indicated are those in which the predominant share of the given oil was produced. 2/ Preliminary 3/ Revised series for most commodities except olive and corn oils. 4/ Excludes olive residue oil. 5/ Estimated on the basis of exports and information available on consumption in the various producing areas. 6/ Revised series. 7/ Mill production 1900-65 only. 8/ Includes quantities of refined oil for edible purposes. 9/ Rendered lard only in most countries. Foreign Agricultural Service. Prepared or estimated on the basis of official statistics of foreign governments, other foreign source materials, reports of U. S. agricultural attaches and foreign service officers, results of office research and related information.

### Exports soybeans, oil and meal

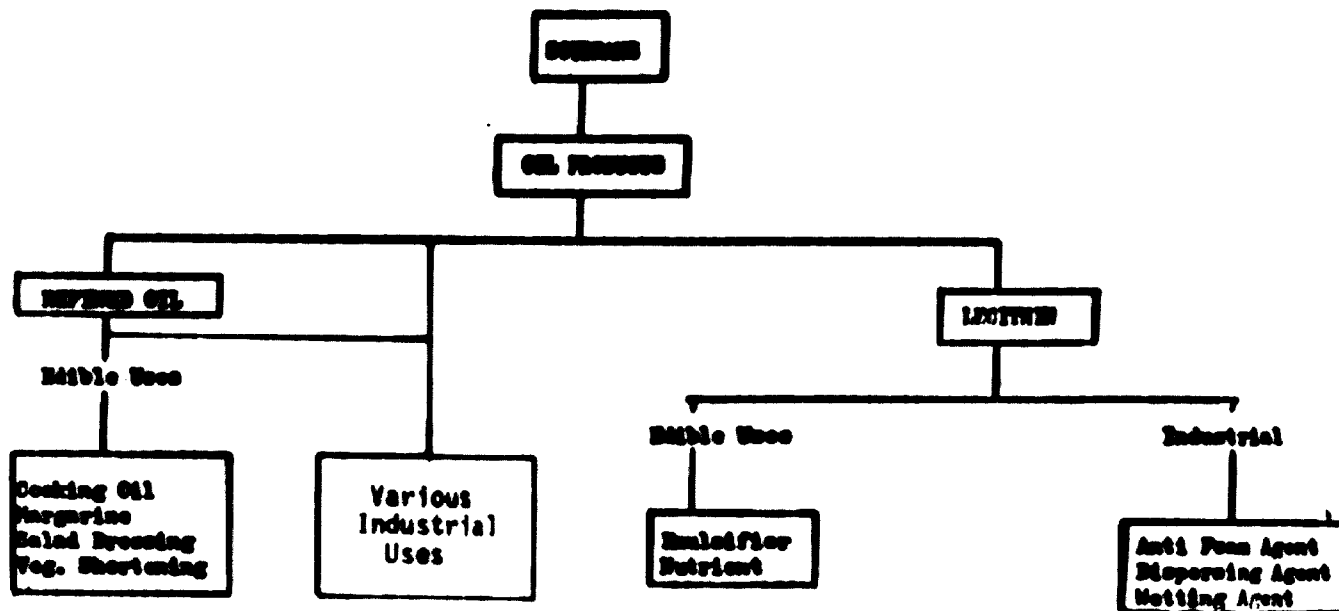
Soybeans, soybean meal and soybean oil: U. S. exports by country of destination, and total value, 1967-70

Continent and country of destination	Soybeans 1/				Soybean meal				Soybean oil			
	1967	Year beginning September 1968	1969	1970 2/	1967	Year beginning October 1968	1969	1970 2/	1967	Year beginning October 1968	1969	1970 3/
	1,000 bu.				1,000 tons				Mill. lb.			
<b>North America</b>												
Canada	21,736	37,856	69,952	42,162	227.8	262.9	270.9	242.1	25	29	51	50
Dominican Republic	---	---	37	324	4/	4/	4	9	50	28	25	24
Haiti	---	---	---	---	---	---	2	12	17	19	19	26
Mexico	308	824	5,004	2,192	2.7	9	2.8	116.3	11	4	18	1
Panama	---	---	---	37	1.1	1.4	1.0	3.5	11	5/	17	23
Other	3/	---	358	109	21.6	20.9	27.1	60.3	14	19	21	23
Total	22,044	38,680	75,351	44,824	253.2	286.0	302.4	424.3	128	99	151	147
<b>South America</b>												
Argentina	1	4	3/	2	.2	4/	---	---	---	2	---	5/
Brazil	6	---	---	2	.1	---	---	---	21	9	10	6
Chile	---	---	---	---	---	---	3.3	10.1	33	31	38	58
Colombia	---	---	---	837	---	---	---	---	9	8	17	17
Ecuador	---	---	---	---	---	---	---	---	6	9	12	23
Peru	---	---	202	---	4/	4/	---	---	5	9	59	111
Venezuela	1,336	1,650	2,070	3,042	.1	1	4/	2.9	2	3	5/	5-
Other	---	---	---	---	4/	2	2	3	1	5/	3	5
Total	1,343	1,654	2,272	3,883	.4	3	3.5	13.3	77	71	139	219
<b>Western Europe</b>												
Austria	---	---	---	2	7.0	1.3	5.2	1.5	---	---	---	5/
Belgium-Luxembourg	8,698	10,237	16,115	13,222	240.7	166.9	219.0	308.8	5/	5/	8	5/
Denmark	18,516	11,797	18,408	21,442	66.0	18.3	32.5	85.6	---	5/	5/	5/
Finland	---	---	---	---	---	---	---	---	---	5/	---	---
France	551	284	4,988	13,223	495.4	471.8	622.8	712.1	5/	5/	5/	---
Germany, West	31,966	30,515	41,778	52,980	508.2	636.5	855.9	994.4	5/	5/	2	5/
Greece	---	---	---	2	2.1	3	---	---	---	---	---	12
Ireland	---	---	---	---	31.0	43.2	60.4	36.5	---	---	---	---
Italy	14,788	16,428	25,413	25,978	190.5	231.9	309.5	330.8	5/	5/	5-	5/
Netherlands	36,835	42,660	57,397	57,381	546.9	515.8	659.0	675.4	5/	5/	1	1
Norway	4,959	4,247	5,434	7,462	---	4/	4/	2.2	5/	---	5/	5
Spain	29,498	31,172	36,349	38,691	15.0	96.1	34.1	10.7	---	---	---	---
Sweden	1	3	8	309	5	3	1.1	1	5/	5/	5/	5
Switzerland	431	380	495	188	9.4	64.3	111.8	69.1	---	---	---	2
United Kingdom	3,919	4,840	7,510	5,892	82.0	38.5	42.9	100.1	5/	1	12	10
Other	3/	352	1,047	1,600	28.0	33.4	18.5	9.2	4	2	5	1
Total	147,163	150,915	214,942	238,372	2,222.7	2,318.6	2,972.7	3,336.5	6	3	26	26

Soybean Utilization Chart



Soybean Utilization Chart





## OILSEED MEALS: Trade of Net Exporting Countries(a) - (1 000 metric tons)

SOYBEAN MEAL	J a n u a r y / J u n e						Jan/June
	1975	1971p	1970p	1969	1968	1967	1971p
Gross exports	-	-	-	4.8	13.8	22.8	-
U.S.S.R. ....							
U.S.A. ....	4 800	4006.4	3640.4	2995.8	2698.0	2465.0	2000.2
Brazil ....	1 200	872.2	525.4	295.4	234.5	125.4	254.3
Thailand ....	3	2.0*	4.7	8.6	2.8	2.5	1.1
Other countries*	47	40.4	35.5	17.2	6.7	8.1	9.4
World ....	5 250	5001.0	4226.0	3321.0	2955.0	2623.0	2303.0
Gross imports	-	-	-	-	-	-	-
World net exports	5 250	5001.0	4226.0	3321.0	2955.0	2623.0	2302.0
<b>COTTONSEED MEAL</b>							
Gross exports							
U.S.S.R. ....	10	25.0*	29.0*	182.0*	187.0*	222.0*	20.0*
El Salvador ....	36	30.0*	27.1	43.0	23.7	20.7	15.4
Guatemala ....	20	24.0*	14.3	39.5	27.0	45.9	0.8
Mexico ....	-	-	-	13.7	24.5	46.8	-
Nicaragua ....	30	46.3	30.0*	57.7	48.8	37.1	22.0*
U.S.A. ....	30	23.8	16.5	-	-	-	23.5
Argentina ....	80	74.0(d)	88.9	78.8	41.5	73.8	42.3(d)
Brazil ....	170	116.7	161.5	171.9	78.3	27.4	56.4
Angola ....	4	3.5*	2.1	2.8	1.3	1.5	1.8
Ethiopia ....	12	11.0*	10.9	6.5	0.5	0.1*	4.7
Egypt ....	1	1.0*	0.8	-	0.8	7.0*	0.1*
Kenya ....	3	3.0*	3.0	2.8	3.6	5.2	1.8
Mocambique ....	35	30.0*	33.7	23.5	19.5	17.7	15.5
Morocco ....	5	3.9	4.1	4.0	3.7	4.6	3.9
Sudan ....	180	153.7	183.5	129.8	167.8	115.9	62.9
Tanganyika ....	40	35.0*	38.3	48.1	41.0	48.6	16.0
Uganda ....	80	65.0*	75.4	70.6	51.6	74.7	23.6
India ....	100	75.0*	105.7	89.8	116.5	137.9	38.8
Pakistan ....	40	25.0*	31.1	30.7	26.2	36.8	4.6
Syria (f) ....	75	70.0*	80.8	120.1	89.2	78.1	21.1
Turkey ....	200	162.6	176.0	179.6	179.9	193.3	105.0*
Other countries*	120	113.5	110.3	110.1	105.6	79.7	60.1
World ....	1 270	1092.0	1223.0	1485.0	1238.0	1274.0	539.0
Gross imports							
U.S.S.R. ....	5	-	-	21.0	18.0	24.0	-
Other countries*	3	3.0	3.0	2.0	1.5	3.0	2.0
World ....	8	3.0	3.0	23.0	19.5	27.0	2.0
World net exports	1 262	1089.0	1220.0	1362.0	1218.5	1247.0	537.0
<b>GROUNDNUT MEAL</b>							
Gross exports							
Dominican Republic .	22	21.0*	20.0*	10.4	16.0	23.8	6.0*
Argentina ....	50	64.1(d)	64.6	46.0	103.0	116.9	10.0(d)
Brazil ....	200	200.5	201.2	135.4	102.8	148.4	162.1
Angola ....	2	1.1*	2.0	1.1	2.4	1.9	-
Ethiopia ....	3	2.6*	2.0	2.0	1.9	0.9	1.6
Gambia ....	25	23.0*	26.0*	16.0*	26.6	34.2	11.0*
Mocambique ....	5	5.0*	6.3	2.9	5.3	10.4	3.0*
Niger ....	34	12.0*	11.1	9.0*	11.0*	7.5	5.0*
Nigeria ....	150	99.2	162.1	170.6	173.4	132.9	50.5
Sénégal ....	300	145.2(d)	199.4(d)	188.5	225.5(d)	229.0	77.6(d)
Sudan ....	30	24.9	36.5	27.2	42.3	47.9	6.8
Uganda ....	-	0.1*	0.2	2.1	5.4	1.9	-
Burma ....	30	29.0*	30.0*	28.0*	41.0*	45.0*	15.0*

(Cont'd next page)

UTROBAK OROVNIH SIROVINA U PRERADNOJ INDUSTRIJI  
CONSUMPTION OF BASIC RAW MATERIALS BY THE FOOD PROCESSING INDUSTRY

	1968	1969	1970	1971	
White Cereals, thousand tons	2,889	2,863	2,909	2,872	Bile žitarice, hilj. tona
Maize, tons	85	81	110	184	Žitarice, hilj. tona
Sugar Beet, tons	3,200	3,306	2,806	2,816	Šećerna repa, hilj. tona
Sunflower, tons	237	303	300	183	Šumskret, hilj. tona
Other Oil Seeds, tons	29,086	8,836	6,636	25,472	Ostale uljarice, tona
Barley, tons	88,112	61,134	51,930	62,797	Jahin, tona
Fresh Meat, thousand tons	136	144	184	172	Sveže meso, hilj. tona
Bacon, tons	84,872	42,363	47,782	56,712	Slanina, tona
Fresh Fish, tons	80,988	19,712	22,861	26,317	Sveža riba, tona
Fruit, tons	47,936	89,449	37,636	48,649	Voće, tona
Vegetables, thousand tons	79	82	118	117	Povrće, hilj. tona
Cocoa beans, tons	11,206	10,648	10,744	12,786	Kakaovac, tona
Flour, tons	108,686	123,862	501,825 *	527,406	Žitno brašno, tona
Sugar, tons	80,472	84,416	91,643	106,823	Šećer, tona
Molasses, thousand tons	114	119	140	163	Melasa, hilj. tona
Refined Sugar, thousand hectolitres	5,663	4,272	15,088	15,062	Refinirana, hilj. hl

\* Consumption of flour in 1970 is bigger if compared with 1969 due to the changed nomenclature.

\* Potrošnja brašna u 1970. god. veća je u odnosu na 1969. zbog promjene nomenklature

Source: SFRJ Stat. YRBK 72

POTROŠNJA ELEKTRIČNE ENERGIJE I GORIVA U INDUSTRIJI (1971)

CONSUMPTION OF ELECTRIC ENERGY AND FUEL IN INDUSTRIAL ENTERPRISES (1971)

	Elektro energija mil. MWh	Antra- cit	Koks	Kamni ugalj	Međi ugalj	Lignit	Tečna goriva	Masut	
	u hiljadama tona								
	Electr. Million MWh	Anthra- cite	Coke	Bitumi- nous Coal	Brown Coal	Lignite	Liquid Fuels	Gasol	
	i n t h o u s a n d t o n s								
Total	15,287	132	1,464	2,200	6,496	16,263	678	2,237	Ukupno
Food Manufac- turing Industr.	728	-	16	11	806	309	43	198	Prehrambena industrija

Source: SFRJ Stat. YRBK 72

	J o n u e r y / D e c e m b e r						Jan/June
	1970	1971 <sup>a</sup>	1972 <sup>b</sup>	1973	1974	1975	1971 <sup>a</sup>
<b>Groundnut meal</b>							
India	200	655.0 <sup>c</sup>	655.1	555.9	700.9	500.0	300.0
Pakistan	2	1.2 <sup>c</sup>	1.9	0.6	17.9	10.4	0.2
Thailand	4	5.0 <sup>c</sup>	4.8	3.1	4.4	5.6	2.2
Other countries <sup>d</sup>	20	20.1	23.2	20.2	25.2	17.3	12.4
World	148	1309.0	1446.5	1199.5	1514.0	1403.0	684.0
Gross imports	1	1.0	0.5	0.5	0.5	0.5	-
World net exports	148	1308.0	1446.0	1199.0	1513.5	1402.5	684.0
<b>SUNFLOWER MEAL</b>							
Gross exports							
U.S.S.R.	-	10.0 <sup>c</sup>	24.0 <sup>c</sup>	130.0 <sup>c</sup>	120.0 <sup>c</sup>	130.0 <sup>c</sup>	10.0 <sup>c</sup>
Argentina	200	200.0 <sup>c</sup>	403.8	291.1	379.2	304.3	194.7
Uruguay	16	13.0 <sup>c</sup>	19.0 <sup>c</sup>	15.5	10.4	20.5	10.0 <sup>c</sup>
Turkey	118	110.6	92.7	80.2	85.3	104.1	40.0 <sup>c</sup>
Other countries <sup>d</sup>	19	12.4	14.5	13.2	12.1	10.1	7.3
World	433	437.0	564.0	530.0	607.0	676.0	262.0
Gross imports	-	-	-	-	-	-	-
World net exports	433	437.0	564.0	530.0	607.0	676.0	262.0
<b>RAPESEED MEAL</b>							
Gross exports							
Denmark	n.i.	n.i.	n.i.	5.6	n.i.	1.4	n.i.
France	140	142.6	65.2	99.9	70.0	40.2	50.5
Chile	15	11.0 <sup>c</sup>	15.0 <sup>c</sup>	12.2	8.8	30.0 <sup>c</sup>	3.0 <sup>c</sup>
Ethiopia	2	1.0 <sup>c</sup>	1.6	4.9	4.0	4.4	-
Pakistan	20	22.1 <sup>(d)</sup>	29.0 <sup>(d)</sup>	8.5 <sup>(d)</sup>	16.1 <sup>(d)</sup>	17.4 <sup>(d)</sup>	11.6 <sup>(d)</sup>
Other countries <sup>d</sup>	23	20.2	10.2	12.4	12.1	10.6	10.4
World	210	197.0	120.0	144.5	119.0	104.0	83.5
Gross imports							
Denmark	n.i.	n.i.	n.i.	11.1	n.i.	11.6	n.i.
France	7.5	8.3	5.7	0.2	2.0	4.9	5.9
Other countries <sup>d</sup>	0.5	0.2	0.3	0.2	0.5	0.5	0.1
World	8.0	8.5	6.0	11.5	2.5	17.0	6.0
World net exports	202.0	188.5	123.0	133.0	116.5	87.0	77.5
<b>SESAME MEAL</b>							
Gross exports							
Sudan	15	13.0 <sup>c</sup>	16.6	20.8	12.1	8.8	6.8
Burma	0	0.0 <sup>c</sup>	0.0 <sup>c</sup>	0.0 <sup>c</sup>	7.0 <sup>c</sup>	9.0 <sup>c</sup>	4.0 <sup>c</sup>
Other countries <sup>d</sup>	7	7.0 <sup>c</sup>	6.4	5.2	4.9	5.2	4.2
World	22	20.0	23.0	26.0	24.0	23.0	15.0
Gross imports	-	-	-	-	-	-	-
World net exports	22	20.0	23.0	26.0	24.0	23.0	15.0
<b>COPRA MEAL</b>							
Gross exports							
Mozambique	4	5.0 <sup>c</sup>	5.2	4.2	4.9	5.6	3.0 <sup>c</sup>
Tanganyika	5	5.0 <sup>c</sup>	6.1	5.9	4.7	3.1	2.1
Fiji	5	4.0 <sup>c</sup>	7.2	8.2	7.4	5.1	2.0 <sup>c</sup>
India	4	4.5 <sup>c</sup>	8.3	9.2	6.5	6.8	1.9
Indonesia	200	230.0 <sup>c</sup>	185.6	170.2	160.7	165.8	105.0 <sup>c</sup>
N. Guinea/Papua	14	14.0 <sup>c</sup>	13.5	11.7	12.6	13.4	7.6
Philippines	300	290.9 <sup>(d)</sup>	236.7 <sup>(d)</sup>	184.2	207.6	193.6	119.0 <sup>(d)</sup>
Thailand	10	10.0 <sup>c</sup>	8.1	8.8	10.5	4.6	3.3
Other countries <sup>d</sup>	13	13.6	15.3	16.6	14.1	9.0	7.1
World	645	577.0	506.0	419.0	429.0	407.0	251.0
Gross imports	-	-	-	-	-	-	-
World net exports	645	577.0	506.0	419.0	429.0	407.0	251.0

(Continued next page)



(Oilseed meals continued)

**PALM KERNEL MEAL**

	J 1970 <sup>a</sup>	n 1971 <sup>b</sup>	u 1970 <sup>c</sup>	r 1969	y/D 1968	e 1967	c 1967	m 1967	b 1967	r 1967	Jan/June 1971 <sup>d</sup>
<b>Gross exports</b>											
Brazil (e) .....	48	31.0 <sup>e</sup>	48.3	47.0	33.6	35.9					15.3 <sup>e</sup>
Zaire (Congo K.) (d) ..	57	36.6 <sup>e</sup>	30.7	51.2	44.9	44.9					31.3
Dahomey .....	26	25.5 <sup>e</sup>	23.0 <sup>e</sup>	23.5	23.5	21.1					9.5 <sup>e</sup>
Nigeria .....	31	29.0	33.3	40.2	30.9	41.0					16.7
Sierra Leone .....	-	-	-	-	2.0	3.8					-
Other countries <sup>g</sup> ...	31	23.9	17.7	15.1	14.1	12.3					9.0
<b>World</b> .....	<b>185</b>	<b>165.0</b>	<b>173.0</b>	<b>177.0</b>	<b>149.0</b>	<b>159.0</b>					<b>82.0</b>
<b>Gross imports</b>	-	-	-	-	-	-					-
<b>World net exports</b>	<b>185</b>	<b>165.0</b>	<b>173.0</b>	<b>177.0</b>	<b>149.0</b>	<b>159.0</b>					<b>82.0</b>

**LINSEED MEAL**

	J 1970 <sup>a</sup>	n 1971 <sup>b</sup>	u 1970 <sup>c</sup>	r 1969	y/D 1968	e 1967	c 1967	m 1967	b 1967	r 1967	Jan/June 1971 <sup>d</sup>
<b>Gross exports</b>											
Canada .....	15	12.7	14.0	5.0	4.7	7.3					2.5
U.S.A. ....	70	100.4	67.9	84.6	68.0	87.5					26.2
Argentina .....	240	365.0 <sup>(d)</sup>	365.3	271.5	274.5	344.8					187.0 <sup>(d)</sup>
Brazil .....	8	4.0 <sup>e</sup>	11.5	4.5	1.5	5.9					4.0 <sup>e</sup>
Uruguay .....	46	46.0 <sup>e</sup>	48.0 <sup>e</sup>	44.8	5.0	16.2					31.0 <sup>e</sup>
Egypt .....	6	6.0 <sup>e</sup>	7.0 <sup>e</sup>	10.3	10.2	6.0 <sup>e</sup>					3.5 <sup>e</sup>
Ethiopia .....	10	14.5 <sup>e</sup>	5.4	8.7	11.3	9.1					6.0
Morocco .....	2	1.7	2.3	0.2	3.6	1.3					0.5
India .....	38	30.0 <sup>e</sup>	26.9	28.8	14.2	4.9					17.0
Other countries <sup>g</sup> ...	16	15.7	15.7	15.6	16.0	16.5					7.5
<b>World</b> .....	<b>448</b>	<b>595.0</b>	<b>563.0</b>	<b>488.0</b>	<b>489.0</b>	<b>499.5</b>					<b>285.0</b>
<b>Gross imports</b>											
U.S.A. ....		2.0			0.6	0.1					0.8
Other countries <sup>g</sup> ...		0.5			0.4	0.4					0.2
<b>World</b> .....	<b>2</b>	<b>2.5</b>	<b>1.0</b>	<b>1.0</b>	<b>1.0</b>	<b>0.5</b>					<b>1.0</b>
<b>World net exports</b>	<b>443</b>	<b>593.5</b>	<b>563.0</b>	<b>487.0</b>	<b>488.0</b>	<b>499.0</b>					<b>285.0</b>

**UNSPECIFIED MEALS (b)**

Dominican Republic ..	2	2.0 <sup>e</sup>	2.0 <sup>e</sup>	2.0 <sup>e</sup>	0.1	3.3					1.0 <sup>e</sup>
U.S.A. ....	60	74.5	52.6	43.0	78.6	34.1					38.3
Brazil (c) .....	50	54.0 <sup>e</sup>	47.0 <sup>e</sup>	51.5 <sup>e</sup>	44.9	25.7					30.0 <sup>e</sup>
Angola .....	3	2.4 <sup>e</sup>	2.6	3.8	2.1	3.4					0.6
Egypt .....	30	30.0 <sup>e</sup>	36.3	31.5 <sup>e</sup>	18.2	20.0 <sup>e</sup>					17.0 <sup>e</sup>
Ethiopia .....	7	6.5 <sup>e</sup>	6.0	11.1	8.6	16.8					2.8
Mocambique .....	5	5.0 <sup>e</sup>	4.5 <sup>e</sup>	4.8	5.8	4.0					3.0 <sup>e</sup>
Morocco .....	5	3.5	7.1	2.6	5.5	1.6					0.5
Burma .....	40	40.0 <sup>e</sup>	45.0 <sup>e</sup>	55.0 <sup>e</sup>	52.0 <sup>e</sup>	55.0 <sup>e</sup>					19.0 <sup>e</sup>
India .....	60	60.0 <sup>e</sup>	63.9	64.3	11.9	18.2					33.3
Pakistan .....	1	1.0 <sup>e</sup>	1.1	0.5	9.7	4.2					0.3
Thailand .....	15	12.0 <sup>e</sup>	21.1	20.0 <sup>e</sup>	18.7	1.6					3.7
Turkey .....	1	0.5 <sup>e</sup>	0.1	1.0 <sup>e</sup>	1.2	1.7					0.3 <sup>e</sup>
Other countries <sup>g</sup> ...	101	98.6	97.7	92.9	80.7	67.4					47.2
<b>World</b> .....	<b>380</b>	<b>398.0</b>	<b>387.0</b>	<b>384.0</b>	<b>338.0</b>	<b>257.0</b>					<b>197.0</b>
<b>Gross imports</b>											
India .....		3.0 <sup>e</sup>	7.2	9.9	5.6	9.1					0.2
Other countries <sup>g</sup> ...		22.0	14.8	15.1	14.4	10.9					11.8
<b>World</b> .....	<b>22</b>	<b>25.0</b>	<b>22.0</b>	<b>25.0</b>	<b>20.0</b>	<b>20.0</b>					<b>12.0</b>
<b>World net exports</b>	<b>358</b>	<b>365.0</b>	<b>368.0</b>	<b>359.0</b>	<b>318.0</b>	<b>237.0</b>					<b>185.0</b>

(a) Only such countries are listed that are net exporters of the respective meal and seed combined.

(b) Except castor bean meal, where separately specified, and other oilmeal fertilizers. (c) Incl. maize germ meal. (d) Preliminary shipping date. (e) Mainly babassu meal. (f) Including negligible amounts of other oilseed meals. (g) Imports of the U. K. and the Netherlands from Pakistan.

OILSEED MEALS: Production in West Europe (1 000 MT)

	J a n u a r y / D e c e m b e r					Jan/June
	1971p	1970p	1969	1968	1967	1971p
<u>Soybean meal</u>						
Belgium-Luxembourg	255 <sup>a</sup>	250 <sup>a</sup>	212 <sup>a</sup>	198 <sup>a</sup>	185 <sup>a</sup>	143 <sup>a</sup>
France .....	306	338	35	40	104	200
Italy .....	676 <sup>a</sup>	674 <sup>a</sup>	508 <sup>a</sup>	441 <sup>a</sup>	478 <sup>a</sup>	400 <sup>a</sup>
Netherlands .....	870	866	676	431	355	444
West Germany ...	1 648	1 677	1 178	1 153	1 340	867
EEC .....	3 845	3 805	2 685	2 283	2 480	2 084
Denmark .....	394 <sup>a</sup>	425 <sup>a</sup>	326 <sup>a</sup>	318 <sup>a</sup>	318 <sup>a</sup>	207 <sup>a</sup>
Finland .....	60 <sup>a</sup>	38 <sup>a</sup>	38 <sup>a</sup>	40 <sup>a</sup>	48 <sup>a</sup>	32 <sup>a</sup>
Norway .....	163 <sup>a</sup>	143 <sup>a</sup>	131 <sup>a</sup>	128 <sup>a</sup>	131 <sup>a</sup>	76 <sup>a</sup>
Portugal .....	41 <sup>a</sup>	38 <sup>a</sup>	14 <sup>a</sup>	.	.	24 <sup>a</sup>
Spain .....	994 <sup>a</sup>	970 <sup>a</sup>	828 <sup>a</sup>	712 <sup>a</sup>	640 <sup>a</sup>	541 <sup>a</sup>
Sweden .....	7	2	.	.	.	7
Switzerland .....	13	13	2 <sup>a</sup>	.	.	9 <sup>a</sup>
United Kingdom ..	210 <sup>a</sup>	251	225	186	185 <sup>a</sup>	110 <sup>a</sup>
Total .....	3 788	3 882	4 162	3 617	3 782	3 088
<u>Cottonseed meal</u>						
West Germany ...	.	3	.	.	.	.
Greece .....	146 <sup>a</sup>	148 <sup>a</sup>	147 <sup>a</sup>	95 <sup>a</sup>	83 <sup>a</sup>	65 <sup>a</sup>
Portugal .....	17 <sup>a</sup>	17 <sup>a</sup>	6 <sup>a</sup>	5 <sup>a</sup>	4 <sup>a</sup>	8 <sup>a</sup>
Spain .....	58 <sup>a</sup>	63 <sup>a</sup>	77 <sup>a</sup>	83 <sup>a</sup>	97 <sup>a</sup>	27 <sup>a</sup>
United Kingdom ..	.	2	18	17	21 <sup>a</sup>	.
Total .....	221	288	288	208	205	100
<u>Groundnut meal</u>						
Belgium-Luxembourg	4 <sup>a</sup>	7 <sup>a</sup>	14 <sup>a</sup>	48 <sup>a</sup>	20 <sup>a</sup>	2 <sup>a</sup>
France .....	112	162	228	262	248	62
Italy .....	48 <sup>a</sup>	86 <sup>a</sup>	52 <sup>a</sup>	74 <sup>a</sup>	71 <sup>a</sup>	24 <sup>a</sup>
Netherlands .....	.	1	7	13	2	.
West Germany ...	11	24	28	46	33	7
EEC .....	175	280	329	435	374	95
Denmark .....	.	.	1 <sup>a</sup>	2 <sup>a</sup>	1 <sup>a</sup>	.
Finland .....	.	1 <sup>a</sup>	1 <sup>a</sup>	1 <sup>a</sup>	.	.
Ireland .....	.	1 <sup>a</sup>	1 <sup>a</sup>	2 <sup>a</sup>	.	.
Norway .....	1 <sup>a</sup>	3 <sup>a</sup>	2 <sup>a</sup>	6 <sup>a</sup>	4 <sup>a</sup>	1 <sup>a</sup>
Portugal .....	21 <sup>a</sup>	34 <sup>a</sup>	64 <sup>a</sup>	66 <sup>a</sup>	79 <sup>a</sup>	2 <sup>a</sup>
Spain .....	13 <sup>a</sup>	12 <sup>a</sup>	20 <sup>a</sup>	17 <sup>a</sup>	10 <sup>a</sup>	3 <sup>a</sup>
Switzerland .....	34	37	28 <sup>a</sup>	33 <sup>a</sup>	26 <sup>a</sup>	19 <sup>a</sup>
United Kingdom ..	.	.	5	31	32 <sup>a</sup>	.
Total .....	384	588	443	593	528	116
<u>Sunflowerseed meal</u>						
Belgium-Luxembourg	.	.	1 <sup>a</sup>	1 <sup>a</sup>	1 <sup>a</sup>	.
France .....	13	8	3	3	3	5
Italy .....	42 <sup>a</sup>	107 <sup>a</sup>	106 <sup>a</sup>	101 <sup>a</sup>	100 <sup>a</sup>	32 <sup>a</sup>
West Germany ...	15	20	29	6	3	12
EEC .....	70	135	139	111	107	49
Finland .....	7 <sup>a</sup>	19 <sup>a</sup>	15 <sup>a</sup>	8 <sup>a</sup>	4 <sup>a</sup>	5 <sup>a</sup>
Spain .....	97 <sup>a</sup>	53 <sup>a</sup>	20 <sup>a</sup>	12 <sup>a</sup>	14 <sup>a</sup>	29 <sup>a</sup>
Total .....	174	207	174	131	125	83
<u>Rapeseed meal</u>						
Belgium-Luxembourg	1 <sup>a</sup>	.	2 <sup>a</sup>	3 <sup>a</sup>	2 <sup>a</sup>	.
France .....	311	182	180	161	90	141
Italy .....	202 <sup>a</sup>	131 <sup>a</sup>	99 <sup>a</sup>	73 <sup>a</sup>	116 <sup>a</sup>	103 <sup>a</sup>
Netherlands .....	42	17	10	8	13	20
West Germany ...	167	94	167	142	79	75
EEC .....	723	424	438	387	300	339

(Cont'd next page)

(Oilseed meals continued)

	J a n u a r y		/ D e c e m b e r			Jan/June
	1971 <sup>p</sup>	1970 <sup>p</sup>	1969	1968	1967	1971 <sup>p</sup>
Austria .....	1 <sup>a</sup>	1 <sup>a</sup>	1 <sup>a</sup>	1 <sup>a</sup>	1 <sup>a</sup>	1 <sup>a</sup>
Denmark .....	- .	2 <sup>a</sup>	10 <sup>a</sup>	9 <sup>a</sup>	7 <sup>a</sup>	- .
Finland .....	8 <sup>a</sup>	9 <sup>a</sup>	7 <sup>a</sup>	10 <sup>a</sup>	6 <sup>a</sup>	3 <sup>a</sup>
Sweden .....	70	73	80	92	70	30
Switzerland .....	13	10	9 <sup>a</sup>	10 <sup>a</sup>	8 <sup>a</sup>	4 <sup>a</sup>
United Kingdom ...	42 <sup>a</sup>	30	48	49	29 <sup>a</sup>	19 <sup>a</sup>
Total .....	857	549	613	588	421	395
<b>Coarse meal</b>						
Belgium-Luxembourg	3 <sup>a</sup>	3 <sup>a</sup>	13 <sup>a</sup>	10 <sup>a</sup>	15 <sup>a</sup>	3 <sup>a</sup>
France .....	19	16	20	22	26	8
Italy .....	11 <sup>a</sup>	4 <sup>a</sup>	8 <sup>a</sup>	6 <sup>a</sup>	7 <sup>a</sup>	4 <sup>a</sup>
Netherlands .....	20	28	44	46	45	10
West Germany .....	98	88	62	84	91	44
EEC .....	158	164	147	158	164	69
Denmark .....	7 <sup>a</sup>	6 <sup>a</sup>	11 <sup>a</sup>	9 <sup>a</sup>	9 <sup>a</sup>	4 <sup>a</sup>
Finland .....	3 <sup>a</sup>	3 <sup>a</sup>	3 <sup>a</sup>	3 <sup>a</sup>	5 <sup>a</sup>	1 <sup>a</sup>
Ireland .....	1 <sup>a</sup>	1 <sup>a</sup>	1 <sup>a</sup>	1 <sup>a</sup>	1 <sup>a</sup>	- .
Norway .....	8 <sup>a</sup>	7 <sup>a</sup>	8 <sup>a</sup>	7 <sup>a</sup>	7 <sup>a</sup>	3 <sup>a</sup>
Portugal .....	7 <sup>a</sup>	4 <sup>a</sup>	4 <sup>a</sup>	5 <sup>a</sup>	5 <sup>a</sup>	3 <sup>a</sup>
Spain .....	6 <sup>a</sup>	4 <sup>a</sup>	6 <sup>a</sup>	4 <sup>a</sup>	5 <sup>a</sup>	2 <sup>a</sup>
Sweden .....	17	13	15	15	23	8
Switzerland .....	4	4	6 <sup>a</sup>	1 <sup>a</sup>	3 <sup>a</sup>	2 <sup>a</sup>
United Kingdom ...	12 <sup>a</sup>	11	14	16	17 <sup>a</sup>	6 <sup>a</sup>
Total .....	218	187	218	199	237	98
<b>Palm kernel meal</b>						
Belgium-Luxembourg	- .	- .	6 <sup>a</sup>	10 <sup>a</sup>	4 <sup>a</sup>	- .
France .....	19	30	20	22	24	15
Italy .....	1 <sup>a</sup>	1 <sup>a</sup>	1 <sup>a</sup>	- .	1 <sup>a</sup>	1 <sup>a</sup>
Netherlands .....	112	76	73	51	38	48
West Germany .....	38	42	34	45	41	18
EEC .....	170	149	134	128	108	82
Denmark .....	13 <sup>a</sup>	10 <sup>a</sup>	11 <sup>a</sup>	9 <sup>a</sup>	5 <sup>a</sup>	6 <sup>a</sup>
Greece .....	3 <sup>a</sup>	3 <sup>a</sup>	2 <sup>a</sup>	2 <sup>a</sup>	1 <sup>a</sup>	1 <sup>a</sup>
Ireland .....	1 <sup>a</sup>	2 <sup>a</sup>	1 <sup>a</sup>	2 <sup>a</sup>	2 <sup>a</sup>	1 <sup>a</sup>
Portugal .....	8 <sup>a</sup>	7 <sup>a</sup>	5 <sup>a</sup>	5 <sup>a</sup>	5 <sup>a</sup>	3 <sup>a</sup>
Spain .....	2 <sup>a</sup>	1 <sup>a</sup>	1 <sup>a</sup>	- .	- .	1 <sup>a</sup>
Switzerland .....	3 <sup>a</sup>	1 <sup>a</sup>	6 <sup>a</sup>	4 <sup>a</sup>	6 <sup>a</sup>	2 <sup>a</sup>
United Kingdom ...	28 <sup>a</sup>	17	28	29	56 <sup>a</sup>	11 <sup>a</sup>
Total .....	288	198	183	179	183	107
<b>Linseed meal</b>						
Belgium-Luxembourg	38 <sup>a</sup>	28 <sup>a</sup>	29 <sup>a</sup>	26 <sup>a</sup>	29 <sup>a</sup>	14 <sup>a</sup>
France .....	38	36	25	28	32	21
Italy .....	6 <sup>a</sup>	5 <sup>a</sup>	1 <sup>a</sup>	1 <sup>a</sup>	2 <sup>a</sup>	3 <sup>a</sup>
Netherlands .....	98(e)	61(e)	61(e)	50(e)	43	28(e)
West Germany .....	48	47	74	61	29	26
EEC .....	218	177	185	166	131	92
Denmark .....	4 <sup>a</sup>	3 <sup>a</sup>	3 <sup>a</sup>	3 <sup>a</sup>	3 <sup>a</sup>	1 <sup>a</sup>
Finland .....	3 <sup>a</sup>	6 <sup>a</sup>	3 <sup>a</sup>	4 <sup>a</sup>	6 <sup>a</sup>	1 <sup>a</sup>
Greece .....	6 <sup>a</sup>	6 <sup>a</sup>	5 <sup>a</sup>	6 <sup>a</sup>	3 <sup>a</sup>	1 <sup>a</sup>
Ireland .....	1 <sup>a</sup>	2 <sup>a</sup>	1 <sup>a</sup>	1 <sup>a</sup>	1 <sup>a</sup>	1 <sup>a</sup>
Norway .....	2 <sup>a</sup>	4 <sup>a</sup>	5 <sup>a</sup>	6 <sup>a</sup>	4 <sup>a</sup>	- .
Portugal .....	1 <sup>a</sup>	1 <sup>a</sup>	1 <sup>a</sup>	2 <sup>a</sup>	2 <sup>a</sup>	1 <sup>a</sup>
Spain .....	15 <sup>a</sup>	21 <sup>a</sup>	14 <sup>a</sup>	14 <sup>a</sup>	15 <sup>a</sup>	7 <sup>a</sup>
Switzerland .....	5	5	4 <sup>a</sup>	4 <sup>a</sup>	5 <sup>a</sup>	2 <sup>a</sup>
United Kingdom ...	42 <sup>a</sup>	40	41	46	57 <sup>a</sup>	19 <sup>a</sup>
Total .....	294	265	263	252	227	125

(Oilseed meals continued)	J a n u a r y / D e c e m b e r					Jan/June
Unspecified meals	1971 <sup>p</sup>	1970 <sup>p</sup>	1969	1968	1967	1971 <sup>p</sup>
Belgium-Luxembourg .	1 <sup>a</sup>	1 <sup>a</sup>	2 <sup>a</sup>	3 <sup>a</sup>	8 <sup>a</sup>	1 <sup>a</sup>
France . . . . .	16 <sup>a</sup>	15 <sup>a</sup>	16 <sup>a</sup>	24 <sup>a</sup>	30 <sup>a</sup>	7 <sup>a</sup>
Italy (c) . . . . .	66 <sup>a</sup>	63 <sup>a</sup>	65 <sup>a</sup>	62 <sup>a</sup>	83 <sup>a</sup>	33 <sup>a</sup>
Netherlands . . . . .	4	10(e)	4(e)	1	1	2(e)
West Germany (b) . . . . .	23	23	24	17	16	11
EEC . . . . .	110	112	111	109	138	54
Austria . . . . .	.	.	.	.	.	.
Denmark . . . . .	15 <sup>a</sup>	9 <sup>a</sup>	11 <sup>a</sup>	10 <sup>a</sup>	7 <sup>a</sup>	8 <sup>a</sup>
Greece . . . . .	4 <sup>a</sup>	4 <sup>a</sup>	4 <sup>a</sup>	3 <sup>a</sup>	3 <sup>a</sup>	2 <sup>a</sup>
Ireland . . . . .	1 <sup>a</sup>	1 <sup>a</sup>	1 <sup>a</sup>	2 <sup>a</sup>	4 <sup>a</sup>	.
Norway . . . . .	2 <sup>a</sup>	2 <sup>a</sup>	1 <sup>a</sup>	3 <sup>a</sup>	4 <sup>a</sup>	1 <sup>a</sup>
Portugal (c) . . . . .	22 <sup>a</sup>	22 <sup>a</sup>	20 <sup>a</sup>	19 <sup>a</sup>	18 <sup>a</sup>	8 <sup>a</sup>
Spain (d) . . . . .	1 <sup>a</sup>	7 <sup>a</sup>	7 <sup>a</sup>	1 <sup>a</sup>	1 <sup>a</sup>	1 <sup>a</sup>
Sweden . . . . .	-	-	1	.	1 <sup>a</sup>	-
Switzerland . . . . .	.	.	2 <sup>a</sup>	2 <sup>a</sup>	1 <sup>a</sup>	.
United Kingdom . . . . .	7 <sup>a</sup>	11 <sup>a</sup>	3 <sup>a</sup>	9 <sup>a</sup>	3 <sup>a</sup>	6 <sup>a</sup>
Total . . . . .	162	168	161	158	180	80

(a) Mainly sunfl. meal. (b) Incl. maize meal. (c) Incl. maize & similar seed meals. (d) Excl. meal of domestic safflowerseed. (e) Net imports of linseed, meal basis.

**OILSEED MEALS: Trade of W. Europe's Net Importing Countries (e) - (1000 metric tons)**

SOYBEAN MEAL	J a n u a r y / D e c e m b e r					Jan/June	
Gross imports	1971 <sup>p</sup>	1970 <sup>p</sup>	1969	1968	1967	1966	1971 <sup>p</sup>
Belgium-Luxembourg .	341.1	348.0	230.1	171.3	157.9	144.8	143.3
France . . . . .	939.4	843.3	802.8	739.5	625.9	614.9	486.2
Italy . . . . .	325.4	264.5	221.4	194.0	169.6	126.8	154.5
Netherlands . . . . .	650.9	530.9	271.6	345.0	271.2	212.8	283.1 <sub>r</sub>
West Germany . . . . .	1270.3	997.7	980.1	697.3	788.5	755.2	567.8
EEC . . . . .	3527.1	2982.4	2506.0	2147.1	2013.1	1854.5	1636.9
Austria . . . . .	120.6	98.2	64.0	51.9	55.6	50.2	31.0
Denmark . . . . .	262.6	243.0	204.4	179.8	215.7	265.7	132.0
Finland . . . . .	-	-	-	8.8	13.6	13.9	-
Greece . . . . .	40.0 <sup>a</sup>	34.5 <sup>a</sup>	27.5 <sup>a</sup>	20.0 <sup>a</sup>	20.0 <sup>a</sup>	19.0 <sup>a</sup>	18.5 <sup>a</sup>
Ireland . . . . .	96.9	92.0 <sub>r</sub>	62.4	66.1	48.9	49.4	50.9
Portugal . . . . .	54.0 <sup>a</sup>	22.0	16.9	28.0 <sup>a</sup>	16.1 <sup>a</sup>	16.7 <sup>a</sup>	24.0 <sup>a</sup>
Spain . . . . .	27.7	24.3	116.7	53.0 <sup>a</sup>	9.0 <sup>a</sup>	134.0 <sup>a</sup>	8.0
Sweden . . . . .	166.9	168.0	140.1	162.5	173.3	184.8	75.9
Switzerland . . . . .	79.4	58.9	72.3	62.7	79.0	70.1	46.3
United Kingdom . . . . .	319.1	248.3	146.0 <sub>r</sub>	193.1	163.6	216.0	164.2
West Europe(c) . . . . .	4894.3	3971.6	3356.3	2973.0	2807.9	2874.3	2187.7
Gross exports							
Belgium-Luxembourg .	143.0	131.3	102.9	81.0	67.3	37.3	76.1
France . . . . .	12.0	8.8	3.9	3.1	3.5	3.3	7.1
Italy . . . . .	6.8	10.2	2.5	2.6	7.7	9.7	3.4
Netherlands . . . . .	423.0	365.3	368.8	242.7	137.3	131.0	179.4 <sub>r</sub>
West Germany . . . . .	249.6	264.9	124.7	171.8	224.0	160.6	117.0
EEC . . . . .	834.4	780.5	602.8	501.2	439.8	341.9	383.0
Denmark . . . . .	117.8	130.0	75.8	102.1	128.8	103.6	59.6
Finland . . . . .	1.2	8.7	17.9	-	-	-	1.2
Norway . . . . .	80.8	57.9	39.3	39.0	37.2	3.4	36.6
Portugal . . . . .	-	-	2.0	-	-	-	-
Spain . . . . .	1.8	-	.	9.9 <sup>a</sup>	23.0 <sup>a</sup>	4.4 <sup>a</sup>	-
United Kingdom . . . . .	0.9	1.8	3.0	.	-	0.2	0.5
West Europe . . . . .	1038.9	978.9	740.8	652.2	628.8	453.5	480.9

(Oilseed meals continued): (a) Only such countries are listed that are net importers of the respective seed and meal combined. (b) Includes cester meal. (c) Norway no imports. (d) Excl. meal (if any incl. with "unspecified meals".) (e) Excl. cake (if any, incl. with "unspecified meals"). (f) Might incl. olive cakes. (g) Excl. trade with Belgium-Luxembourg.

**OILSEED MEALS: Total Supplies(a) Available for Home Consumption in W. European Countries**

(1 000 MT)

	J a n u a r y / D e c e m b e r					Jan/June
	1971 <sub>p</sub>	1970 <sub>p</sub>	1969	1968	1967	1971 <sub>p</sub>
<b>Soybean meal</b>						
Belgium-Luxembourg	464.1*	464.7*	339.2*	288.3*	273.6*	272.2*
France .....	1313.4	1172.5	833.9	776.4	726.4	679.1
Italy .....	994.6*	928.3*	723.9*	632.4*	639.9*	551.1*
Netherlands .....	1097.9	1031.6	578.8	533.3	488.9	547.7
West Germany .....	2668.7	2409.8	2033.4	1678.5	1904.5	1317.8
EEC .....	6538.7	6006.9	4509.2	3908.9	4033.3	3307.9
Austria .....	120.6	98.2	64.0	51.9	55.6	31.0
Denmark .....	538.8*	538.0*	454.6*	395.7*	404.9*	279.4*
Finland .....	58.8*	26.3*	17.1*	48.8*	61.6*	30.8*
Greece .....	40.0*	34.5*	27.5*	20.0*	20.0*	18.5*
Ireland .....	96.9	92.0	62.4	66.1	48.9	50.9
Norway .....	82.2*	85.1*	91.7*	89.0*	93.8*	39.4*
Portugal .....	95.0*	60.0*	28.9*	28.0*	16.1*	48.0*
Spain .....	1019.9*	994.3*	939.7*	755.1*	626.0*	549.0*
Sweden .....	173.9	170.0	140.1	162.5	173.3	82.9
Switzerland .....	92.4	71.9	74.3*	62.7*	29.0*	51.3*
United Kingdom .....	528.2*	497.5	368.0	349.1	348.6*	273.7*
West Europe .....	9385.4	8674.7	6777.5	5937.8	5961.1	4762.8
<b>Cottonseed meal</b>						
Belgium-Luxembourg	24.2	56.0	58.3	50.5	54.3	12.8
France .....	42.0	45.0	50.6	52.7	45.8	24.6
Netherlands .....	0.8(d)	14.2	62.2	41.9	46.5	0.8(d)
West Germany .....	276.7	267.7	248.3	198.6	185.2	159.0
EEC .....	343.7	382.9	419.4	343.7	331.8	197.2
Denmark .....	271.2	349.0	338.0	257.2	275.7	125.5
Finland .....	-	-	0.2	8.6	11.5	-
Greece .....	111.0*	119.0*	135.8*	87.0*	60.4*	53.4*
Ireland .....	7.7	8.9	13.3	18.3	14.9	5.5
Norway .....	42.0	68.2	51.0	60.3	51.1	30.5
Portugal .....	24.0*	17.1*	6.0*	4.8*	2.6*	10.3*
Sweden .....	91.0	96.5	92.4	95.2	104.1	42.7
Spain .....	68.7*	63.4*	81.5*	83.2*	97.7*	32.8*
United Kingdom .....	119.4	199.4	224.3	210.7	225.8*	78.7
West Europe .....	1078.7	1304.4	1361.9	1169.0	1175.6	576.6
<b>Sunflowerseed meal</b>						
Belgium-Luxembourg	33.3*	59.0*	42.4*	54.6*	58.5*	21.5*
France .....	61.7	66.6	63.7	73.7	64.4	26.8
Italy .....	40.9*	100.0*	96.4*	88.2*	81.4*	29.6*
Netherlands .....	41.5(d)	85.6	79.2	105.3	116.2	25.7(d)
West Germany .....	122.1	148.1	135.8	124.1	112.1	67.2
EEC .....	299.5	459.3	417.5	445.9	432.6	170.8
Austria .....	1.2	1.2	0.1	0.2	0.4	0.6
Denmark .....	88.2	116.9	90.1	85.3	100.1	36.1
Finland .....	7.0*	19.0*	15.8*	16.8*	14.9*	5.0*
Norway .....	-	-	-	18.8	26.1	-
Spain .....	102.6*	54.0*	43.0*	21.3*	20.7*	33.4*
Sweden .....	3.0	2.9	0.8	4.0	18.1	1.0
United Kingdom .....	37.7	77.3	91.7	119.0	132.1*	22.2
West Europe .....	539.2	730.6	659.0	711.3	745.0	269.1

(Oilseed meals continued)	January / December					Jan/June
	1971 <sub>p</sub>	1970 <sub>p</sub>	1969	1968	1967	1971 <sub>p</sub>
<b>Groundnut meal</b>						
Belgium-Luxembourg	58.1*	56.1*	49.3*	50.3*	58.9*	37.2*
France .....	319.3	388.9	362.0	402.7	450.7	179.4
Italy .....	41.8*	43.0*	49.1*	62.2*	57.9*	20.9*
Netherlands .....	11.3(d)	11.2	33.8	36.0	33.8	4.4(d)
West Germany .....	124.2	128.3	171.1	192.1	160.3	66.3
EEC .....	564.7	627.5	665.3	753.5	761.6	308.2
Austria .....	15.8	15.6	15.2	15.8	20.0	4.2
Denmark .....	0.1	.	13.7*	100.7*	98.9*	0.1
Finland .....	.	1.0*	1.0*	1.0*	- *	.
Ireland .....	4.9*	9.8*	5.0*	9.7*	5.0*	2.9*
Norway .....	23.7*	57.0*	40.8*	38.9*	38.5*	15.5*
Portugal .....	48.3*	39.2*	64.8*	61.4*	49.5*	10.4*
Spain .....	31.3*	17.4*	25.0*	19.7*	11.5*	13.3*
Sweden .....	23.3	44.1	40.3	52.0	46.1	9.5
Switzerland .....	55.4*	45.8*	27.4*	39.2*	47.5*	23.5*
United Kingdom .....	292.4	374.4	361.6	395.8	368.5*	161.2
West Europe .....	1059.9	1231.8	1260.1	1487.7	1447.1	548.8
<b>Rapeseed meal</b>						
Belgium-Luxembourg	64.6*	34.9*	45.2*	41.6*	32.1*	26.7*
France .....	176.7	122.5	80.3	85.0	54.7	88.0
Italy .....	126.9*	62.7*	66.0*	43.9*	33.2*	59.3*
Netherlands .....	103.8(d)	49.3	69.0	47.8	38.4	40.2(d)
West Germany .....	176.8	119.4	129.5	118.4	94.8	79.2
EEC .....	648.8	388.8	390.0	336.7	253.2	293.4
Austria .....	11.4*	9.0*	6.8*	6.4*	7.3*	2.6*
Denmark .....	30.1*	17.2*	14.4*	14.5*	17.2*	9.9*
Finland .....	8.0*	9.0*	7.0*	10.0*	6.0*	3.0*
Norway .....	32.3	36.0	47.2	47.1	41.0*	19.9
Portugal .....	0.7*	0.8*	- *	- *	- *	0.6*
Spain .....	0.4*	- *	2.5*	- *	- *	- *
Sweden .....	71.8	72.9	80.0	92.1	75.2	30.0
Switzerland .....	13.0	10.0	9.0*	10.0*	8.0*	4.0*
United Kingdom .....	138.3*	94.0	148.0	135.4*	105.7*	59.6*
West Europe .....	954.8	637.7	704.9	652.2	513.6	423.0
<b>Copra meal</b>						
Belgium-Luxembourg	15.3*	15.0*	19.3*	20.1*	24.4*	8.2*
France .....	22.7.	17.6	21.0	23.9	29.2	8.9
Italy .....	9.8*	2.9*	7.1*	4.8*	6.0*	3.4*
Netherlands .....	164.6(d)	101.0	78.6	45.3	92.2	64.0(d)
West Germany .....	510.8	437.9	433.4	418.8	398.6	260.9
EEC .....	723.2	574.4	559.4	512.9	550.4	343.4
Austria .....	2.2	1.3	1.3	1.2	1.8	0.5
Denmark .....	30.6*	27.3*	30.6*	35.0*	53.6*	15.5*
Finland .....	3.0*	3.0*	3.0*	3.0*	5.0*	1.0*
Ireland .....	1.0*	1.0*	1.0*	1.0*	1.0*	.
Norway .....	1.9*	5.0*	8.0*	7.0*	6.7*	0.4*
Portugal .....	7.0*	5.0*	5.2*	6.0*	5.0*	3.0*
Spain .....	6.0*	4.0*	6.0*	4.0*	5.0*	2.0*
Sweden .....	30.2	24.4	42.5	48.0	57.3	13.3
Switzerland .....	3.3*	3.4*	5.0*	- *	2.7*	1.5*
United Kingdom .....	9.0*	6.0*	7.0*	9.5*	13.0*	5.5*
West Europe .....	817.4	654.8	669.0	627.6	701.5	388.1

(Cont'd next page)

(Oilseed meals continued)

	J e n u a r y / D e c e m b e r					Jan/June
	1971p	1970p	1969	1968	1967	1971p
<b>Palm kernel meal</b>						
Belgium-Luxembourg .	5.5*	1.7*	-0.2(b)*	4.6*	3.1*	1.0*
France . . . . .	30.9	37.1	30.2*	32.1	31.8	21.9
Italy . . . . .	1.0*	1.0*	1.0*	.	1.0*	1.0*
Netherlands . . . . .	12.1(d)	2.8	3.6	3.3	-2.5(b)	3.3(d)
West Germany . . . . .	277.5	269.2	265.1	238.6	246.9	136.9
EEC . . . . .	327.0	311.8	299.7	278.6	280.3	164.1
Denmark . . . . .	2.6*	-1.5(b)*	1.3*	1.9*	-1.8(b)*	1.3*
Greece . . . . .	1.0*	0.5*	1.0*	2.0*	1.0*	- *
Ireland . . . . .	1.0*	2.0*	1.0*	2.0*	2.0*	1.0*
Portugal . . . . .	5.0*	7.0*	5.0*	5.0*	5.0*	3.0*
Spain . . . . .	2.0*	1.0*	1.0*	- *	- *	1.0*
Sweden . . . . .	0.3	3.5	2.4	-	-	-
Switzerland . . . . .	0.9*	1.0*	6.0*	4.0*	6.0*	0.6*
United Kingdom . . . . .	18.5*	8.0*	9.0*	18.5*	27.5*	6.0*
West Europe . . . . .	388.3	333.3	326.4	312.0	320.0	177.0
<b>Linseed meal</b>						
Belgium-Luxembourg .	67.8*	47.3*	41.7*	32.7*	31.7*	26.3*
France . . . . .	131.1	164.8	158.1	131.6	167.8	62.0
Italy . . . . .	59.1*	51.0*	40.2*	41.6*	40.4*	31.3*
Netherlands . . . . .	311.1(d)	218.6	158.2	116.2	96.4	154.0(d)
West Germany . . . . .	318.5	275.8	256.0	212.7	203.4	155.0
EEC . . . . .	687.6	757.5	654.2	534.8	539.7	428.6
Austria . . . . .	13.1	11.7	10.5	9.4	11.0	3.5
Denmark . . . . .	29.6*	24.7*	25.0*	19.3*	21.7*	13.1*
Finland . . . . .	3.0*	6.0*	3.0*	4.0*	6.0*	1.0*
Greece . . . . .	0.5*	- *	4.6*	5.6*	2.7*	-1.5(b)*
Ireland . . . . .	5.1*	8.6*	9.5*	9.7*	10.6*	4.0*
Norway . . . . .	-0.7(b)*	3.4*	4.3*	5.5*	11.9*	-0.4(b)*
Portugal . . . . .	5.0*	5.5*	2.0*	4.0*	2.0*	3.0*
Spain . . . . .	20.8*	23.2*	15.0*	16.0*	15.6*	10.8*
Sweden . . . . .	1.0	1.1	1.1	1.9	2.1	0.5
Switzerland . . . . .	7.0	10.6	8.1*	6.9*	14.3*	2.9*
United Kingdom . . . . .	43.5*	42.5	45.6	51.7	64.9*	19.9*
West Europe . . . . .	1015.5	894.8	782.9	668.8	702.5	485.4
<b>Unspecified meals</b>						
Belgium-Luxembourg .	156.7*	151.9*	146.1*	75.8*	51.0*	88.8*
France . . . . .	9.7*	3.2*	10.3*	17.0*	23.2*	2.0*
Italy . . . . .	59.2*	61.3*	60.4*	56.6*	66.8*	29.4*
Netherlands . . . . .	218.4(d)	160.9	48.0	14.2	14.3	99.6(d)
West Germany . . . . .	190.8	185.8	243.6	184.6	147.2	92.9
EEC . . . . .	634.8	563.1	598.4	388.2	302.5	312.7
Austria . . . . .	12.2*	12.6*	9.4*	9.2*	7.4*	4.4*
Denmark . . . . .	7.5*	3.6*	5.5*	6.6*	5.0*	3.8*
Greece . . . . .	3.5*	3.5*	3.4*	3.0*	3.0*	1.8*
Ireland . . . . .	7.2*	29.8*	5.3*	4.7*	11.1*	2.1*
Norway . . . . .	2.0*	2.0*	1.1*	3.0*	4.5*	1.0*
Portugal . . . . .	34.0*	25.5*	22.0*	21.6*	17.7*	12.7*
Spain . . . . .	12.4*	10.8*	12.9*	2.0*	3.6*	13.5*
Sweden . . . . .	0.2*	0.5*	1.7*	0.3*	1.4*	0.1*
Switzerland . . . . .	7.2*	1.5*	4.4*	4.7*	4.0*	3.1*
United Kingdom . . . . .	24.6*	28.2*	18.2*	24.3*	19.8*	21.1*
West Europe . . . . .	745.6	681.1	592.3	427.6	380.0	376.3

(Continued next page)

## (W. Europe's New Supplies cont'd)

	J a n u a r y / D e c e m b e r					Jan/June
	1971 <sup>p</sup>	1970 <sup>p</sup>	1969	1968	1967	1971 <sup>p</sup>
<b>Oilseed meals, total</b>	<b>900</b>	<b>807</b>	<b>741</b>	<b>629</b>	<b>588</b>	<b>435</b>
Belgium-Luxembourg						
France . . . . .	2 107	2 018	1 610	1 595	1 594	1 093
Italy . . . . .	1 333	1 251	1 044	930	927	726
Netherlands . . . . .	1 961	1 675	1 111	943	924	940
West Germany (a) . .	4 666	4 242	3 916	3 366	3 453	2 335
EEC . . . . .	10 967	10 073	8 422	7 463	7 486	5 529
Austria . . . . .	176	150	107	94	103	47
Denmark . . . . .	999	1 075	973	916	975	485
Finland . . . . .	80	64	47	92	105	41
Greece . . . . .	156	157	172	118	87	72
Ireland . . . . .	124	152	97	111	93	66
Norway . . . . .	183	257	244	270	274	106
Portugal . . . . .	219	160	134	131	98	91
Spain . . . . .	1 264	1 168	1 127	901	780	656
Sweden . . . . .	395	416	401	456	478	180
Switzerland . . . . .	179	144	135	131	161	87
United Kingdom . . .	1 212	1 327	1 273	1 314	1 306	648
West Europe . . . . .	15 954	15 143	13 132	11 997	11 946	8 008
Fish meal (c) . . . .	1 474	1 632	1 885	1 848	1 597	659
<b>Total . . . . .</b>	<b>17 428</b>	<b>16 775</b>	<b>15 017</b>	<b>13 845</b>	<b>13 543</b>	<b>8 667</b>

(a) Actual production plus imports less exports. (b) Reduction of stocks. (c) Net Imports of above countries, excluding Denmark and Norway. (d) Excluding trade with Belgium-Luxembourg. (e) Including amounts shipped to East Germany, i.e. 221 600 T in Jan/June 1971, 477 600 T in Jan/Dec 1971, 378 500 T in Jan/Dec 1970, 357 600 T in Jan/Dec 1969, and 236 800 T in Jan/Dec 1968.

## FISH MEAL (a): Trade of Net Exporting Countries (1000 metric tons)

	J a n u a r y / D e c e m b e r					Jan/June	
	1972 <sup>s</sup>	1971 <sup>p</sup>	1970 <sup>p</sup>	1969	1968	1967	1971 <sup>p</sup>
<b>Gross exports</b>	<b>200</b>	<b>172.4</b>	<b>166.6</b>	<b>165.6</b>	<b>183.4</b>	<b>85.0(b)</b>	<b>80.9</b>
Denmark . . . . .	200	172.4	166.6	165.6	183.4	85.0(b)	80.9
Iceland . . . . .	100	60.4	62.3	66.3	62.1	132.8	39.9
Norway . . . . .	450	318.9	248.1	302.1	435.5	494.9	126.2
U.S.S.R. . . . .	-	10.0 <sup>a</sup>	12.1	26.5	28.0	35.7	9.0 <sup>a</sup>
Canada . . . . .	70	62.6	72.8	72.7	63.7	47.9	32.7
Chile (c) . . . . .	240	193.6	99.9	144.8	167.2	111.2	105.4
Peru . . . . .	2200	1749.6(c)	1886.8	1707.4	2078.5	1594.7	664.7(c)
Angola . . . . .	50	45.0 <sup>a</sup>	62.1	92.4	44.0	36.8	22.6
Morocco . . . . .	20	19.4	23.3	27.5	38.2	25.3	5.1
S. & S.W. Africa . .	200	117.7	193.0	314.1 <sup>r</sup>	365.5 <sup>r</sup>	288.8	35.2
Other countries . .	50	45.4	43.0	42.6	41.9	43.9	23.3
<b>World . . . . .</b>	<b>3580</b>	<b>2795.0</b>	<b>2870.0</b>	<b>2962.0</b>	<b>3508.0</b>	<b>2897.0</b>	<b>1145.0</b>
	J a n u a r y / D e c e m b e r					Jan/June	
<b>Gross Imports</b>	<b>1972<sup>s</sup></b>	<b>1971<sup>p</sup></b>	<b>1970<sup>p</sup></b>	<b>1969</b>	<b>1968</b>	<b>1967</b>	<b>1971<sup>p</sup></b>
Denmark . . . . .	20	20.1	18.5	31.0	7.9	12.9(b)	8.9
Norway . . . . .	1	1.3	0.7	1.0	0.9	1.8	0.2
Canada . . . . .	.	.	0.2	1.0	2.4	1.0	.
Other countries . .	1	0.6	0.6	1.0	0.8	0.3	0.4
<b>World . . . . .</b>	<b>22</b>	<b>22.0</b>	<b>20.0</b>	<b>34.0</b>	<b>12.0</b>	<b>16.0</b>	<b>9.5</b>
<b>Net exports</b>	<b>3558</b>	<b>2773.0</b>	<b>2850.0</b>	<b>2928.0</b>	<b>3496.0</b>	<b>2881.0</b>	<b>1135.5</b>

(a) Including fish solubles (dry weight basis) and similar products for Denmark and Canada (the trade in solubles being negligible in all other countries), but excluding whale meal wherever separable. (b) Excluding fish solubles. (c) Preliminary shipping data.

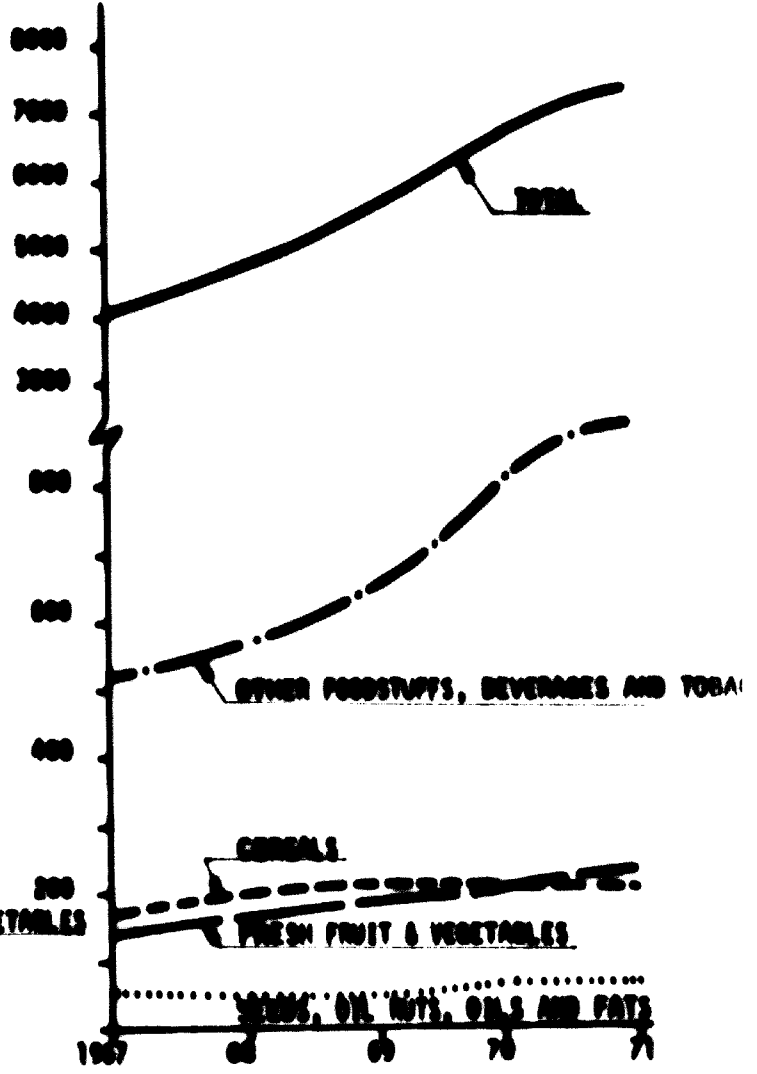
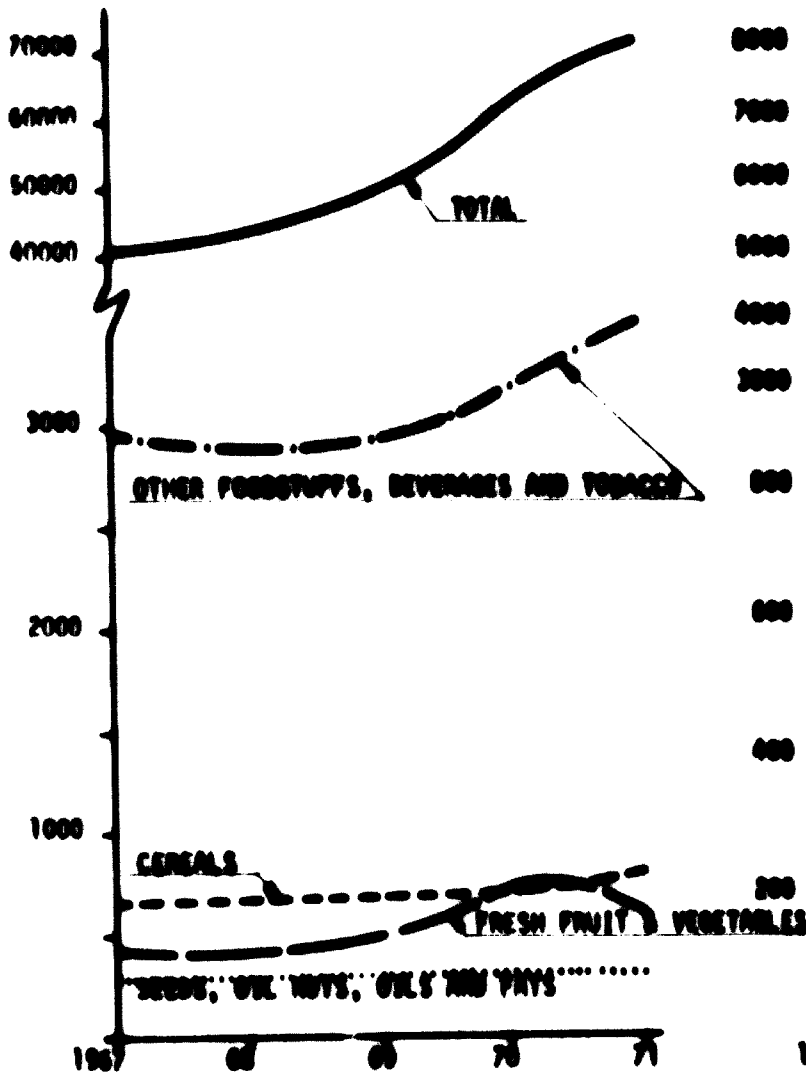


B. RELEVANT PRICES IN BK

TRANSPORT BY COMMODITIES IN PUBLIC MOTOR TRANSPORT

(GOODS CARRIED, THRU. TONS)

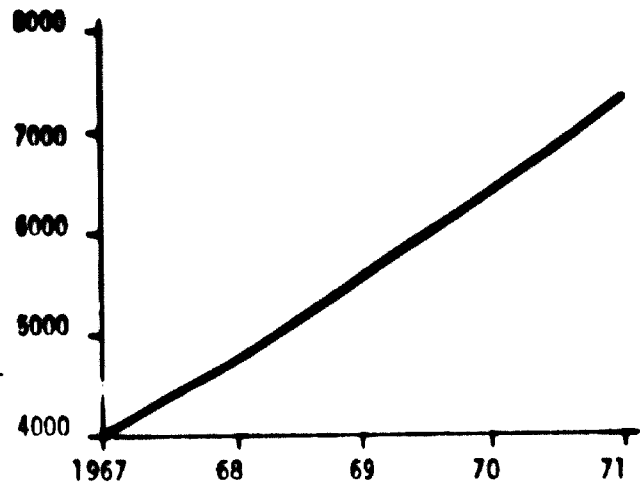
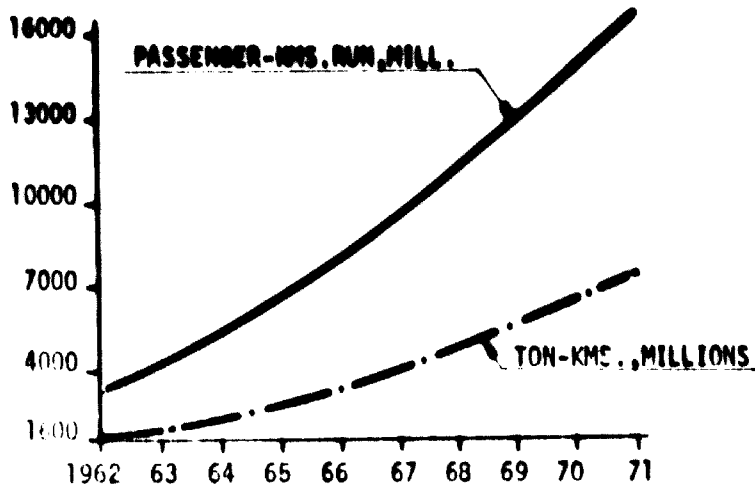
(TON-KMS. PERFORMED, MILL.)



Source: SPAJ Stat. Year 72

PUBLIC ROAD MOTOR TRANSPORT

TRANSPORT BY COMMODITIES IN PUBLIC MOTOR TRANSPORT  
(TON-KMS. PERFORMED, MILLIONS)



B. RELEVANT PRICES IN BK AS CURRENT IN AUTUMN 1972 AND USED FOR CALCULATIONS AND ESTIMATES

1. LABOR

For specific calculation purposes, the average wage of 1972 for each employee group was taken, with an addition of 50% social payments by the enterprise.

For overall estimates of average cost per employee to the enterprise 30,000 MD per year were taken, incl. all social payments.

Wage Index in Meat Industry

Laborer	100
Butcher	125
Master	165
Technologist	220

2. RAW MATERIALS FOR PROCESSING

For Vegetables & Fruit

<u>Raw Material</u>	<u>Price</u>	<u>Raw Material</u>	<u>Price</u>
Peas	2,00	Sodium Benzoate	8,58
Beans	1,80	Pectin	65,20
Peppers (thick ones)	1,40	Wine Vinegar	18,75
Peppers (Pepper Tomatoes)	1,50	Protectol Oil	9,00
Red Peppers	1,30	Glue (Band)	8,25
Tomatoes	0,60	Glue	4,50
Cucumbers I Class	2,00	Blueberry Concentrate	210,00
" II "	1,75	Orange Concentrate	10,00
" III "	1,10	Sinalco Concentr.	41,30
Aubergines	1,30	Raspberry Aroma	210,00
Beetroot	1,00	Garlic Concentr.	190,00
Parsley	3,00	Sulphur Dioxide	2,45
Carrots	1,30	Filter Double	7,20
Onion	1,30	Sulphuric Acid	0,35
Garlic	4,50	Applemark	0,75
Pepperoni	5,00	Mixed Mark	2,80
Tomato Concentrate	7,50	Dogroseberry Mark	1,65
Cherries	1,80	Plum Pulp	1,30
Strawberries	3,50	Peach Pulp	3,20
Blackberries	2,50	Apricot Pulp	5,00
Sour Cherries	2,20	Strawberry Pulp	3,50
Apricots	3,50	Sour Cherry Pulp	3,15
Peaches	2,20	Cherry Pulp	2,50
Apples	0,50	Black Cherry Juice	2,75
Dogrose Berries	2,60	Blackberry Juice	3,70
Plums	1,00	Apple Concentrate	6,75
Salt	1,10	Pasteur. Juice of	2,90
Sugar	3,65	Black Cherry	
Edible Oil	6,50	Pasteur. Juice of	4,00
Vinegar	8,00	Blackberry	
Sorbate	65,00		
Cucumber Aroma	200,00		
Pepper Concentrate	200,00		

3. PACKAGING MATERIALSPacked in Glass

Bottle	1/2	0.65
Bottle	1/1	0.95
Jar of 250 gr.		0.65
" "	1/2	0.65
" "	1/1	0.75
" "	1/1	0.85
" "	3/1	2.80
Jar "	4/1	5.50
either with twist-off lids or glass lid + rubber band + wire		
Lids		0.35
"	ø 83	0.40
"		0.30
"	ø 100	0.85
Corks		0.05
Corks		0.15
Rubber Caps		1.15

Packed in Carton

Thick Carton Boxes for Cans 250 gr.		2.25
-ditto-	of 1/2	1.75
-ditto-	1/1	1.70
-ditto-	5/1	2.50
Thick Carton Boxes for Jars 1/2		3.70
-ditto-	1/1	4.20
-ditto-	4/1	3.15
Small Thick Carton Boxes for Tubes		1.80
Bigger -ditto-		2.60
Thick Carton Boxes for Jars of 250 gr.		2.80
-ditto-	Cans of 3/1	1.35
-ditto-	Bottles 1/1	3.35
-ditto-	Bottles 1/2	3.60
-ditto-	Doypack kgs.	2.00
-ditto-	Jars 3/1	3.20
-ditto-	Cans 3/1	3.55
-ditto-	Cans 4/2 Export	2.25

Other Packaging Material

Doypack Bags	0.40
Straw	0.05
Tubes of 100 gr.	0.55
Tubes of 200 gr.	0.75

4. UTILITIES

Water M<sup>3</sup> = 0,32 MD  
 Electricity kWh = 0,25 MD  
 Fuel Oil Ton = 1603,00 MD  
 Steam Ton = 39,00 MD

5. OTHERS

Polyphosphates kgs. = 17,87 MD  
 Natural Casings, sheep m = 0,65 MD  
 Natural Casings, pig m = 1,00 MD  
 Cost of Refrigerated Trucks

5 ton = 350,000 MD  
 10 ton = 720,000 MD

## Veterinary Service (Supervision) Check

Calf	2,00	MD per head
Sheep	1,50	" "
Pig	5,00	" "
Cattle	8,00	" "

## Slaughter Costs

Banja Luka	60,00	MD per head
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C. YUGOSLAVIA - AVERAGE RETAIL PRICES

C. YUGOSLAVIA - AVERAGE RETAIL PRICES 1971

		1970	1971
<b>CEREALS</b>			
Wheat	kg.	1.05	1.00
Maize	"	0.85	1.02
Rice	"	4.02	6.02
<b>CEREAL PRODUCTS</b>			
Bread, Wheat Flour, type 000	"	1.72	2.20
Bread, Wheat Flour, type 400	"	2.02	2.20
Flour, Wheat, type 000	"	2.20	2.20
Macaroni	"	6.11	6.20
<b>VEGETABLES</b>			
Potatoes for Human Consumption	"	1.05	1.41
Beans	"	2.20	6.00
Onions	"	1.20	2.20
Carrots	"	2.21	4.20
APPLES	"	2.25	3.75
PRUNES	"	4.20	9.00
TOMATO PUREE	"	12.75	17.00
MARMALADE	"	2.07	6.22
<b>FRESH MEAT</b>			
Beef	"	11.11	17.25
Veal	"	12.05	20.00
Pork	"	12.00	20.00
Mutton	"	9.21	14.00
Chicken, killed	"	10.27	12.00
<b>MEAT PREPARATIONS</b>			
Pork, dried	"	20.05	42.24
Bacon, dried	"	10.40	17.14
Salami	"	10.77	21.42
CARP	"	7.01	11.00
SARDINES IN OIL	"	17	22.00
EGGS, WEN,	Nos.	0.85	0.75
<b>MILK AND DAIRY PRODUCTS</b>			
Milk	Lit.	1.00	2.20
Cottage Cheese, white, soft, slices	kg.	6.20	12.45
Butter	kg.	10.21	27.00
<b>FATS</b>			
Pork Lard, domestic	"	6.25	7.05
Edible Oil	Lit.	4.07	6.00
Margarine	kg.	7.20	8.00
<b>OTHER MANUFACTURED FOODSTUFFS</b>			
Granulated Sugar	"	2.02	3.15
Coffee, roasted	"	20.72	20.04
Salt, table	"	1.05	1.20
Chocolate	"	14.00	22.10
<b>ALCOHOLIC DRINKS</b>			
Wine	Lit.	4.00	6.01
Brandy, double distilled	"	12.07	14.70
Beer, pale, in bottles of 1/2 litre	"	3.05	3.01
Brandy distilled from wine	"	10.70	22

Source: SFRJ Stat. YRDK 72

D. **GUARANTEED MINIMUM PRICES**



GUARANTEED MINIMUM PRICES

"Guaranteed Minimum Prices" are given here as background and reference material. Prices taken for calculation purposes in the report are sometimes different since they reflect actually paid or obtainable prices, for inputs and outputs, in summer 1972.

I. Guaranteed Prices

Guaranteed prices are prescribed for the following products:

Wheat and Rye

Dinars/kg.

- |                         |      |
|-------------------------|------|
| 1. Wheat, quality A & B | 1,40 |
| 2. Wheat, quality C     | 1,30 |
| 3. Rye                  | 1,30 |

These prices increase successively from August through May as follows:

- |                      |                            |
|----------------------|----------------------------|
| Wheat, quality A & B | by Dinars 0,010/kg monthly |
| Wheat, quality C     | by Dinars 0,008/kg monthly |
| Rye                  | by Dinars 0,008/kg monthly |

Maize

Dinars 1,00/kg.

This price increases successively from December through May by Dinars 0,008/kg monthly. In June, July and August the May price is valid.

Barley and Oats

Dinars 1,05/kg.

This price increases successively from August through May by Dinars 0,007/kg monthly. May price is valid in June.

Livestock guaranteed prices:

Pigs

Live Weight    Warm Halves  
Dinars/kg.

Pork pigs and their cross-breeds; based on 25% flesh/100 kg live weight or 33% meat/100 kg warm halves

7,36                  9,36

Cattle

Live Weight - Dinars/kg.

- |   |       |
|---|-------|
| 1. High-bred fat calves and their cross-breeds up to six months old:                        |       |
| a) Grade Ia   | 11,74 |
| b) Grade I  | 11,15 |
| 2. High bred fat steers and heifers and their cross-breeds over 6-12 months old:            |       |
| a) Grade Ia   | 10,32 |
| b) Grade I  | 10,00 |
| 3. High-bred fat steers and heifers and their cross-breeds 12-18 months old:                |       |
| a) Grade Ia   | 10,32 |
| b) Grade I  | 10,00 |
| 4. High-bred fat young cattle and their cross-breeds 18-36 months old:                      |       |
| a) Grade Ia   | 10,00 |
| b) Grade I  | 9,50  |
| 5. Fat calves, cross-breeds of Busha and other domestic breeds, up to 6 months old:         |       |
| a) Grade I  | 9,68  |
| b) Grade II   | 9,25  |
| 6. Fat steers and heifers, cross-breeds of Busha and other domestic breeds 6-18 months old: |       |
| a) Grade I  | 9,25  |
| b) Grade II   | 8,60  |

Live Weight - Dinars/kg.

- 7. Fat young cattle, cross-breeds of Busha and other domestic breeds, 18-36 months old:
  - a) Grade I 8,90
  - b) Grade II 8,30

Sheep

- 1. Fat lambs 5-12 months old:
  - a) Grade I 9,44
  - b) Grade II 8,88
- 2. Fat Hoggets over 1-2 years old:
  - a) Grade I 8,40
  - b) Grade II 7,77
- 3. Fat ewes and wethers over 2 years old:
  - a) Grade I 6,88
  - b) Grade II 6,55

Poultry

Fat broiler chickens:

- a) Grade I 8,00
- b) Grade II 7,70

Guaranteed prices for other relevant agricultural products:

Dinars/kg.

Vegetables and Fruits

- Potatoes 0,52-0,67
- Onions 0,88
- Beans 4,00-5,00
- Plums "Pozegaca" 0,56

Minimum repurchase prices are prescribed for the following agricultural products:

Dinars

- Cows' and sheep's milk 0,40/fat unit
- Sugar beets 0,24/kg.
- Sunflower 2,10/kg.
- Hemp fiber: Grade I 0,35/kg.
- Grade II 0,30/kg.
- Grade III 0,27/kg.
- Grade IV 0,25/kg.

II Premiums

Premiums are paid for the following agricultural products:

Cows' and sheep's milk: Producers from social estates receive Dinars 0,40-0,50/liter, and co-operative producers Dinars 0,20-0,40/liter, under condition that the milk purchaser receives a premium of Dinars 0,10/liter

Raw cotton: Dinars 0,60-0,50/kg. according to the cotton grade.

Raw hemp: Dinars 0,15-0,08/kg. according to the grade.

Wool: Dinars 15,20-6,60/kg. according to the sort and grade.

III. SUBSIDIES

Producer of artificial fertilizers sold for use in agriculture and forestry receive the following subsidies per kg. of plant nutrient:

Dinars

- 1. Home-produced nitrogenous fertilizers 0,75/kg.N
- 2. Home-produced phosphate fertilizers 0,67/kg.P<sub>2</sub>O<sub>5</sub>
- 3. Mixed and complex home-produced fertilizers 0,75/kg.N - 0,67/kg.P<sub>2</sub>O<sub>5</sub>

Subsidies based on plant-nutrient content are also given for imported artificial fertilizers such as under 1., 2. and 3. above or of similar types.

E. RESULTS OF THE SURVEY OF SELLERS' SELLING EXPENDITURES

The basic task of this survey was to collect data on the sale of food products, influence of the season, acceptance of new products by consumers, margins for some products.

### Territory

The territory on which the survey was conducted had been defined in the contract with the ordering party of the survey.

Comprised were retail outlets in the following towns:

<u>TOWN</u>	<u>No. OF INHABITANTS</u>	<u>No. OF OUTLETS SURVEYED</u>	<u>TOWN</u>	<u>No. OF INHABITANTS</u>	<u>No. OF OUTLETS SURVEYED</u>
Zagreb	566.084	5	Zadar	43.187	4
Beograd	770.140	5	Maribor	115.159	4
Sarajevo	244.065	4	Novi Sad	214.048	3
Skopje	387.889	4	Gnjilane	67.950	3
Ljubljana	212.258	5	Banja Luka	157.515	3
Titograd	42.104	4	Vitez	20.616	3
Rijeka	132.933	4	Horgos	7.895	2
Split	183.912	4			

### Time

The complete survey was conducted in the period of 19th - 27th June, 1972.

### Organization

Within the framework of this survey, as mentioned before, were comprised 55 outlets. The structure of those outlets by types is given in the following review.

<u>Types of Outlets</u>	<u>Number of Outlets Surveyed</u>
Supermarkets	11
Self-Services	12
Groceries	11
Greengroceries	9
Butcher Shops	12
<b>Total</b>	<b>55</b>

1. Decision-making about the purchase respectively about the choice of products to be included into the assortment.

On the basis of the results of this survey, the following decision about the assortment of a particular outlet has been established.

<u>Types of Outlet</u>	<u>Shop Manager</u>	<u>Purchasing Department</u>	<u>Total</u>
Supermarkets	6	5	11
Self-services	6	6	12
Groceries	7	4	11
Green-groceries	6	3	9
Butcher Shops	7	5	12
<b>TOTAL</b>	<b>32</b>	<b>23</b>	<b>55</b>

2. Products with the Best Turnover

This survey aimed also to establish which products, being the objectives of this survey, have the best turnover in the outlets surveyed.

Besides the identification of the products with the best turnover shop managers also stated the factors influencing such an increased turnover.

These results are related to five types of outlets.

3. YUGOSLAVIA - DOMESTIC TRADE

SUPERMARKET:

<u>Product</u>	<u>Frequency</u>	<u>Product</u>	<u>Frequency</u>
Fresh Milk	6	Vegetables	1
Fresh Meat	7	Apricots	1
Fresh Eggs	4	Peas	1
Sausages	3	Poultry	1
Meat Delicatessen	3	Cheeses	1
Canned Fruit and Vegetables	3	Baked Goods	1
Fresh Fruit and Vegetables	4	Industrial Cakes	1
Potato	2	Grocery	1
Jams and Compotes	2		
Total Supermarkets: 11			
Responded: 11			

SELF-SERVICES

<u>Product</u>	<u>Frequency</u>	<u>Product</u>	<u>Frequency</u>
Fresh Milk	7	Plum Jams	1
Dairy Products	4	Apples	1
Fresh Meat	4	Potato	1
Sausages	4	Eggs	1
Fruits	3	Peppers	1
Vegetables	2	Cream	1
Tomato	2	Chicken Meat	1
Meat Delicatessen	2	Canned Pork	1
Canned Fruit and Vegetables	1	Industrial Cakes	1
TOTAL Self-Services:			
Responded:			
Didn't respond:			

GROCERIES:

<u>Product</u>	<u>Frequency</u>	<u>Product</u>	<u>Frequency</u>
Fresh Milk	6	Meat Delicatessen	2
Dairy Products	3	Veal	1
Cheeses	3	Lamb	1
Fruits	3	Eggs	1
Vegetables	2	Bakery Products	1
Sausages	2	Beverages	1
Tomato	1	Apples	1
Cucumbers	1	Jams	1
Cherries	1	Canned Peas	1
Peaches	1	Compotes	1
Apricots	1	Chocolates and Sweets	1
Total Groceries: 11			
Responded: 11			

GREEN-GROCERIES:

<u>Product</u>	<u>Frequency</u>	<u>Product</u>	<u>Frequency</u>
Potato	6	Carrots	1
Tomato	6	Eggs	1
Fruits	4	Fruit Cake	1
Peppers	3	Vegetables	1
Apples	3	Cherries	1
Peaches	2	Bananas	1
Cabbage	2	Pears	1
Onion	1		

BUTCHER'S SHOPS:

<u>Product</u>	<u>Frequency</u>	<u>Product</u>	<u>Frequency</u>
Pork		Sausages	
Beef		Dogs	
Poultry		Tea Sausages	
Lamb		Picnic Sausages	
Baby-beef		Ham	
Total Butcher Shops: 12			
Responded: 12			

As the products being at the top of the ranking list of the products with the best turnover represent consumers goods for everyday consumption, this fact was given as the main reason for the increased turnover. As the next reasons are stated reasonable prices causing also the increased consumption.

We have to mention though that the meat-ranking list is not the reflection of the consumers' preference solely but is brought about by sometimes inadequate meat supply.

3. Tendency to introduce new products into the assortment of goods in the outlets being surveyed.

The survey was also aimed to establish the tendency to introduce new products into the assortment of goods. The question by which that was to be achieved was worded:

"Would you any of these products (being surveyed), and which you don't have, include into your assortment? And what are the reasons you don't keep them?"

Responses to this question are also given by the types of outlets.

SUPERMARKETS:

<u>Product</u>	<u>Frequency</u>	<u>Reasons</u>	<u>X</u>
Frozen Fruit	2	Too small sales space, lack in cooling plant	1
Poultry	1	Consumers not interested	1
Powder Egg	1	Cannot obtain	1
Frozen Carrots	1	No imported powder eggs	1
Fresh Apricots	1	Domestic producers don't product	1
Fresh Peppers	1	No supplier	1
Frozen Egg Yolk	1	Better assortment at the market-place	1
Frozen Egg Whites	1	Consumers not interested	1
Frozen Vegetables	1	Lack in interest of consumers	1
Frozen Semi-ready Dishes	1	Too small sales space - lack in cooling plant	1
Frozen Cucumbers	1	Too small sales space - lack in cooling plant	1
Frozen Cabbage	1	Cannot get from the supplier	1
Frozen Apricots	1	Cannot get from the supplier	1
Frozen Pears	1	Cannot get from the supplier	1
Total Supermarkets: 11			
Responded: 6			
Did not respond: 5			

GROCERIES :

Powder Eggs	2	Greater demand in the winter	1
Apples	2	Not obtainable	1
Potato	2	No space	1
		No apples on the market	1
		Sales space - lack in a refrigerator	1
		Doesn't keep long	1

GROCERIES: (cont'd.)	Frequency	Reasons	X
Carrots	1	Not much demand for kale	1
Leek	1	Consumers don't demand	1
Kale	1	Not much demand	1
Cream	1	Greater demand in the winter	1
Canned beef	1	Greater demand of tourists	1
Fresh Meat	1	No space	1
Frozen Fruit	1	Unsatisfactory supply of the products demanded	1
Canned Vegetables	1	Unsatisfactory supply of the products demanded	1
Poultry in Pieces	1	Sales space - lack of a refrigerator	1
Beef in a Piece	1	Sales space - lack of a refrigerator	1
Lamb in a Piece	1	Sales space - lack of a refrigerator	1
Fresh Peas	1	Sales space - lack of a refrigerator	1
Garlic	1	Sales space - lack of a refrigerator	1
Poultry	1	No deep freezer	1
<u>SELF-SERVICES:</u>			
Strawberries	1	Situation on the market - hard to get	1
Apricots	1	Situation on the market - hard to get	1
Canned Strawberries	1	Don't supply	1
Frozen Peppers	1	Harder to get	1
Frozen Peas	1	Harder to get	1
Fresh Meat	1	Limited prices	1
Candied Fruits	1	Lack in space, unsatisfactory supply	1
Frozen Fruit and Vegetables	1	There are fresh on the market	1
Fresh Pears	1	Still no fresh pears on the market	1
Fresh Quinces	1	Still no fresh quinces on the market	1
Total Selfservices:	12		
Responded:	10		
Did not respond:	2		
<u>GREENGROCERIES:</u>			
Frozen Tomato	2	Because they haven't got refrigerator	1
Frozen Peas	2	Lack in space	1
Compotes	2	Because they haven't got refrigerator	1
Apricots	1	Lack in space	1
Leek	1	Insufficient sales space	1
Kale	1	No compotes even in a warehouse	1
Apples	1	Don't provide	1
Plums	1	No demand for leek	1
Frozen Fruit	1	Not much demand	1
Frozen Fruit	1	Cannot be obtained	1
Dried Fruit	1	Not obtainable	1
Frozen Vegetables	1	Lack in sales space	1
Jams	1	Lack in cooling facilities	1
Frozen French Beans	2	Lack in cooling facilities	1
Frozen Plums	1	Insufficient sales space	1
Frozen Strawberries	1	Insufficient sales space	1
Frozen Peaches	1	For they have no refrigerator	2
		For they have no refrigerator	1
		For they have no refrigerator	1
		For they have no refrigerator	1



GREENGROCERIES: (cont'd.)

<u>Product</u>	<u>Frequency</u>	<u>Reasons</u>	<u>X</u>
Lemons	1	No lemon on the market	1
Cherries	1	Not obtainable	1
Strawberries	1	Too high prices	1
Frozen Peppers	1	Lack of space	1
Frozen Spinach	1	Lack of space	1
Total Greengroceries:	9		
Responded:	7		
Did not respond:	2		

BUTCHER SHOPS:

Poultry	3	Cannot get	1
		Inhabitants rear them by themselves	1
		Low price	1
Pork	2	Doesn't know the reason	1
Lamb	1	Cannot obtain	1
Sausages	1	Production too expensive - prices too low	1
Veal	1	Cannot obtain	1
Total Butcher Shops:	12		
Responded:	5		
Did not respond:	7		

## 4. Seasonal Influences

One of the defined tasks of this survey was also to establish the seasonal influences on the turnover, that is on the consumption of the products being surveyed.

SUPERMARKETS:

<u>Product</u>	<u>Frequency</u>	<u>Character of the Seasonal Influences</u>
Fruits	6	Tourist season; Spring - Summer Great demand in the summer
Sausages	3	Winter food; Interesting for tourists
Vegetables	2	Great demand in the summer
Canned Vegetables	2	In the winter months
Milk	2	Winter - spring; During the whole year
Eggs	2	During the whole year: In winter months
Hard Cheeses	2	Winter and spring: Interesting for tourists
Meat	2	During the whole year: Great demand in the summer
Canned French Beans	1	Sells better in the winter - due to the lack of fresh ones
Canned Peas	1	Sells better in the winter - due to the lack of fresh ones
Powder Milk	1	During the whole year - insufficient
Lamb	1	Light food for the summer period
Frozen Vegetables	1	Sells in December, January, February and March
Fruit Juices	1	Without answer
Bottled Vegetables	1	In winter months
Peppers	1	Summer
Tomato	1	Summer
Compotes	1	Winter season
Sardines	1	From May to August
Meat Pastes	1	From November to September
Luncheon Meat	1	From November to September
Total Supermarkets:	11	
Responded:	9	
Did not respond:	2	

<u>Product</u>	<u>Frequency</u>	<u>Character of the Seasonal Influences</u>
Fruit	3	In July and August; Summer and autumn In the summer sells better
Milk	3	In winter months; Autumn and winter
Dairy Products	3	Greater demand in the winter
Vegetables	2	In July and August; In the summer and in the autumn
Meat	2	In July and August; Autumn and winter
Peas	2	From January till April; May and June
Canned Food	2	Winter, early spring; In winter months
Peaches	1	May and June
Strawberries	1	May and June
Plum-jam	1	During the whole year
Yoghurt	1	Greater demand in the summer
Cream	1	Greater demand in the summer
Canned Meat	1	Used more in the summer but enough in the winter as well
Veal	1	January and May; supply insufficient, demand greater
Frozen French Beans	1	From December till February
Canned Peppers	1	From November till May
Apples	1	Late in the autumn
Canned French Beans	1	In the winter and early spring
Fruit	6	The greatest demand in the summer From November till March; Spring and Autumn
Milk	2	The greatest demand from April till September; In the winter months;
Dairy Products	2	The greatest demand from April till September; In the winter months;
Vegetables	2	Spring; In the season
Tomato	2	From the beginning till the end of the season
Sausages	2	Spring; From November till March
Canned Peas	2	The best turnover in the winter. Winter
Eggs	1	During the whole year
Butter	1	The greatest demand from April till September
Powder Milk	1	Demand from December till March
Canned Cherries	1	Winter
Canned Plums	1	Winter
Canned Peppers	1	Winter
Cucumbers	1	In the spring and the autumn
Cabbage	1	In the spring and the autumn
Watermelons	1	Demand greatest in the summer
Beverages	1	Demand greatest in the summer
Meat Delicatessen	1	Demand greatest in the summer
Chocolate	1	Demand greatest in the summer

GROCERIES:

Orange	1	Sells more in the winter
Lemon	1	Sells more in the winter
Frozen Products	1	Sells more in the winter
Canned Vegetables	1	Sells more in the winter because of lack in fresh vegetables
Yoghurt	1	In the summer
Cherries	1	May and June
Sauerkraut	1	From November till May
Total Groceries:	11	
Responded:	10	
Did not respond:	1	

GREENGROCERIES:

<u>Product</u>	<u>Frequency</u>	<u>Character of the Seasonal Influence</u>
Fruit	4	During the whole year: From December till April In the summer months: Sells better in the winter
Tomato	4	Preparing for winter: Spring and summer; From June till September
Peppers	3	Preparing for winter; From June till September
Vegetables	2	During the whole year; Sells better in the winter
Cabbage	1	Autumn
Canned Fruit	1	From December till April
Canned Vegetables	1	From December till April
Eggs	1	From December till April
Cucumbers	1	Autumn - preparing for winter
Apples	1	In the summer months
Pears	1	In the summer months
French Beans	1	Spring and summer
Cherries	1	Spring and summer
Strawberries	1	Spring and summer
Peaches	1	Spring and summer
Sauerkraut	1	June and July
Bananas	1	During the whole year
Oranges	1	During the whole year
Apricots	1	June and July
Total Greengroceries:	11	
Responded:	8	
Did not respond:	3	

BUTCHER SHOPS:

Lamb	6	Spring; July, August, September;
Sausages	5	Consumed more in the winter: Summer and autumn; For lasting - tourist season; From January till May; In the summer
Pork	4	Consumed more in the winter; Tourist season; In colder days - autumn, winter, spring; From January till May
Poultry	2	Consumed more in the summer; July, August, September
Beef	2	Tourist season; In the summer
Cheeses	2	Consumed more in the summer
Baby-beef	1	July, August, September
Meat Delicatessen	1	Season - in the summer
Canned Food	1	In the summer
Meat	1	In the summer
Canned Vegetables	1	From October till May
Total Butcher Shops:	12	
Responded:	10	
Did not respond:	2	

## 5. The Highest and the Lowest Margins

The outlets surveyed quoted in their answers the highest and the lowest margin as follows:

SUPERMARKETSThe Highest Margin (in %)

Sausages	17
Fruit and Vegetables	12
Eggs	16
Canned Fruit and Vegetables	25
Sausages and Dried Cured Meat	20

The Lowest Margin (in %)

Milk	3
Meat	10
Total Supermarkets:	11
Responded:	8
Did not respond:	3

SELF-SERVICES:The Highest Margin (in %)

Pork	10
Vegetables	30
Fruit and Vegetables	15

The Lowest Margin (in %)

Pepper	3
Meat	11
Milk	3
Eggs	7
Meat and Meat Products	3
Total Self-services:	12
Responded:	8
Did not respond:	4

GROCERIES:The Highest Margin (in %)

Pork	20
Pork and Canned Pork	10
Compotes	15
Fruit and Vegetables	18
Peaches, Apricots	30
Milk	6
Meat, Sausages	20
Fruit	2
Dairy Products	3
Total Groceries:	11
Responded:	9
Did not respond:	2

GREENGROCERIES:The Highest Margin (in %)

Tomato	10
--------	----

The Lowest Margin (in %)

Strawberries	5
Canned Fruit and Vegetables	8 - 12
Total Greengroceries:	9
Responded:	5
Did not respond:	4

BUTCHER SHOPS:The Highest Margin (in %)

Dairy Products	17
Tea - Sausage	20
Sausages	30
Sausages; Meat Delicatessen	20
Cheese	6

The Lowest Margin (in %)

Eggs	6
Cheese - semi-hard	11
Meat	15
Canned Pork and Beef	15
Beef, Veal	10
Milk, Dairy Products	5
Total Butcher's Shops:	12
Responded:	7
Did not respond:	5

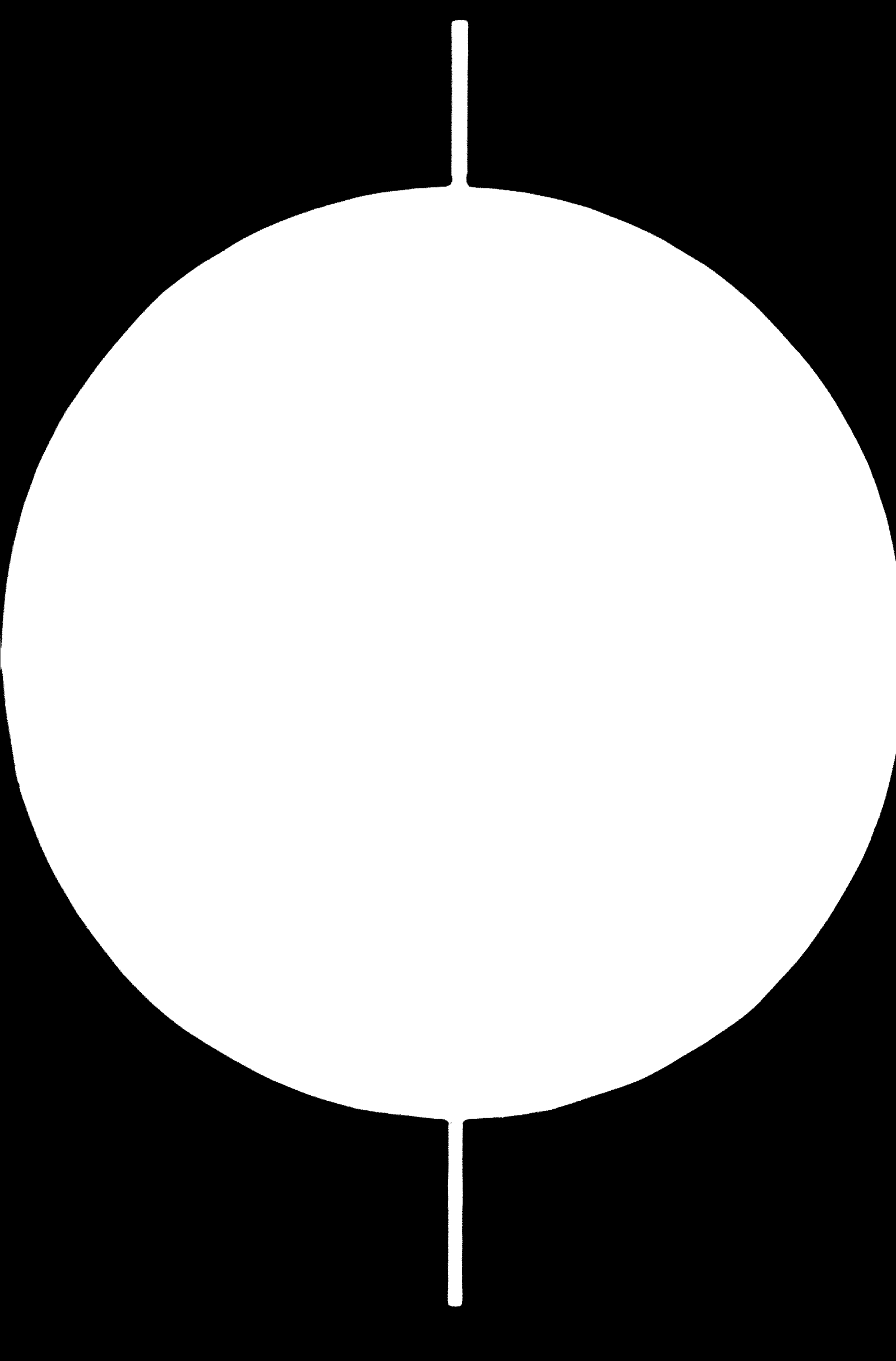
## 6. New Products

As regards new products/not appearing on the Yugoslav market before/ and which are the objectives of this survey the intention was firstly to identify the new products that have recently appeared and besides the intention was also to identify their producers.

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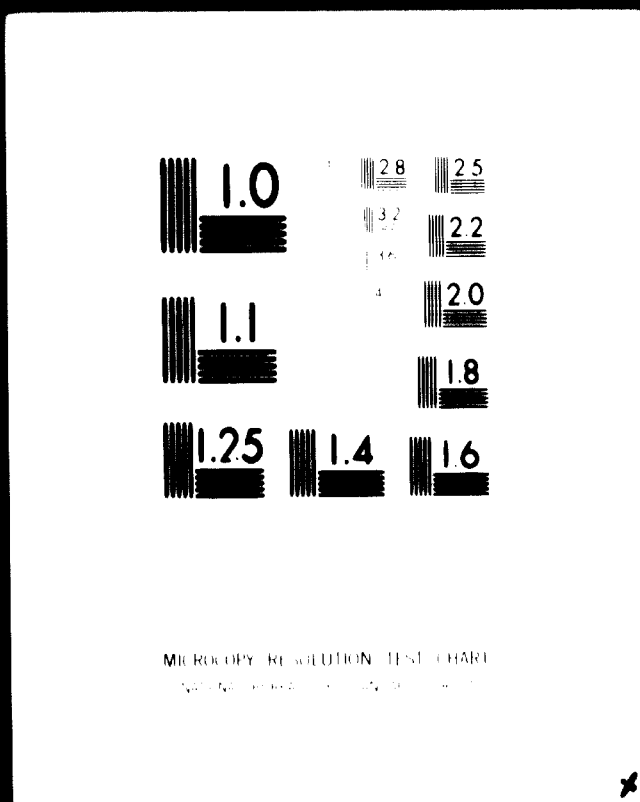


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## 02348



SUPERMARKETS:

<u>Product</u>	<u>Frequency</u>	<u>Producer</u>
Industrial Cakes	5	"Soko Stark" - Beograd "Radnik" - Opatija "Zito" - Ljubljana "Mlinotest" - Ajdovscina Pekarsko Poduzece Pula
Rolls	2	"Radnik" - Opatija Valpovo PIK
Frozen Peas	2	Hladnjaca - Zagreb Sladis, Umag
Frozen Vegetables	2	Kulpin - Novi Sad Hladnjaca - Zagreb
Torte	1	"Zitopromet" - Sarajevo
"Marble" Cake	1	"Zitopromet" - Sarajevo
Tea Cake	1	"Zitopromet" - Sarajevo
Frozen Fruits	1	"Kulpin" - Novi Sad
Candied Fruits	1	"Vocar" - Beograd
Canned Meat Products	1	"Gavrilovic" - Petrinja
Packed Sausages	1	"Emona" - Ljubljana
Packed Meat	1	"Emona" - Ljubljana
Frozen Strawberries	1	Hladnjaca - Zagreb
Frozen Plums	1	Hladnjaca - Zagreb
Frozen Cherries	1	Hladnjaca - Zagreb
Frozen Raspberries	1	Hladnjaca - Zagreb
Frozen Peppers	1	Sladis - Umag
Fresh Cucumbers	1	Rumunjska - Uvoz
Fresh Tomato	1	Rumunjska - Uvoz
Fruit Juices	1	Jaffa
Total Supermarkets:	11	
Responded:	8	
Did not respond:	3	

SELF-SERVICES:

Fruit Cake	3	"Soko Stark" - Beograd
Frozen Peas	3	Zagrebacka mljekara "Progres" - Prizren
Potato - mashed	3	"Kolinska" - Ljubljana "Podravka" - Koprivnica
Potato-chips	2	"Vocar" - Cacak
Frozen Vegetables	2	Trznica - Beograd IPK - Sarajevo
Frozen Fruit	2	Trznica - Beograd Trznica - Zagreb
Roll	2	Tvornica kolaca - Valpovo "Bobis" - Split
Canned Potato	1	"Vocar" - Beograd
Yoghurt - small pack	1	IPK - Sarajevo
Domino Cake	1	"Sloboda" - Osijek
Industrial Cake	1	Tvornica Kolaca - Valpovo
Meat Paste	1	PIK Vrbovec
Frozen Peppers	1	Ledo-Zagreb
Candied Fruit	1	Trznica - Zagreb
Euro-cream	1	Takovo - Gornji Milanovac
Jam-Tourist	1	"Fructal" - Ajdovscina
Flora Orange Juice	1	Fabrika konzervi - Becej
Canned Cabbage	1	PIK - Slovenija
Canned Carrots	1	"Podravka" - Koprivnica
Total Self-services:	12	
Responded:	10	
Did not respond:	2	



<u>GROCERIES:</u>	<u>Frequency</u>	<u>Producer</u>
Industrial Cakes	4	"Bobis" - Split; "Mlinoteks" - Ajdovscina; "Jospi Kraš" - Zabreb "Zito" - Lesce
Frozen Peas	2	PPK - Vrana; Trznica - Zagreb
Fruit Cake	2	Tvornica kolaca - Valpovo; "Nada Stark" - Zagreb
Butter	2	Zagrebacka mljekara; PIK Belje
Frozen Cucumbers	1	Veletrgovina - Beograd
Pepper	1	PIK - Prizren
Sour Sheep Milk	1	"Crvena Zastava" - Stip
Candied Fruit	2	Trznica - Zagreb
Dried Cured Pork	1	"29 November" - Subotica
Canned Peas	1	"Progres" - Prizren
Peach Jam	1	"Vocar" - Beograd
Frozen French Beans	1	Trznica - Zagreb
Total Groceries:	11	
Responded	8	
Did not respond:	3	

GREENGROCERIES:

Frozen Vegetables	2	"Bobis" - Split "Kulpin" - Novi Sad
Frozen Peas	2	"Proges" - Prizren Hladnjaca - Zagreb
Fruit Cake	2	"Soko Stark" - Beograd
Canned French Beans	2	"Delamaris" - Izola ETA - Kamnik
Frozen Peppers	1	PIK - Prizren
Frozen Spinach	1	Hladnjaca - Zagreb
Frozen Strawberries	1	Hladnjaca - Zagreb
Frozen Plums	1	Hladnjaca - Zagreb
Total Greengroceries:	9	
Responded:	5	
Did not respond:	4	

BUTCHER SHOPS

Meat Paste	2	"Emona" - Ljubljana "Gavrilovic" - Petrinja
Dogs	1	IPK - Sarajevo
Ribs	1	IPK - Sarajevo
"Dedis" Products	1	"Gavrilovic" - Petrinja
Picnic Sausages	1	"Venac" - Novi Sad
Beef Steak	1	"Venac" - Novi Sad
Luncheon Meat	1	"Emona" - Ljubljana
Sausage - Violet	1	AIK - Pozarevac
Sausage - Mlavka	1	AIK - Pozarevac
Mayonnaise	1	"Nektar" - Nova Gradiska
Serbian Sausage	1	IPK - Sarajevo
Beef Stew	1	"Venac" - Novi Sad
Total Butcher Shops:	12	
Responded:	7	
Did not respond	5	

Besides the identification of new products this survey also aimed to establish the acceptance of new products by consumers. Besides the acceptance remarks/satisfactory, not so satisfactory, unsatisfactory/ there are also given the reasons for the unsatisfactory acceptance of single products.

SUPERMARKETS

PRODUCT	Acceptance			Reasons for Unsatisfactory Acceptance
	Satisfactory	Not so Satisfactory	Unsatisfactory	
Industrial Cake	1	-	1	At the beginning it was well accepted but the quality did not remain as good. Short lasting time.
Torte	1	-	-	
Marble Cake	1	-	-	
Frozen Fruits	1	1	-	
Frozen Vegetables	1	1	-	
Rolls	1	-	-	
Hot-Dogs	1	-	-	
Packed Sausages	1	-	-	
Packed Meat	1	-	-	
Frozen French Beans	1	-	-	
Frozen Peas	2	-	-	
Frozen Peppers	1	-	-	
Frozen Cucumbers	1	-	-	
Frozen Tomatoes	1	-	-	
Jaffa Fruit Juice	1	-	-	
Total Supermarkets:	11			
Responded:	8			
Did not respond:	3			

SELFSERVICES:

Dried Cured Pork	-	1	-	
Quince Jam	-	-	1	Bad quality; high price; bad packing
Frozen Peas	3	-	-	
Yoghurt	2	-	1	Short lasting time
Fruit Cake	1	-	-	
Canned Pork	1	-	-	
Roll	1	1	-	
Potato-flakes, mashed	2	-	-	
Industrial Cake	1	-	-	
Meat Paste	1			
Euro-Cream	1			
Jam Tourist	1			
Frozen Fruit	1			
Frozen Vegetables	1			
Fried Potato	1			
Canned Cabbage	1			
Canned Carrots	1			
Frozen Peppers	1			
Total Self-Services:	12			
Responded:	10			
Did not respond:	2			

GREENGROCERIES:

Frozen Peas	1			
Fruit Cake	1	1		
Frozen Peppers			1	Bad taste - housewives prepare them for winter themselves; Expensive
Industrial Cake		1		
Dried Apples			1	
Canned French Beans	1			
Lemon Juice	1			
Strawberries	1			
Total Greengroceries:	9			
Responded:	5			
Did not respond:	4			

PRODUCT	Acceptance			Reasons for Unsatisfactory Acceptance
	Satisfactory	Not so Satisfactory	Unsatisfactory	
<b>GROCERIES:</b>				
Frozen Cucumbers			1	Tasteless, expensive
Frozen Peppers		1		
Fruit Cake	2			
Industrial Cake	1			
Cheese Semi-hard	1			
Milk in Tetra-packs	1			
Frozen Peas	1			
Sour Sheep Milk	1			
Dried Cured Pork	1			
Smoked Meat	1			
Canned Peas		1		
Total Groceries:	11			
Responded:	8			
Did not respond:	3			

**BUTCHER SHOPS:**

Serbian Sausages	1		
"Dedis" Meat Paste	1		
"Dedis" Dogs	1		
Picnic Sausages	1		
Beef Steak	1		
Beef Stew	1		
Luncheon Meat	1		
Sausage - Violet	1		
Sausage - Mlavska	1		
Sausage - Moravska	1		
Mayonnaise		1	
Total Butcher Shops:	12		
Responded:	7		
Did not respond:	5		

Finally, shop managers were asked to give their opinions, suggestions and recommendations to the producers of new products.

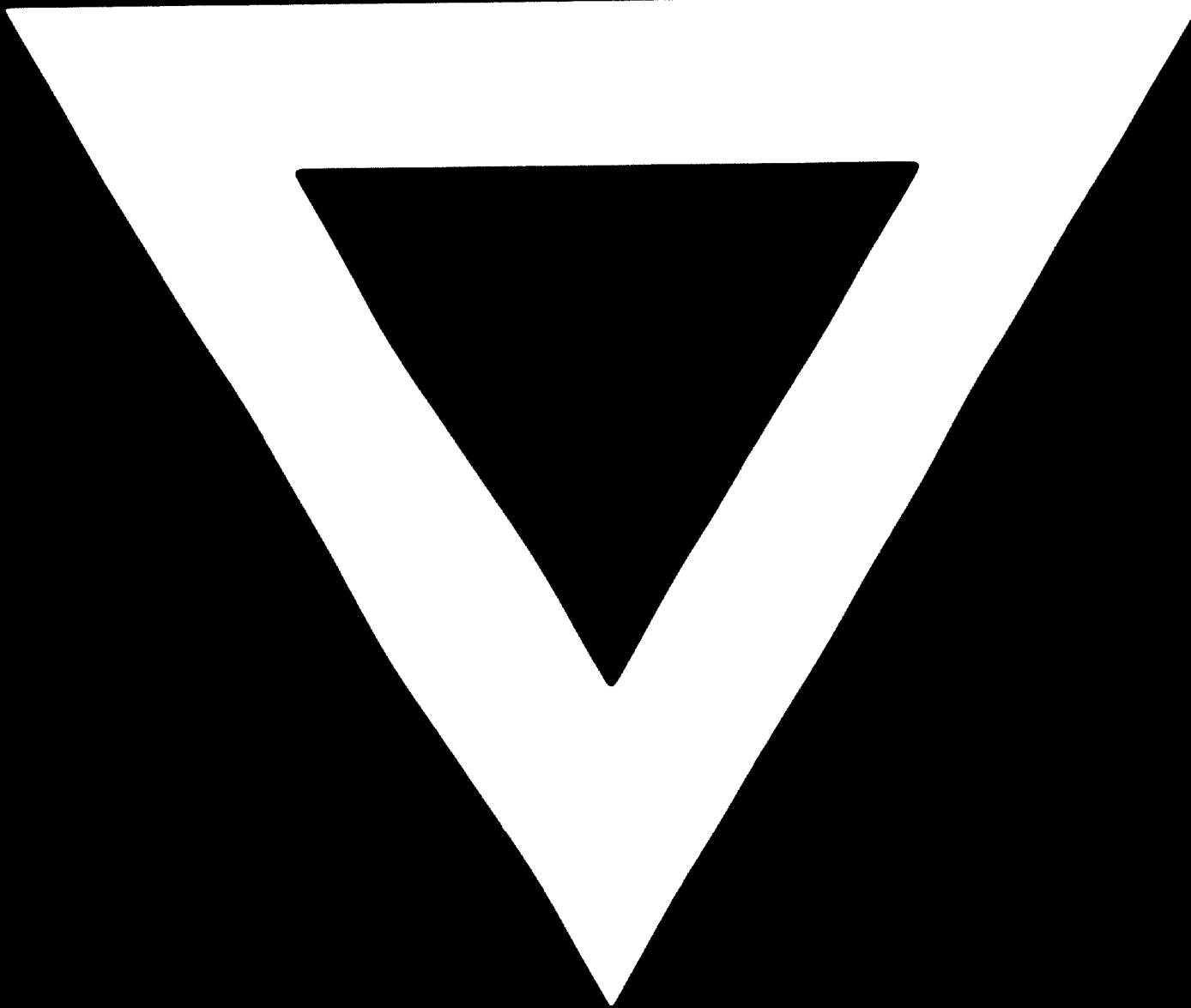
In connection with above said, we are quoting several of the most characteristic responses given by the interviewed shop managers:

- Every new product is of a good quality; but the quality changes to worse as times go on. Consumers accept good and leave bad.
- More advertising, introduce degustration
- Better advertising; keep stable prices.
- New product should be of first-rate quality, advertised and consumer must get instructions. Market should be well supplied.
- Stock very unstable because of the producers. Assortment limited. If that should be improved there would be more success on the market.
- Products are very well accepted on the market, but the demand is not satisfied.
- Product should be constantly present on the market and supplier should be offering it all the time.
- Packaging should be improved; should be more advertised; prices should be more stable.
- Consumers should be convinced of a product quality on the spot.
- Good quality, nicer packaging, more advertising, more moderate prices, prize-contests.
- Longer lasting time and more advertising.

- More organized advertising and better quality of wrapping material.
- TV advertising
- More advertising; commercial travellers.
- Improved supply; wrapping material fragile and should be strengthened.
- More advertising; prompt delivery; stable prices.
- Improve supplying possibilities; no price increases.
- Products quality and moderate prices, more intensive advertising; tasting of some products, suitable packaging.
- Prices should be stable and reasonable.
- Lasting period should be improved, cooking facilities and selling space necessary.
- Better quality and packaging; reasonable prices/bad packaging of tomatoes.
- Consumers will accept every new product if price is reasonable. Good advertising necessary.

\* \* \* \*

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