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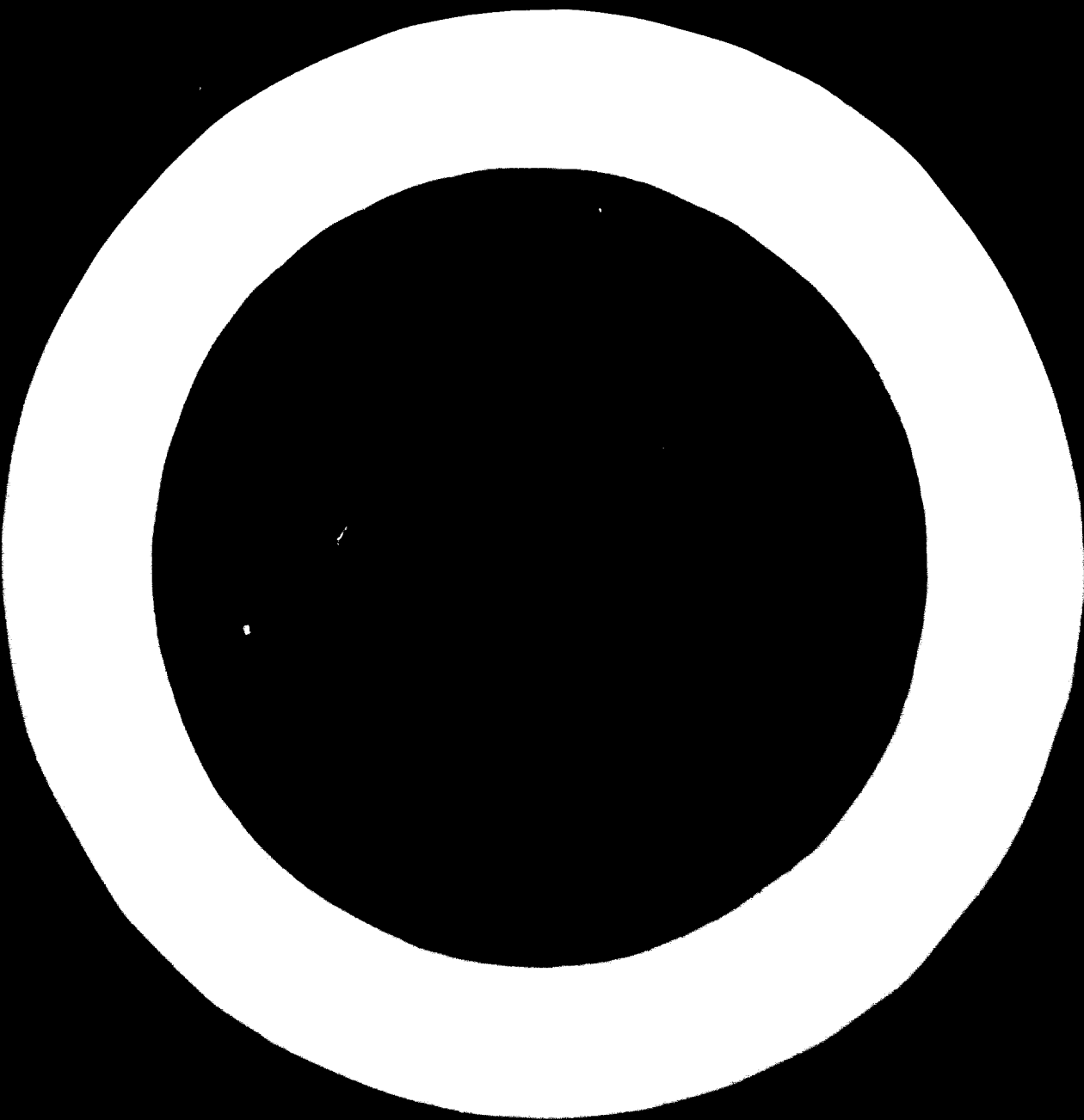
Belgrade, Yugoslavia, 13-18 May, 1974

INTEGRATED AGRO-INDUSTRIES CONTRIBUTION  
AND THE PRESENT WORLD FOOD SHORTAGE <sup>1/</sup>

prepared by  
the Secretariat of UNIDO

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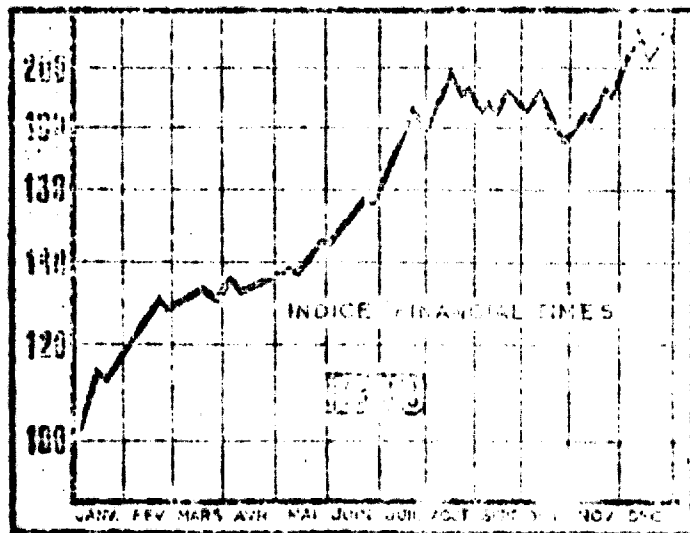
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IMPACT OF THE OIL PRICE RISE ON THE WORLD  
AND THE PEOPLE'S REPUBLIC OF CHINA

(A look at the in international  
trade and economic relationships)

The most salient economic feature of the last two to three years has been the escalating raw material prices, precursors of new modus vivendi between the developing countries and the industrialized world, and clearly presented in the diagram below which relates to the price indices for the twelve most typical raw materials on the world market (cotton, cocoa beans, coffee, cotton cakes, maize, wheat, copper, rubber, wool, lead, tin and kenaf) in 1973.



Source: Financial Times Marchés tropicaux

If these prices are related to 1952 as base year (100), prices can be seen to have increased to 210.96 in 1973: where "primary" food products are concerned these indices are even more revealing. For a long time, sugar was the 'sick man' amongst the cash crops. As late as 1970, world prices were far below the production costs even in countries with the cheapest labour resources - a ton of sugar cost only £30 a ton. Yet by the end of 1973, sugar prices had rocketed to £200 a ton, and the current price is of the order of £270.

In 1971, to cite another example, soya beans were to be had at a regular price of US\$115-120 per ton whilst current prices are creeping up to US\$270-300

per ton. Palm kernels from Nigeria now cost £190 per ton as opposed to £60 some two years ago, whilst copra prices reached a 1973 high of \$130 a ton as compared with \$165 twelve months previous.

The original CIF price for cotton from Africa (Central or West) was F.3.95 per kg. and current prices now touch F8.70 per kg. Sisal, which has suffered throughout the last ten years, started out at £75 a ton (Kenya or Tanzania) and now runs to £403 per ton, an increase of no less than 500 per cent.

An epoch has come to an end and a new one has started, and what has happened to bring it about so suddenly? It could be that this is only a temporary shift, or possibly it heralds a new stage in the raw material/finished goods relationship: in other words, a new stage in the relationship between the developed and developing countries.

There is no doubting the validity of this claim: the first key to this problematic issue can be traced to the sudden imbalance between the supply and demand of raw materials brought about mostly by the developing countries.

1. The primary reason for the lack of supplies lies in the international monetary situation which has been completely upset and the resultant inflation which has caused people to take refuge in durables (gold!) instead of money.
2. The secondary reason is of a more political nature. The raw material producers have learnt to exploit to their advantage their position as main suppliers of certain commodities to the developed countries, which permits them to exercise politico-economic pressure and assess anew the value of loans invested in the production of raw materials as against those invested in more sophisticated finished products of an industrial nature.
3. Raw material trade was based on international agreements (pertaining to sugar, coffee, cocoabeans, copra etc.) in which the consumer countries played the dominant role, allocating production quotas to the developing countries which were always a little higher than the planned consumption. These continuous artificially created surpluses ensured that prices remained low despite growing consumption. In many sectors, this short-sighted policy has led to an intolerable situation. Sugar producers in Jamaica have been subsidizing sugar

consumers in the United Kingdom despite the fact that average incomes in the latter country were US\$3000 as against US200-250 in the former. Although sugar production costs at the time were over US\$72 per ton, the premium price paid to Jamaica for exported sugar was of the order of US\$55-58 per ton.

Needless to say, at present none of the international "agreements" are still in force.

4. The fourth contributory factor was the lack of goodwill, the unwillingness of the entrepreneurs in the developed countries to run the risk of establishing joint ventures in developing countries, or even to invest capital and "know how" in the production of raw or semi-processed materials.

5. At the same time, a certain degree of commercial tactics was at play. Capital invested in raw material production offers a return only one to two years later whereas capital invested in raw material processing to finished products (margarine from palm oil, chocolate from cocoabeans, white sugar from brown sugar, prime meat cuts from carcasses, spice extracts from black pepper, shoes and leather goods from imported skins and hides, garments from wool) offers a tenfold return per annum. Furthermore, processing can be kept under complete legal and managerial control, ensuring the owners up to five times as much interest as in the production of raw materials.

Consequently raw material production cannot keep pace with increased demand and the prices of different raw materials have leapt to unprecedented heights.

This situation calls for a complete change of attitude with respect to co-operation between developed and developing countries. Instead of antagonism and fights (raising prices of finished products that are essential to developing countries), the developed world should concentrate on the rapid implementation of joint ventures, thus contributing to the rapid development of raw material production in the developing countries with an appreciable processing factor.

Some of the developed countries have spontaneously taken the initiative in the formulation and implementation of such policies. Japan is doing its utmost by establishing new joint fishing companies, new soya farms, new meat-processing factories, new sugar plants to ensure its future commodity supplies

which are accepted as repayments of loans or capital invested.

The Netherlands has helped to establish sugar plants in Ethiopia and France and is establishing cotton growing companies in West Africa. The Federal Republic of Germany has encouraged the production of cassava pellets for animal feedstuff production in Brazil, Malaysia, and Thailand.

The appeal for co-operation instead of fighting is a very urgent one of common interest. The international commodity agreements will never re-appear in their old guise. In 1972 a mere six agreements accounted for a total of US\$6,291 million of exports from developing countries, in respect of cocoa, coffee, olive oil, sugar, tin and wheat. At present, only one of these is still applicable and its duration is uncertain. Yet, the question of finding an adequate substitute for these agreements goes begging in the endeavours for co-operation.

In reality such international agreements cannot be based on political issues, but should have an economic and financial background. An international agreement, if it is to be really appreciated by both parties, can only be formulated as a sum total of successfully operating individual agreements which serve as working models essential to a more general framework.

The rapidly increasing gap between supply and demand in the food and feed sectors throughout the world provides a rare opportunity to approach the problems sincerely.

This situation could easily reverse the present deterioration of relationships between the poor and rich countries of today, and be taken as an incentive towards closer co-operation. It is quite apparent that now, as never before, the developed industrialized countries are in urgent need of certain processed foods which only the developing countries can supply, if they are provided with the appropriate technical and financial assistance in industrial development!

Industrial development, on the other hand, will not only contribute to the production of commodities presently in short supply, but it will also raise the purchasing power and generate the utilization of know-how and financial means for further investment and economic development.



R. Wolff, one of the world's best known sugar equipment producers predicted in a speech (November, 1972 in Paris) that the world sugar deficiency would reach 22 million tons by 1980, most of which could be (and would be) produced in developing countries. He said that at least US\$ 1,700 million would have to be invested in new sugar factories and at least US\$ 700 million in the reconstruction of existing plants. He failed to indicate who would provide this amount of money or who would produce the necessary equipment, train the technicians and workers, or eventually plant the 500.000 - 700.00 ha of new sugar plantations, not to speak of the irrigation, harvesting and transport facilities required.

The solution lies solely in close co-operation and common interests. The developed countries should come to realise that the situation has changed and that a new epoch marked by partnership and understanding must start without delay, the necessary pre-requisites being:

1. It must be understood that any such partnership is based on the equality of chance and benefits, and risks must be shared;
2. Each project should be well prepared and complete, providing the partners with enough data for a clear-cut decision. Equally essential is an objective, well-elaborated feasibility study enabling both partners to come to a decision.
3. The capital know-how and training loans should be repaid in the form of exported commodities at world prices.
4. An up-to-date integrated agro-industrial approach should be adopted, proceeding from market demand with the basic involvement of processing facilities and streamlined agricultural production of raw materials.
5. Broad-scale co-operation between the partners in the field of agro-industrial research, manufacture and selection of food processing equipment and special agro-industrial consultancy services which would permit the joint elaboration of projects, training of staff, provision of management and repair and maintenance services, as well as the reconstruction of agro-industrial enterprises.

Certain issues enumerated above, however, deserve closer study.

I. Partnership involving equal opportunities and risks

Many of the joint ventures hitherto were based on different restrictions and limitations imposed on partners in developing countries. In slaughterhouses in Africa and Latin America exporting cattle carcasses to plants owned by developed countries in Europe or USA, carcass prices were so low that the slaughterhouses in the developing country were just profitable. After a certain period of time, the natural cheap cattle resources around the slaughterhouses were exhausted, whereupon the slaughterhouses were closed down or put at the disposal of the domestic partner. Meanwhile, the meat processing plants owned by the partners in Europe or USA had processed these cheap carcasses into sophisticated final products (sausages, prime cuts, steaks, etc.) and reaped enormous profits. Joint ventures of this kind are neither helpful nor desirable.

2. Well-prepared objective feasibility studies

In order to enable the partners to agree on a viable project on equal terms and in order to avoid mistakes, both partners should try to co-operate in identifying an objective consultant to prepare a good techno-economic study. On the basis of the study, a fast decision can be taken and mutual confidence will be established from the first beginning.

The study should start with a market analysis and should, in general, be export oriented. These are only a few developing countries which can afford to build up commercially sized agro-industries exclusively for their own market.

The second step of the study should be the selection and specification of all the processing and storage facilities necessary for the production programme determined by the market. Finally, an important part of the study should be devoted to the streamlined agricultural production and the supply of raw materials for the said programme. An economic interpretation should run parallel to these technical specifications. Should the price, quality, quantity or assortment of the programme fail to correspond to market expectations, the necessary changes and recalculations have to be made in order to maintain a balanced, consistent and bankable project.

### 3. Loans, royalties, credits and re-payments

The joint venture contracts for the establishment of agro-industries should contain acceptable conditions for the developing countries with respect to the repayments of credits and loans. The problem of know-how is often misunderstood by the developing countries whereas they readily pay for know-how at twice the price if it is "invisible" i.e. included in the price of equipment; they usually feel they are at a disadvantage, if the supplier of know how requests cash payments or royalties.

Taking into consideration all that has been said above about the world shortage of specific commodities, there would be no objection whatsoever to half of the repayments being effected in kind on the basis of world prices. It would, of course, be wrong to agree on some regional or bilateral conditions as was recently the case with sugar. Guyana as sugar producer and supplier to the United Kingdom had agreed under the terms of the Commonwealth Sugar Agreement to supply sugar at a price of £61 a ton, and Mr. Forbes Burnham, Prime Minister of Guyana, is quite justified in stopping delivery, when current world prices are over £240 per ton.

### 4. Integrated agro-industrialization

It is obvious that when establishing export-oriented agro-industrial production only integrated agro-industry comes into consideration. The inherent advantages over other traditional and non-integrated economic developments in the field of agriculture and industry are self-evident. The benefits to be derived from such an agro-industrial development can be summarized as follows:

- integrated agro-industrial development can be accomplished in only a few years. In traditional rural development schemes, colonization schemes or plain agricultural development schemes, a schedule cannot be clear-cut in advance, nor can results be forecast;
- Integrated agro-industrial projects are bankable. Investments, as well as production costs, revenue and net profits can be forecast. In all other kind of developments initial outlays can only be conceived as irretrievable losses;

- Integrated agro-industrial projects can be implemented in countries with different, even extreme, political and social structures and at very different stages of national development. An integrated agro-industrial enterprise can be owned by the state, by private persons, shareholders or members of a co-operative.
- Integrated agro-industry will generate long-term employment opportunities more rapidly and effectively than any other investment in agriculture and serves as a model for neighbouring individuals, co-operatives or even the state itself.
- Integrated agro-industrial enterprises do not fall victim to social antagonism. They have unified management, obviating clashes of interests and safeguarding the optimum use of materials, capital production, transport facilities, as well as manpower.
- Integrated agro-industry need not be permanently subsidized as it is self-sufficient and conducive towards the creation of markets, domestic and foreign. Horizontal linkage with other integrated agro-industrial enterprises presents no problems and joint export endeavours, common technical and research work or even increased specialization can be simply effected.

#### The characterization and structure of integrated agro-industry

The key to agro-industry's success lies in the vertical integration of production, whether this involves ownership of the means of production, common management, or the contracting of common interests in marketing, processing and agricultural production.

This definition differs widely from those established in recent literature on the subject. Agro-industries are not merely industries based on agricultural raw materials nor does the term refer to the suppliers of such auxiliary materials as pesticides, fertilizers, and agricultural machinery. Agro-industry is a much wider concept involving the integration of marketing, processing and agricultural production under a comprehensive management responsible for the production, harvesting, processing and marketing of the products by the most direct means.

Thus, from its very inception, agro-industrial production is a highly planned streamlined process serving a common interest, i.e. the production of marketable goods from minimum inputs to obtain maximum outputs.

This form of production involves either a high degree of specialization or a wide range of products, a characteristic feature being the utilization of all by-products by other sections in the integrated enterprise or association of enterprises. A further advantage of an agro-industrial system is the close relationship it establishes with the various markets.

The establishment of an agro-industry does not start with an analysis of agricultural production nor with the examination of the unutilized production capacities in the relevant industrial branches. The only admissible first step is an exact analysis of existing and potential markets at home and abroad, whereafter an industrial survey is carried out to establish the profile of the factories needed to meet the demands of the markets analysed. This stage is then followed by agricultural considerations and the selection of agricultural branches as raw material suppliers to the planned programme. Whereas this market-oriented approach would inevitably reject certain items, new products would be introduced on the basis of improved utilization of by-products, land or human resources and capacities. A second market analysis to be made would then confirm the suitability of the programme selected and by means of regular checks, an optimum agro-industrial development programme can be elaborated for both limited and broader areas of application.

This close correlation between marketing, industrial processing and agricultural production or importation of raw materials does not end with the establishment of planning methodology. The brief summary below indicates other major problems which could be discussed at a meeting or international consultation on the promotion of agro-industrial development.

1. Long-range agro-industrial development planning

- Agro-industrial development should be planned carefully in order to achieve:
- rapid, yet economic results;
  - rapid rural development;
  - large-scale colonization of virgin territories (including deserts);

- optimum utilization of capital-intensive irrigation facilities;
- solution of socio-economic and political problems.
- best export results.

Careful planning is also necessary to avoid

- competition with ongoing economic or political measures
- dissatisfaction within existing industrial and agricultural sectors;
- economic failures.

Planning could be effected stepwise and limited to one region at a time. Furthermore, it must be adapted to the political structure prevailing in different countries, and a discussion of these specific problems would be most desirable.

## 2. Agro-industrial engineering techniques

Agro-industry is characterized by the very close relationships in terms of time, distance, economic interests and management between marketing and industrial processing on the one hand and between processing and agricultural production on the other. Such relationships constitute the most significant advantages of the integrated process, yet to derive maximum benefit appropriate techniques and engineering must be applied.

It is an undisputed fact that in a fully integrated sugar-cane enterprise agricultural production, harvesting activities and processing can be timed and co-ordinated in such a manner as to ensure minimum quantitative and qualitative losses. In an efficiently integrated agro-industry, for example green peas can be mechanically harvested, immediately chilled and transferred to the processing line for canning or freezing within an hour and one half.

Furthermore, a fully integrated agro-industry closely observes market behaviour at all stages of the operation so as to be able to derive the greatest long or short-term benefits. Consequently, particular importance is attached to the discussion of appropriate techniques and the engineering approach to be adopted in the distribution, processing and production sectors of agro-industry.

### 3. Agro-industrial management

There are numerous management problems peculiar to agro-industrial production. Special accounting systems are needed for the precise price structures of each operation or group of operations and for each management unit in the production, processing and marketing sectors. Such systems must meet the requirements of the various participants in the integrated process, contributing to the effectiveness of their contribution.

In most cases, profits are to be seen at the end of a long process, i.e. on the markets themselves, hence the profit redistribution systems are very new and hotly disputed on account of their importance to the individual participants.

Other management problems should also be discussed, such as:

- the establishment of common services in agro-industrial enterprises;
- the position of quality control throughout the processing line;
- upgrading of participant skills;
- private farmers and their co-operation with agro-industry;
- establishment of checklists and time schedules throughout;
- the planning of balanced comprehensive investment programmes;
- the introduction of computerized management systems into agro-industrial enterprises.

### 4. Agro-industry and rural development

This specific issue should be discussed at such a meeting because of its major influence upon the regional development of backward areas in need of industrial and agricultural assistance.

Particular benefit could be derived from the examination and discussion of the conflicting opinions held on the influence the establishment of integrated agro-industrial enterprises has upon:

- the raising of regional economic standards;
- labour intensity;
- the bankability of projected investments;
- time needed to materialize such projects;

- pre-investment and production costs;
- infrastructural requirements.

It would be interesting to compare the agro-industrial approach with the traditional rural development schemes headed by the concept of agrarian reform and colonization.

#### 5. Agro-industry and the co-operative system

The co-operative system is going from strength to strength and has already been adopted by numerous developing countries as an organizational structure for the development of backward regions or new areas.

In some European countries and elsewhere, co-operatives were set up by private farmers with a view to rationalizing production, providing their members with low-priced inputs, and improving current distribution and marketing systems. The movement developed into larger associations and co-operative organisations, which in turn contributed significantly to the establishment of their own independent industrial enterprises and distribution networks.

This stepwise integration can of course be planned as a single operation in areas where a co-operative system is more desirable than other forms of integrated agriculture.

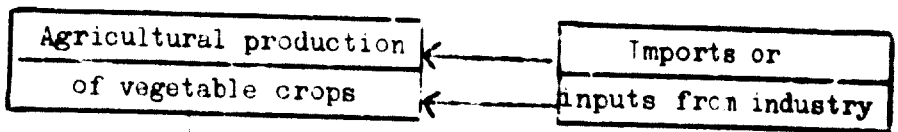
Planning an agro-industry on a co-operative basis as a possible alternative to ownership of the land by the industry or co-operation with private farmers has specific features which are worthy of presentation in a case study.

#### 6. The substantial structure as a criterion for agro-industrial planning

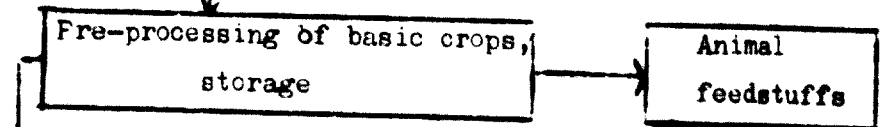
The technological process of an integrated agro-industry has a very specific structure which is normally subdivided into the following six levels:



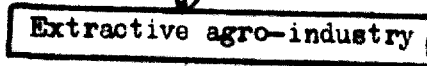
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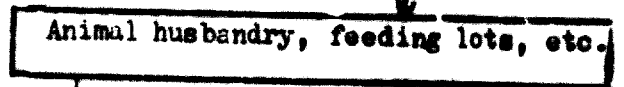
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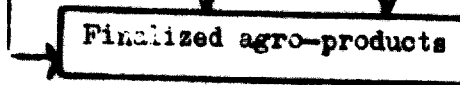
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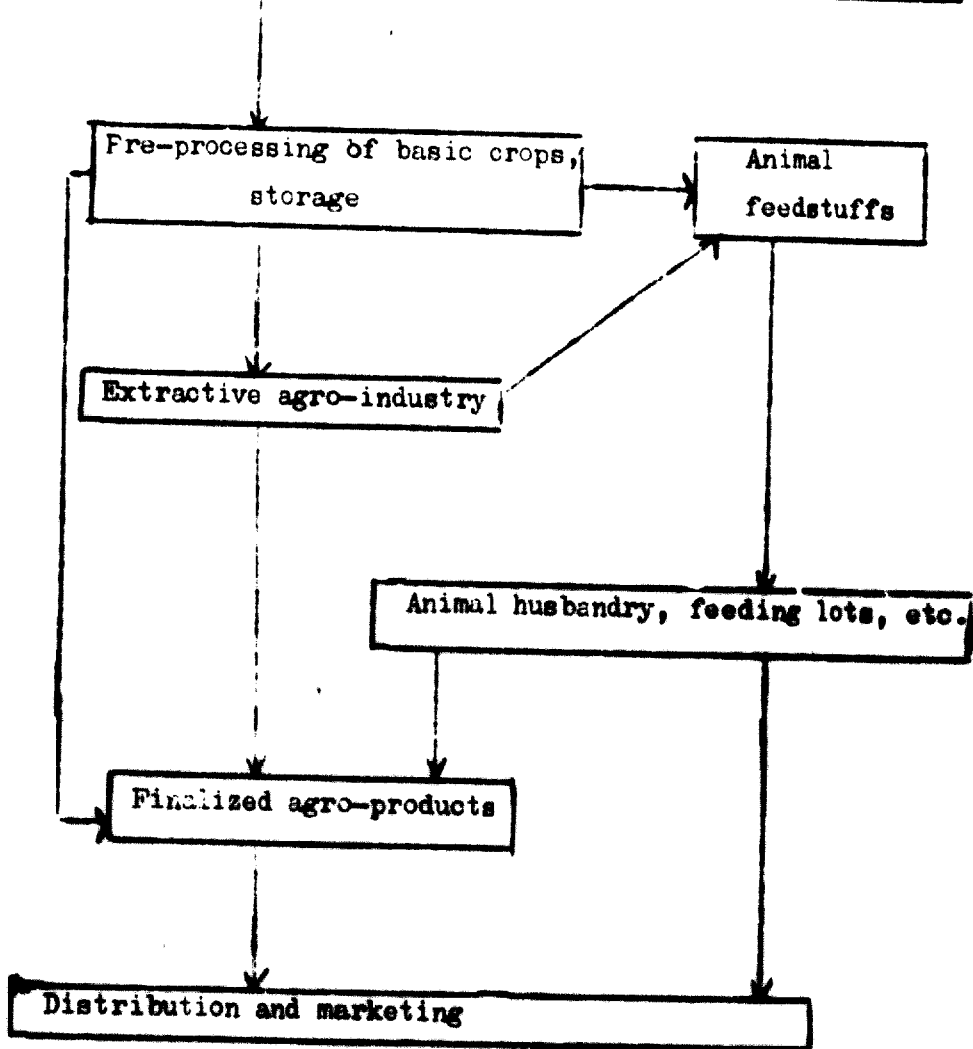
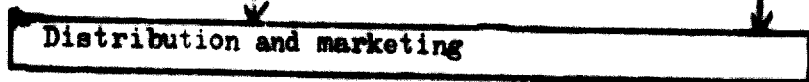
Level 4



Level 5



Level 6



A group of interesting problems arising from this structure could be discussed and studied. such as:

1. Is the stepwise development of an integrated structure such as this possible?
2. At what levels should one start, 1 or 6, and under what circumstances is it preferable to start at level 6?
3. How are the different levels interrelated? Undoubtedly levels 1 and 2 have to be established together and it is equally clear that capital flow can be more easily obtained for investments at level 5 than level 3.
4. At what level should central planning and management be introduced?

7. Higher forms of agro-industrial integration

An agro-industrial system is often not large enough to take over a whole colonization programme, establish factories and national marketing networks or to compete in foreign markets as a serious supplier and exporter. Furthermore, the merging of agro-industrial enterprises with different social structures and production programmes from different regions, raises numerous problems which should be investigated and discussed.

The organization, structure and joint services are particularly interesting at this stage of integration. Moreover, this is the most suitable stage to assess the feasibility of establishing extension services for agricultural or process engineering; special export services for finished and semi-finished products; a joint banking system or common input production facilities (pesticides, repair and maintenance shop for agricultural equipment, etc.).

8. Co-operation with developed countries in the field of agro-industrial development

Particular attention should be devoted to the problems of establishing an agro-industry in a developing country with the assistance of a multi-national company or a governmental agency in a developed country.

The developed countries are endeavouring to co-operate with developing countries in the field of agro-industry for many reasons.

- raw materials are produced only in the developing countries;
- production is competitive as long as the wage levels of the developing countries are maintained;
- traditional techniques can be improved (e.g. refining of brown sugar);
- certain products are in increasingly short supply in world markets.

It is remarkable that, despite the beef deficiency no major developed country, except Japan, has made any serious attempt to organize meat production so as to close this gap. Apart from the low prices imposed upon the meat producers on domestic markets, the lack of sanitary conditions and many other reasons, one of the major obstacles would seem to be the social and political structure peculiar to this branch (butchers, large ranches, small private farms, etc.) which would have to be changed, prior to agro-industrial integration.

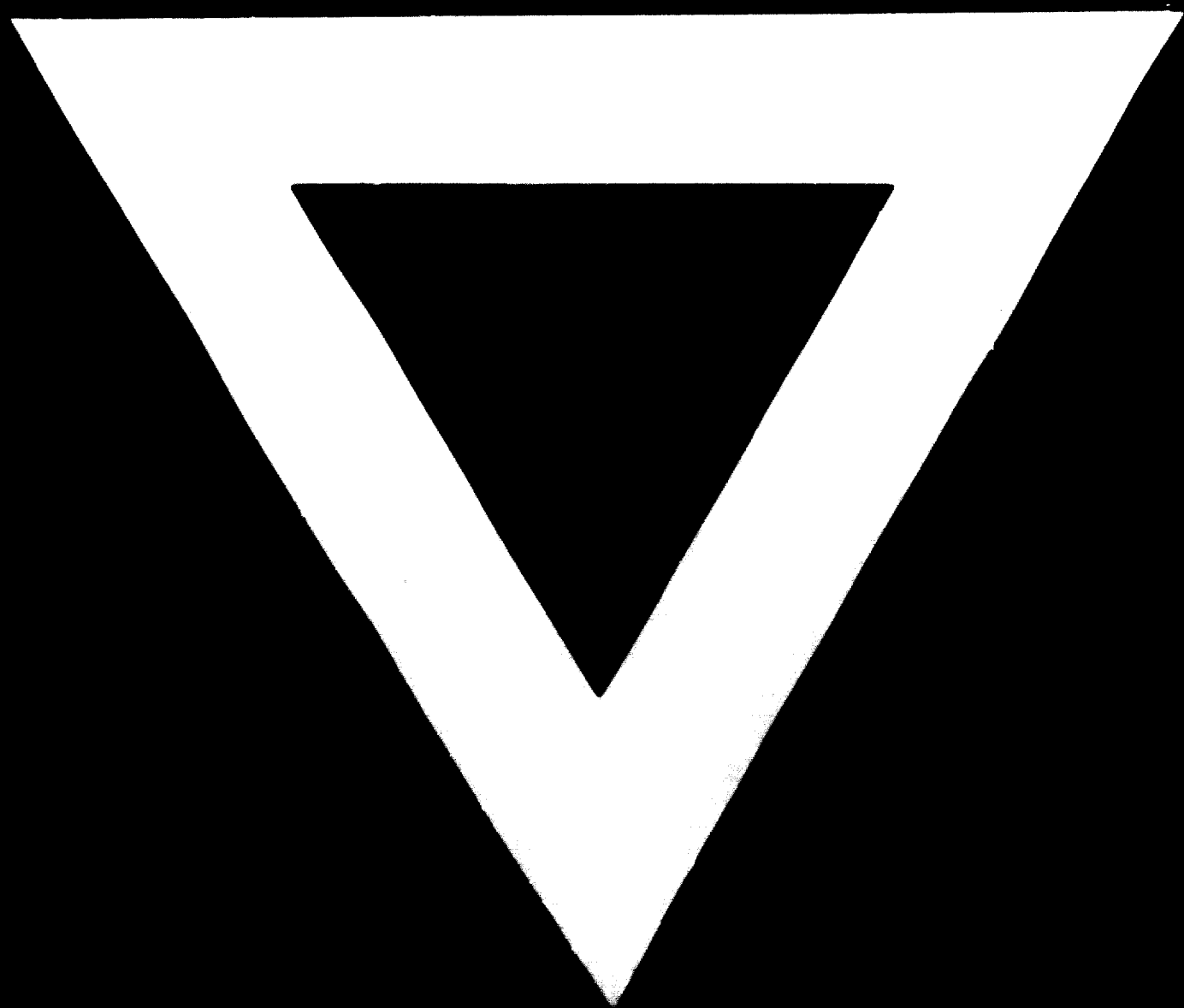
The major multinational companies and/or importers of agro-products in the advanced world would like to identify forms of co-operation which would overcome all these obstacles. Such alternative forms would be smaller mixed companies in neutral territories or standardized agreements on financial and technical co-operation on the basis of royalties or other quantifiable systems.

#### 9. International agencies and agro-industrial development

The activities of international and national agencies and their assistance in the field of agro-industrial development should be reviewed and discrepancies in approach, planning and implementation identified in order to formulate a concise policy and define actions which do not overlap or lead to duplication.

Such papers could be presented by agencies with the greatest interest such as 'UNIDO' in close co-operation with other interested national and international organisations.





**74.09.13**