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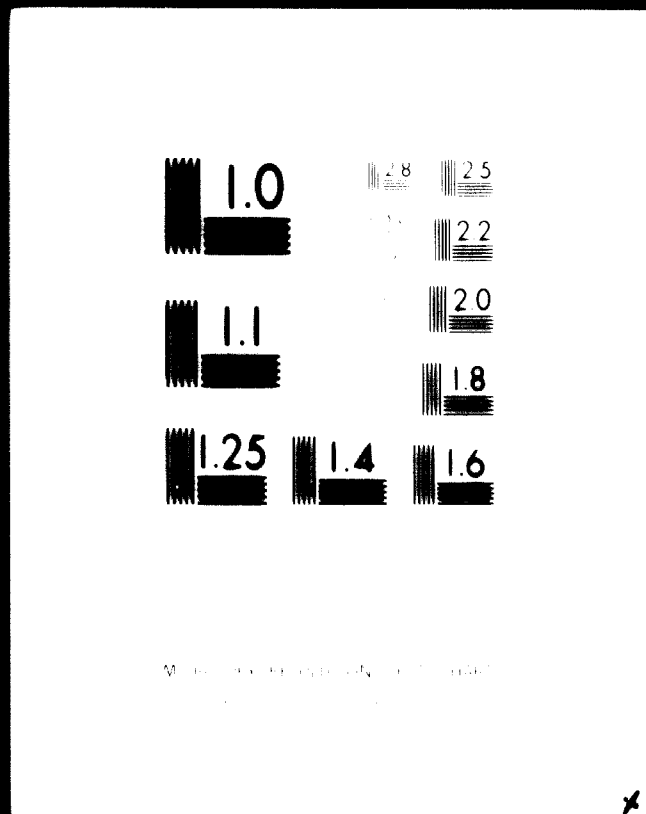
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LEBANON

Exploratory Mission on Sugar Industry
Development.

M. Nautner
Chief, Light Industries Section,
Industrial Technology Division.

23 June to 1 July 1971.

002093

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I. INTRODUCTION

The author left Vienna on 23 July 1971 and arrived in Beirut the same day on his exploratory mission to Lebanon (see project data sheet in Annex 1 for further details).

Following an introductory session with Mr. Hashim Jawad, UNDP Resident Representative in Beirut, and Mr. Mohamed El-Halfawy, UNIDO Regional Representative, further fruitful discussions were held in UNESOB with Mr. Salah Jawhari and, in particular, with Mr. Mohamed Abdelmoneim who supplied exhaustive material on problems relative to the author's mission.

The author first visited the National Economy Minister, Mr. Saeb Jaroudy, who discussed matters thoroughly and highlighted the socio-economic and political implications of Lebanon's development.

Throughout his stay the author was assisted by: Mr. Fuad Abi Saleh, Director of Industry, Ministry of National Economy; Mr. A. Attallah, Bureau of Industrial Development, Ministry of National Economy; Mr. S.P. Klat, Bureau of Industrial Development, Ministry of National Economy; Mr. T. Beydoun, Ministry of National Economy; Mr. K. Choueiri, Head of Foreign Relations Department, Ministry of Agriculture; Mr. C. Kobeh, Head of Co-operative Service, Ministry of Agriculture; Mr. N. Sassin, Ministry of Agriculture and many others.

During his stay the author visited the coastal area to the north and south of Beirut as well as the Beka'a Valley to familiarise himself with the agricultural situation, the food-processing industry and environmental problems. He also visited the Zataré Citro Fruits Co. in Sidon which has developed citrus orchards in that area and is endeavouring to establish fruit-processing operations on an industrial scale. The company pursues an integrated production and processing policy to meet known market demands as the best means of achieving lasting results.

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The author also met and exchanged views on the idea of agro-industrial complexes with Mr. E. Hraoui, President of the Sugar-Beet Co-operative in the Beka'a Valley, Mr. S. El Maiss, Co-operative Director, Mr. R. Bissat, Cereals and Sugar-Beet Office, Ministry of National Economy, and many others who supplied him with a wealth of information.

In Beirut the author met Mr. A. Saad, Technical Director of the Office for Animal Production, and members of the Poultry Industry Co-operative, including the President, who were agreeable to the basic idea of agro-industrial complexes.

The author would like to express his gratitude to everybody, including those not mentioned above, who contributed to the success of his brief mission.

II. ANIMAL PROCESSING INDUSTRY IN LEBANON

1. Population and GNP

In 1970 the population of Lebanon was estimated at approx. 3 million with an annual rate of growth of 2.5 per cent.

Agriculture is the main occupation of 50 per cent of the working population, yet contributes only 12 per cent to GNP, whereas the trade and services sector contributes a substantial portion, 65 per cent. The country has not devoted much attention to agriculture: for a variety of reasons (tradition, geographic location and comparatively poor natural resources) trade, transit trade and services have been promoted.

Industry is still developing and employs only 12 per cent of the working population in artisanal production plants. The exodus of the rural population to urban communities is marked, and a large expatriate community regularly transfers savings and earnings back to Lebanon.

2. Meat industry

In Lebanon agriculture has not kept pace with other economic developments and there is permanent dependence on imported agricultural commodities, in particular food products.

The trade deficit in the food and agriculture sector which amounted to some Lf 300 million in 1970 cannot be offset by the recent increase in the exports of fresh fruit, vegetables and poultry products. The greater part of the trade deficit is incurred by importing meat, dairy products and livestock.

The country's animal protein production is very low because the highly unfavourable local grazing conditions, with only 2 per cent of the total area of Lebanon under forage crop, have not been overcome by the introduction of modern ranching or farming methods. The poultry industry is the only rapid growth sector and Lebanon has changed from being an importer to an exporter of poultry products to adjacent countries within the space of a few years.

3. Meat production

In 1968 Lebanon produced 6,500 tons of meat: 2,000 t cattle; 1,800 t sheep and 2,700 t goats. Meat imports increased from 18,900 t in 1956 to 28,400 t in 1968.

As Mr. A. Saad points out in his paper entitled 'Les aliments d'origine animale au Liban leur consommation, distribution, production et commercialisation' presented at the First National Nutrition Congress (Beirut, July 1970) Lebanon exported 50,000 tons of various brans, oil cakes and bone powder in 1968 which fact would have been enough to feed 1000,000 head of cattle, the number imported the same year.

The Lebanese Office for Animal Production has in a number of studies investigated the possibility of increasing domestic meat and milk production to combat increasing animal protein deficiencies, to contribute to national economic growth, and to give the rural communities the benefit of employment. Their proposals fit into the customary framework below:

1. Selection of livestock, production of forage crops.
2. Protection of domestic meat and milk production by administrative measures and subsidies.
3. Organisation of the feedstuff and animal products markets to maintain adequate prices and profit margins.
4. Improvement of grazing areas, training of technical staff and research into animal husbandry.

In addition to these well intentioned suggestions, which are of a more general and long-term nature, a more up-to-date approach should be adopted to emulate the achievements of the poultry industry. A more detailed proposal for an agro-industrial combine in the Beka'a Valley with terms of reference has, therefore, been included in this report.

4. Domestic meat demand

The following section is based on data supplied in Mr. R.A. Karaoglan's 'Economic analysis of Lebanon's meat requirements' (Beirut/Sept. 1970), in which the consumption of meat and meat products during the three-year period 1967-69 is reported to have averaged 41,000 tons annually, which is slightly higher than the figure quoted by Mr. A. Saad.

80 per cent of Lebanon's meat requirements is imported: 80 per cent livestock, 20 per cent chilled, frozen or preserved meats. Net imports of live animals have decreased somewhat slightly, whereas imports of chilled, frozen or preserved meats have increased from 3,500 tons in 1962-64 to 7,100 tons in 1967-69.

The value of imported meat rose by 52.6 per cent in three years, i.e. from L£ 57 million in 1962-64 to L£ 87 million in 1967-69, the main supplier being Europe and USA.

There are three groups of meat producers in Lebanon: the nomads, dairy farmers and merchants. The nomads drive their flocks down from Syria and let them graze for two or three months before taking them to the slaughter house. The dairy farmers tend to fatten calves as a side line, whereas the merchants import cattle and sheep in bulk from Turkey and Syria and sell them to the slaughterhouses after a brief fattening period.

Thus, the following conclusions may be drawn:

1. Meat produced in Lebanon today cannot yet compete with imported frozen meats; hence no harm is done if imports continue.
2. Animal feedstuffs still have to be imported so that the contribution to the national economy is negligible as long as the Lebanese produce meat under the prevailing conditions.
3. Consequently, animal feedstuffs must be produced on a large scale, fattening operations started and marketing costs reduced if increased domestic meat production is desired.

The pessimistic attitude in the first conclusion is untenable and represents a serious obstacle to further development of the Lebanese meat industry. However, the problem can be solved as shown by the poultry industry which expanded by 50 per cent in 3 years from 11,000 tons produced in 1962-64 to 17,000 tons in 1967-69. Unfortunately, there is no modern meat-processing industry capable of utilizing all the animal raw material on an integrated agro-industrial basis in Lebanon at present.

III. MILK PRODUCTION AND PROCESSING

1. Production

The production of milk and dairy products is declining relatively, and the Office for Animal Production gives the following reasons.

- a. Milk prices have remained unchanged for 20 years.
- b. Animal feedstuffs are more expensive.
- c. Labour costs have increased.

The number of dairy cattle has decreased, while milk production has increased from 32,500 tons in 1959-61 to 62,300 tons in 1965-67, the individual milk yield per cow rising to 3,043 kg/year. The number of sheep, however, has increased: today they total 200,000 head as against 40,000 in 1960. The market prospects of the sheep milk's cheese produced by the small dairy farmers in the Bekaa Valley (Halloum, Kariché, etc) are good.

2. Dairy industry

There are only two modern dairy plants, each with a capacity of 4 tons/hour of pasteurised or sterilised milk based on imported powdered milk. Dry milk imports rose from 13,000 tons in 1960 to 167,000 tons liquid milk equivalent in 1967. FAO/UNICEF provided technical assistance to improve milk production and processing and the newly established Milk Council (APO) proposed numerous administrative measures, its policy being inter alia:

- a. to control the importation of powdered milk;
- b. to subsidise the price of local fresh milk;
- c. to impose import duties on 5 lb tins of powdered milk to make fresh milk competitive.
- d. to promote training schemes, demonstration centres, cold storage areas, etc.

In its present form, the policy is reminiscent of the methods adopted by the European countries in the early days of subsidization a hundred years ago which have presented such insuperable problems that milk production in Europe today depends upon subsidies derived from profits gained in other sectors of the economy (industry, services).

Another characteristic of the dairy industry in Lebanon are the huge quantities of imported butter and cheese.

Consumption of butter and cheese

Dairy products	1967 (tons)	in liquid milk equivalents
Butter	57,000	
<u>Butter (fondu)</u>	<u>22,000</u>	
	79,000	

Cheese (95 per cent imported) 91,100

A definite dairy industry development policy is still lacking. In 1962 a report was prepared by two UNICEF/FAO experts, Messrs. Guérault and Knutrud, but the programme was not implemented after submission to the Government as the findings and recommendations were not in keeping with actual conditions in Lebanon. The authors proposed the establishment of numerous new dairy plants (Beirut, Tripoli, Saida, Terbol, etc.) even though there was no market for the expensive locally produced milk and the imported liquified milk powder was highly competitive and popular. They proposed a host of administrative measures, including the setting-up of a Conseil Supérieur du Lait which was subsequently established to co-ordinate programme planning and implementation. Nevertheless, no programme was ever devised which was self-sufficient and profitable to such an extent that spontaneous growth could be assured and profits reinvested for further development.

IV. SUGAR INDUSTRY

The Lebanese sugar industry is faced with countless difficulties. Domestic consumption is high: in 1966 the per capita consumption was 40.7 kg, i.e. total consumption of 62,800 tons, and it has been increasing at the rate of 20 per cent per year for the last ten years.

There are three sugar factories: two refine imported sugar and the other in Anjar (Beka'a Valley) extracts sugar from local sugar beet. Sugar refining is a profitable business for the refineries as well as the Government which receives LP 30 per kg refined sugar. Some 50,000 tons of refined sugar are produced annually, of which only 20,000 tons are beet sugar.

Furthermore, there is a conflict of interests between the sugar beet growers and the sugar factories which are not dependent upon the growers' supplies. Raw sugar supplies from abroad are steady, operation is year round and the investment/turn-over ratio is far more advantageous than in beet sugar factories. Although an intensive sugar beet programme would benefit the agricultural industry and alleviate certain social problems, the Government is very much aware that it would mean the end of the fiscal revenue currently derived from raw sugar imports and the State would have to subsidize domestic growers if prices were to remain competitive.

The situation has been exacerbated by the domestic sugar beet growers who as early as 1968 produced 120,000 tons and oversupplied the plant at Anjar, intimating that they would establish an independent plant unless their wishes were respected and the existing sugar factories extended their capacities. For socio-political reasons both the Ministry of Agriculture and the Government tend to be amenable to local growers' demands.

Sugar beet yields in the Bekaa Valley are quite good and average 50 t/h with a sugar content of 15-18 per cent. Planting starts in February or March and harvesting in October; the campaign is comparable to those in Italy, Spain Yugoslavia and particularly Israel.

A study commissioned by the Lebanese Ministry of Planning on possible industrial investments, which was prepared by ^{the} Economic Research Institute of St. Joseph's University, gives details of the high prices involved in sugar beet production⁽¹⁾ and confirms the conflict of interests described above.

Sugar beet with 15.5 per cent sugar content costs LR 6 per kg, hence the raw material costs for 1 kg refined sugar are LP 38.7. The current factory selling price is LP 62 per kg and the refinery complains that sugar beet prices are too high as it leaves only LP 23.3 to cover production costs, etc. However, calculations made by the Rural Economic Institute show that ^{the} plant still has a capital return of 8.49 per cent.

The growers wish to establish a factory with a daily capacity of 1,500 tons and plant at least 5,000 ha on a fully mechanised basis.

The sugar industry, however, could be encouraged to use by-products and diversify its range of products. For every ton of sugar produced, there is a quarter of a ton of molasses containing vitamins, nutritive salts, as well as 50 per cent sugar and glucose, which can be used in various ways. It is mainly used to feed livestock but can be dried for other uses. Sugar can be converted into detergents far superior to those on the market today, or fermented to produce yeast, ethyl alcohol or other potable liquors, while sugar beet flakes are another excellent feedstuff.

(1) see page 158

Various sectors of the sugar factory can be used during the off-season for other purposes: power-station, water supply, workshops, transportation, production of CaO and CO₂, etc. The labour force could be allotted to other agricultural sectors during the above period.

V. OTHER AGRO-INDUSTRIES IN LEBANON

Agro-industrial production in Lebanon fluctuates unexpectedly and lacks long-range objectives. Typical examples are:

1. Apples

Lebanon wished to take advantage of its varied climate and grow apples on a large-scale for export to Jordan, Saudi Arabia, Syria and UAR. Originally intended to offer the rural population in the upper regions of the country with a new source of income, production was extended to the valleys and a glut of apples is the outcome.

2. Onions

Encouraged by the apparent demand for dehydrated onions and other vegetables, several dehydration plants were established in the Beka'a Valley. The market suddenly vanished and some plants had to close down.

3. Sunflowers and hemp

A sunflower production programme has been initiated in an attempt to stop hemp being grown in ^{the} Beka'a Valley and upper Beka'a area. Although sunflowers are a profitable crop, growing hemp and smuggling hashish are even more lucrative activities which can only be stopped by strict control, a difficult proposition in Lebanon, or by offering the growers real economic advantages in another agro-industrial sector.

VI. AGRO-INDUSTRIAL COMPLEX

1. Preliminary observations

It is quite clear that Lebanon needs to readjust its long-term planning and programming in the agricultural and agro-industrial sectors. As a profit-oriented country, Lebanon should be able to adapt to its own needs the modern principles of agro-industrial integration.

The basic principle of the integrated agro-industrial approach is stimulation of the marketing sector. Modern agro-industry is no longer solely a producer's economy; it is greatly influenced by the buyer as products only become profitable after the consumer has been convinced by price and quality.

Lebanon, therefore, should locate regular profitable markets for their agro-industrial products and assess acceptable qualities, prices, seasons, packaging, etc. for each item. Only after the products have been assessed and a regular demand ascertained, is it possible to specify the processing facilities needed and prepare a long-range agricultural production programme to meet the raw material requirements.

The procedure described above should completely or partially replace agricultural development based on so many different criteria. Regular profits cannot be obtained if production is started merely because:

- a. a particular soil yields good crops.
- b. the climate is conducive to production
- c. water is available or money has been invested in irrigation.

Lebanon is in a good position as the domestic market which is currently neglected could offer an excellent basis for agro-industrial development.

As evidenced by increased imports, which have reached an annual value of US\$ 30-40 million, there is a steady demand for meat, dairy products, sugar, feedstuffs and hardened oils.

The aim of the project, therefore, is:

- a. to meet the existing demand of the steadily growing Lebanese market by offering acceptable prices, quality and assortment, which would not only reduce imports but also lead to the creation of a highly efficient domestic agro-industry with all the attendant social and political benefits.
- b. to establish an integrated food factory complex in accordance with the most modern economic and technological findings, the capacity of which will be suited to the demand of the local Lebanese market and of the neighbouring markets to be established on the basis of the newly established production.
- c. to streamline agricultural production to provide the above industrial complex with high-quality, low-priced agricultural products to be utilized with all their by-products.
- d. to establish a marketing organization to supply the local market with fresh, semi-processed or ready-made commodities via its own distribution network, avoiding all middlemen and ensuring that part of the net profits are re-invested in various sectors of the integrated agro-industrial organization to provide ^{incentive} and help improve, rationalize and broaden the production programme.
- e. to establish a management body responsible for the financial, technical and economic management of the whole complex to co-ordinate the whole system thereby enhancing the production programme, improving the utilization of raw material, human resources and invested capital and exploiting openings in the market.

2. The establishment of an agro-industrial complex

Before any steps can be taken to set up a complex of this kind, certain political, social and technological problems have to be solved.

a. Socio-political problems

An agro-industrial complex can be owned by the state, a joint-stock company, private individuals or a co-operative organization. The question of ownership should be decided before a detailed programme is prepared, and in view of the political and social implications the decision should be taken by the authorities or persons concerned.

b. Technological problems

The fundamental technological and economic features of an agro-industrial complex are the same irrespective of the form of ownership.

- i) There should be a single director for overall financial, technical and commercial management.
- ii) The system should allow for independent decisions within the different sectors (agriculture, pre-processing, processing, marketing and distribution) to encourage individual initiative. At the same time there should be a central planning and accounting unit to ensure the correct re-investment of market gains in the individual sectors.
- iii) The land for agricultural production should be homogenous, suitable for mechanised cultivation and the application of modern agricultural techniques, and located close to the processing facilities.
- iv) Transportation within the complex, and repair and maintenance services should be independent services embracing the whole operation.

- v) As the marketing and distribution system is the most important part of the complex, it should be able to impose its demands on other sectors by virtue of its experience.
- vi) Numerous centralized services are required, e.g. stockkeeping of materials, spare parts, etc; quality control laboratories; various research facilities; staff training facilities; public utilities (water, electricity, etc.) and security services.

3. Planning and programming of the agro-industrial complex

Planning and programming methods are best shown in the terms of reference attached to this report (Annex 2) which mention the basic requirements.

Lebanon, unlike many other developing countries, has adequate supplies of hard currency which permit the implementation of an agro-industrial complex in two or three phases. In the first stage, production could be started using imported raw materials without having to wait for local prices to drop to an acceptable level, as is the case with soy beans in Denmark, Germany and Sweden. In the second stage, after the application of modern agricultural methods has led to improved domestic yields, production could switch to local raw materials. The production of soy meal, vegetable ghee, soy feedstuffs, meat and meat products will bring the country the benefit of greater profits, more employment and a better balance of payments.

The scheme has five levels of production (see Annex 3).

(A) Production of field crops

Modern agricultural techniques will be applied to the land owned or managed by the agro-industrial complex to ensure an adequate supply of raw material to the sugar-beet plant, vegetable-oil factory, animal feedstuff plant, fruit and vegetable processing factory and the ready-made food sector.

(B) Preservation and pre-processing of crops

All the crops obtained in the first stage as well as those delivered by co-operatives and individual farmers under contract are dried, pre-processed, stored or siloed. This stage also includes the storage of imported raw materials (soya, etc.) and raw material for the animal feedstuff plant.

(C) Animal feedstuff plant

This is the central feature of the complex as it produces feedstuff mixtures for the whole complex and feedstuff concentrate for sale to the poultry industry. Feedstuffs and concentrate, including trace elements, antibiotics, vitamins, enzymes, etc., are also sold to local farmers and co-operatives in exchange for milk, young livestock and contracted crops. The agro-industrial combine also offers private farmers and co-operatives all other necessary services, such as: credit and training facilities, pest control, fertilizers, seeds, veterinary and sanitary services, ploughing etc. The aim is to gradually increase local farmer and co-operative participation so that in the course of time the agro-industrial complex assumes the role of area developer and financier.

(D) Industrial ranching system

This sector comprises two activities: dairy farming and the fattening of high-quality animals. Thousands of dairy cows supply the dairy plant with its daily requirements; the animals are specially selected, fresh stock being raised elsewhere or imported.

In the fattening sector, livestock is imported (Turkey, Syria, etc.) or purchased from co-operatives and local farmers, kept on a holding ground or fattened in pens before moving on to the processing plant. The pig farm, however, has its own litter pens for raising piglets from birth.

(E) Food processing

This sector comprises a sugar factory, vegetable-oil factory, dairy plant, fruit and vegetable processing factory, meat processing factory and a ready-made food plant. The modern commercially oriented plants manufacture products of international standard. Although the management is centralized, each sector is responsible for its success.

(F) Marketing

The agro-industrial complex has its own marketing organization suited to the plants' requirements. Its primary aim is to ensure optimum distribution of finished goods to the consumer directly. The exclusion of middlemen will not be easy in Lebanon but should succeed if adequate incentive is given to the primary producers.

4. Timing of the project and procedure

The plant must be developed as a homogeneous programme, yet may be initiated in many different ways. Starting, for example, with the sugar factory, the vegetable-oil factory and the animal feedstuff plant, initial production can thus be limited to sugar, vegetable-oil products and animal feedstuffs before expanding to include finalizing sectors. The programme can start on its own land with or without the collaboration of co-operatives or private farmers.

The consultants must elaborate the plan of the complex primarily on the basis of marketing and economic analyses, and not on the basis of social or political reasons. The latter should be taken into consideration by the Government when taking the final decision to implement the programme. Obviously the materialization of the project must be subdivided into two or three stages, but the fact remains that it is only the finalization of goods into profitable ready-made foods that ensures lasting and optimum results for the projected agro-industrial complex.

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
UNITED NATIONS DEVELOPMENT PROGRAMME
Special Industrial Services
Project Data Sheet

1. Reference Data

Country: Lebanon
Project Title: Exploratory Mission on Sugar Industry Development
Project Number: UNIDO Ref.: 71/360 LEB (11)
Origin and Date of Request:
Purpose of Project: Assistance by means of an exploratory mission on the development of the sugar industry and preparation of the terms of reference for further assistance.

2. Background Information: Lebanon consumes annually about 60,000 tons of sugar processed from domestic beet production. The Government assigns a high priority to the development of beet sugar production in order to face the market's expanding needs and upgrade land utilisation in the Bekka region.

3. Description of the Project: The services of an exploratory mission by a UNIDO staff member will be made available to the Government of Lebanon to assist in the following tasks:

- (a) Assess the general technical conditions of the existing sugar plant;
- (b) Taking into account projection of the demand, review and assess the possibilities of further expansion in the beet sugar industry in Lebanon;
- (c) Prepare the terms of reference for further assistance related to the establishment of new sugar processing facilities in the context of the viability of utilisation of additional acreage for beet production.

4. Project Budget:

<u>Components</u>	<u>Duration</u>	<u>Cost</u>
Food Technologist	2 - 3 weeks	US \$880.-

5. Request Approved:

FOR UNIDO

Date: 11 June 1971

22 July 1971

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
UNITED NATIONS DEVELOPMENT PROGRAMME
REQUEST FROM THE GOVERNMENT OF LEBANON
FOR
SPECIAL INDUSTRIAL SERVICES
FOR THE

PREPARATION, BY A CONSULTING COMPANY, OF A COMPREHENSIVE MASTER PLAN,
SUPPORTED BY TECHNICAL AND ECONOMIC FEASIBILITY STUDIES,
FOR THE ESTABLISHMENT OF A MODERN AGRO-INDUSTRIAL COMBINE
IN THE BEKAA AREA, LEBANON

TERMS OF REFERENCE

1. Description of the Project:

The United Nations Industrial Development Organization, under its Special Industrial Services Programme of Technical Assistance, is to assist the Government of Lebanon by providing it with a comprehensive master plan, supported by technical and economic feasibility studies, for the establishment of a modern agro-industrial combine located in the Bekaa Area, Lebanon. The master plan will consist, inter alia, of individual feasibility studies for (1) the establishment of food processing industries to produce the products for which a proven market demand exists, and based on the raw materials, which are to be produced for their use and according to their specification by the combine, and by sub-contractors under certain circumstances; (2) the production of the raw materials specified by said industries; (3) the establishment of a livestock ranch using industrial methods for breeding and fattening high-quality animals; (4) the re-organization and establishment of various processing plants for the sugar, vegetable oil and feedstuff and citrus industry; (5) the establishment of secondary and complementary manufacturing industries and (6) the establishment of allied "service" industries.

/....

The principal criterion to be used for establishing the combine is that it shall provide an acceptable rate of return on the investment required. The Government intends to use the master plan prepared by the consulting company as a "model" for the development of more agro-industrial combines and, wherever feasible, to incorporate them in the country's development programme.

2. Concept of an Agro-Industrial Combine:

The concept of an agro-industrial combine, which is endorsed by the Government of Lebanon, is described hereunder and is to be used by the consulting company as a guide for the preparation of the master plan.

Agro-industrial development entails the vertical integration of the complete food-production process from the field to the final consumer. Vertical integration means that all stages of the production process are planned, organized and controlled by one organization which has an industrial market-oriented approach and plans its production policy to meet a proven market demand for its products. The basic theory behind vertical integration of this kind is to produce and process food products at the lowest possible unit cost and to obtain maximum profits from their sale which can be partly reinvested in other projects for the benefit of developing the country's economy. The principal criterion for establishing an agro-industrial combine is that it shall provide an acceptable rate of return on the investment required.

An agro-industrial combine is an integrated enterprise which engages in the production of agricultural raw materials and their processing into final products and by-products which are packaged and marketed by the combine. The combine is based essentially on the production of its own raw materials, and only buys raw

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materials and services from outside suppliers if it is more economical, or if, by so doing, the combine can expand its capacity and positively influence the growth of the regional and national economy.

The planners of a modern agro-industrial combine must essentially be market-minded. They must thoroughly investigate and analyse the existing and future market demand, both domestically and on world markets, to ascertain which products they should produce to meet the demand. They must then assess which of the products in demand are likely to be the most profitable to produce. They must then investigate the possibility of the large-scale industrial production of the raw materials required for the production of the products in demand, and estimate the cost of producing the quantities and qualities of raw materials required, and delivering them to the processing plants in accordance with a planned time-table. The planners then select the optimum-size processing plants which will allow the complete utilization of the raw materials to be produced for the production of final products and by-products. At the same time the planners will design a balanced programme of agricultural production by the combine suited to the needs of the processing plants which they have selected, but which would not preclude the purchase of raw materials from sub-contractors under certain conditions. The planners will then calculate the final investment required for the processing and distribution facilities, and estimate the final costs of production. They are then in a position to study the market for a second time, taking into account more clearly defined quantities, qualities, prices and market timing. The second market study will confirm the viability or otherwise of the production programme envisaged, and will indicate the minor or major corrections which may be required throughout the integrated planning process to adapt it to meet market demands.

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3. Background Information:

It is the Lebanon Government's opinion that the establishment of agro-industrial combines will represent a major economic break-through and will open up new opportunities for the Lebanon economy. Agro-industrial combines, based essentially on an industrial market-oriented approach, will reduce the country's dependence on imports and encourage the growth and diversification of exports. According to the Government's views, agro-industrial combines should, wherever feasible, be incorporated in existing Development Schemes. The most suitable area for the establishment of a "model" agro-industrial combine is believed to be the Bekaa region of the country where an area of over 20,000 hectares has been provided. This area has irrigated land, large fruit orchards, and some industrial plants, such as a sugar factory, and the basic infra-structure required. The consulting company is required to take the existing facilities into consideration when preparing the master plan.

According to recent studies authorized by the Lebanon Authorities, a primary objective of the combine should be the establishment of a livestock ranch using industrial methods for breeding and fattening high-quality animals in order to produce processed meat, suitable in terms of quality and price, in comparison with the imported meat. In this connection the possibilities of expanding the sugar industry and the production of forage crops and citrus fruits and vegetable oil-bearing materials should also be studied as well as the re-organization of the vegetable oil and feed mill industry, and that the combine should utilize products and by-products produced by the food processing industries.

The Government will assign suitably qualified staff to assist the consulting company in carrying out its work in Lebanon.

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4. Responsibilities and Duties of the Consulting Company:

The consulting company will prepare a comprehensive master plan, supported by technical and economic feasibility studies, for the establishment of a modern agro-industrial combine in the Bekaa Area, Lebanon. The company will also be responsible for preparing the components of the master plan which shall consist of, but not necessarily be limited to, the following:

- (1) a market study, prepared in collaboration and agreement with the United Nations Conference on Trade and Development (UNCTAD), Geneva, to determine the products in demand which can be produced profitably by the combine. The markets studied should include (i) the Lebanon market; a (ii) the potential markets of the Arab States.
- (2) a technical and economic feasibility study for the establishment of optimum-size food processing industries to produce the products for which there is a proven market demand, and based on the raw materials which are to be produced for their use, and according to their specification.
- (3) a technical and economic feasibility study for the existing vegetable oil industry based on a proven market demand, and based on the oil-bearing materials which are to be produced for their use and according to their specification or on imported seeds (soyabeans).
- (4) a technical and economic feasibility study for the existing plants or the establishment of optimum-size plants for the production of animal feedstuffs primarily for use by the livestock ranch but also to supply other markets where there is a proven demand, and based on the use of the products and by-products produced by the food processing, sugar and vegetable oil industries;

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- (5) a technical and economic feasibility study for the establishment of an optimum-size dairy products plant;
- (6) a technical and economic feasibility study for the establishment of an integrated optimum-size meat processing plant including a slaughterhouse and leather tannery;
- (7) a technical and economic feasibility study for the establishment of an optimum-size additional sugar factory, and/or the expanding of the existing enterprise.
- (8) a technical and economic feasibility study for the establishment of an optimum-size citrus fruit processing plant.
- (9) a technical and economic feasibility study for the establishment of an optimum-size plant for the manufacture of agricultural implements, machinery and equipment primarily for use by the combine but also to supply other markets where there is a proven demand;
- (10) a technical and economic feasibility study for the establishment of optimum-size secondary and complementary industries to utilize the non-edible raw materials available in the area in which the combine is to be located; and for which there is a proven market demand.
- (11) A technical and economic feasibility study for the establishment of "services industries" specifically designed to "service" the combine;
- (12) a technical and economic feasibility study for the establishment of an optimum-size "livestock ranch" using industrial methods for breeding and fattening high-quality animals.
- (13) an agro-economic feasibility study for the production and pre-processing of the vegetable and animal raw materials specified by the food processing industries which are to be established;

- (14) a report on the existing production facilities already located on the ear-marked land in the Bekaa area, which has been allocated for use by the combine. In this report the consulting company shall state whether these existing production facilities can be technically and economically integrated into the combine in their present form, or by re-organisation, and if so the company should prepare a plan for integration. If these facilities cannot be integrated into the combine the company should state the reasons why;
- (15) a plan for the marketing and distribution of all of the products to be produced by the combine;
- (16) a financial and economic analysis assessing the financial viability and the economic justification for the establishment of the combine;
- (17) a plan for the organization, management, staffing, operation and training of personnel for the combine;
- (18) a review of existing laws, regulations, and taxation to determine any constraints which would affect operating the combine in the most efficient and profitable way (e.g. restrictions on exports, etc.);
- (19) a draft plan for the technical assistance required by the Government for implementing the master plan to establish the combine;
- (20) a plan for establishing the combine in a logical sequence of two or more stages showing the investment required for each stage. The plan shall include a Critical Path Analysis Network to timetable all of the activities involved in the task of establishing the combine;

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- (21) a plan for the marketing of raw materials, both vegetable and animal, during the period prior to the establishment of the food processing industries;
- (22) a system of accounting specially designed for the financial control of the individual plants which comprise the combine, and also for the combine as a whole;

IMPORTANT:

- (1) The components of the master plan listed above are not necessarily exhaustive of those required for the preparation of the master plan. The consulting company is required automatically to collect, analyse and present any additional information which it considers essential for the preparation of the master plan.
- (2) In preparing the technical and economic feasibility studies mentioned above the consulting company shall specify each item of machinery and equipment required for the plants and agricultural production, and for the storage facilities, including equipment for materials handling and the vehicles required for collecting raw materials and delivering finished products. The US\$ C.I.F. price Lebanon of each item of machinery and equipment specified must be stated. Also recommend a two-year supply of spare parts for the machinery, equipment and vehicles specified and state the cost. The machinery and equipment specified must be new, modern in design and utilize up-to-date methods of processing, resulting in the maximum yield of final products and by-products.
- (3). The consulting company shall use the Discounted Cash Flow (DCF) principle and method of investment appraisal and determine the rate of return on capital to be invested in the combine.

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- (4) The master plan report, and the feasibility studies, shall contain all of the data which has been used as the basis for preparing them and they shall also contain:
- (a) a statement showing the total investment required in which the foreign exchange required is shown separately;
 - (b) a statement showing the proposed financial structure;
 - (c) capital-cost estimates;
 - (d) working capital requirements;
 - (e) a pro-forma Cost of Production and Profitability Statement;
 - (f) a pro-forma Profit and Loss Statement;
 - (g) a pro-forma Balance Sheet;
 - (h) pro-forma Cash Flow Estimates;
 - (i) a statement showing the rate of return on capital invested, calculated in accordance with the Discounted Cash Flow (DCF) principle and method of investment appraisal;
 - (j) estimates of pre- operational costs and start-up expenses.
- (5) The master plan report must also include a "Summary Chapter" containing all of the information necessary to facilitate the work of those responsible for deciding whether or not it is technically, economically and financially feasible to establish the agro-industrial combine.
- (6) The consulting company is also required to cross-reference the work performed with the work specified in this Terms of Reference. this cross-referencing should be presented in a separate supplement to the master plan report.

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5. Language Qualifications required of the Consulting Company's Field Staff:

English. (French would be a special asset).

6. General Programme Schedule:

- (a) The consulting company's personnel, who are to be responsible for executing this Project, are to be available at the offices of UNIDO, Vienna, and subsequently at the offices of FAO in Rome, UNCTAD in Geneva, and UNDP in Lebanon, within a maximum of fourteen days from the date of signing the contract, for full briefing, the collection of information which these organizations can supply in connexion with this project, and an exchange of views;
- (b) The field work necessary for the collection of the data required for the preparation of the master plan is to be completed within 45 days from the date of signing the contract;
- (c) On the completion of the field work the consulting company shall prepare a brief report on the field work carried out; four copies should be sent to UNIDO. UNIDO will send a copy of these reports to UNCTAD and FAO for information;
- (d) All reports prepared by the consulting company shall be written in the English language;
- (e) The consulting company shall submit to UNIDO eight copies of the draft of the master plan report within 150 days from the date of signing the contract. UNIDO will send one copy of these reports to UNCTAD and FAO for comments;
- (f) UNIDO, UNCTAD and FAO will prepare their comments on the draft of the master plan report within twenty-one days of receipt;

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- (g) The consulting company's personnel shall be available at the offices of UNIDO, Vienna, to discuss the draft of the master plan report with UNIDO at a date and time to be arranged by UNIDO;
- (h) The consulting company shall take into consideration the comments made by UNIDO, in preparing the final master plan report, which shall be submitted in twenty-two copies to UNIDO within thirty days after the completion of the discussions referred to in paragraph (g) above. UNIDO will send copies of this report to UNCTAD and FAO for information.

23 July 1971

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
UNITED NATIONS DEVELOPMENT PROGRAMME

DRAFT PROJECT DATA SHEET

1. Reference Data:

Country: Lebanon

Project Title: Feasibility study for the establishment of a model agro-industrial combine.

Project Number: - UNDP Ref;

- UNIDO Ref:

Origin and Date of Request: Ministry of National Economy

Purpose of the Project: The preparation of a feasibility study for an integrated agro-industrial complex and the training of counterparts.

2. Background Information: Lebanon has by now a population of about 2.8 million with an annual growth rate of some 2.5%. The total area of the country is about 4,300 square miles, but less than 400,000 ha. are being cultivated because of its mountainous character.

According to official estimates, the per capita G.D.P. exceeds US \$400, the highest in the Arab world, except the oil-rich States. There is, however, a marked disproportion of income between the different sectors of economy.

The trade and services sector with the fast growing urbanisation contributes over $\frac{2}{3}$ of the G.D.P., industry less than $\frac{1}{4}$ and agriculture, with the employment of over 50% of the working population about 12% only, and is permanently on the decline. However, Lebanon is still a predominantly agricultural country, but its agricultural production is not able to keep pace with the increase of population. An ever increasing amount of agricultural commodities for food and feed has to be imported every year. But the trade deficit in this category alone is nearing the US \$100 million mark, the bulk of which is attributable to the import of livestock for slaughtering and of milk and other dairy products. The local production of meat covers less than 20% (by tonnage) of the requirements (ca 50,000 ton/an), and that of milk and dairy products about one third, (ca 250,000 ton/an liquid milk equivalent), but by value the discrepancy is aggravating from year to year because of the serious price increases on world markets. A considerable part of those imported commodities is earmarked for the provisioning of the tourist trade, which is an ever-growing factor for the economy of Lebanon.

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Lebanon has an expanding sugar consumption of some 60,000 tons per annum, half of which is covered by the local production from domestic sugar beet in a factory in Zackle, while the rest is provided from imported raw sugar and refined in three local sugar refineries. There is an inclination to expand the beet sugar production, the commercial viability of which is highly controversial and questionable, unless it is co-ordinated within an agro-industrial master plan to assure the best utilization of all crop particles and of all up-graded by-products.

A similar situation is met with in the vegetable oil industry, which depends largely on the importation of oilseeds. While there is a large excess of installed processing capacity, most of which is technically outdated and consequently inefficient, there are still several thousands of tons of oils and fats being imported annually.

Lebanon is self-sufficient in fresh fruits and vegetables, which also consists the main export trade of the country. However in order to develop this branch, Lebanon would have to follow the general trend of industrial processing, which is still in its infancy. But here again the economics of the industries could only be ascertained if programmed and included in a general agro-industrial master plan.

On the other hand, the poultry industry has had a spectacular development in recent years, meeting the full supply of domestic needs and a considerable export of eggs. This is the result of the establishment of well-equipped feed mills, which again largely depend on the import of soyabean meal and other ingredients, while large amounts of residues from the vegetable oil industry are being sent abroad.

The Lebanon statistics disclose that among the full intake item of an average family, the major expenditure is for meat and meat products, followed at a far distance by fruits, bread and cereals, vegetables and milk and milk products. Two-thirds of the fresh milk is consumed by the villagers, indicating the prevailing subsistence economy. Recent studies have shown that there is little prospect, with the prevailing traditional system, for competitive domestic meat production, not only because grazing land is scarce and the bulk of feed has to be imported and is expensive and a growing strain on the foreign currency allocation for it. In addition to the high production costs, there are also credit problems and inadequate and costly marketing system. The same applies to the supply of dairy products. The solution for this intricate position may be found by the establishment of an integrated agro-industrial complex (or complexes), which entails the vertical integration of the whole food production process from the field to the final consumer by an industrial approach.

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This includes the production of programmed forage crops and the maximum utilization of all available economical feeds, co-ordinated by a master plan of production.

The establishment of such a system in the Bekaa upland, where there are sufficiently large arable land tracts available, would also have the benefit of preventing further migration into the urban areas.

3. Description of the Project: A consulting firm will supply the services of: (i) an industrial economist; (ii) an industrial engineer (food technologist); (iii) an industrial agronomist; technologists (e.g. meat, technologist, animal feedstuff technologist, vegetable oil technologist, etc.) who may be called upon to assist in the selected programme of work.

(i) The industrial economist should be fully conversant with the issues of rural development and the problems facing the rural institutions (co-operatives) of the country. His main task should be to devote himself, in close co-operation with the other members of the team, to the economic calculation of the feasibility study to be prepared.

(ii) The food technologist is to be the team-leader and should obtain all the data necessary for the selection of the best locations. He should indicate the capacities to be expected and ensure the provision of all the data needed for the economic assessment.

(iii) The industrial agronomist should have a dual function. He is to survey both the existing and potential crop and land-utilization patterns, including animal husbandry, that can be deemed technically feasible and economical, in order to establish the raw materials and by-products most suitable for inclusion in the agro-industrial programme selected. As a specialist for the supply of raw materials to the food industry and other agro-related industries, he should also assess the investments and other agricultural implements required for the elaboration of the complex feasibility study.

The consulting firm will:

(1) Make themselves acquainted with the previously prepared studies and investigations for the agro-industrial development in Lebanon. In particular, they will make a close study of the locations proposed by the Lebanon Authorities for agro-industrial combines and ascertain whether they are based on sound, realistic criteria. They will make analyses of the existing industries and of the envisaged enterprises, and will establish the possibility of training a group of counterparts who could assist and then continue with other feasibility studies in the agro-industrial field.

(2) Based on the available information on the market and on the analysis under (1) above, the consultant will elaborate a detailed feasibility study for the establishment of an agro-industrial combine in the Bekaa area. Special attention will be given to the most production and processing, to the sugar industry, vegetable oil industry, dairy industry. The agricultural products to be cultivated as raw materials for the processing industry will be indicated (fruits, vegetables, cereals etc.). For each case they will establish: the best location, the area of land required, the infra-structure (roads, water, energy), the production programme (quantities and qualities). They will specify the investments needed for equipment, storage and pre-processing, the processing plants to be established, and the manpower required. Maximum utilization of waste and offals, the up-grading of by-products and derivatives will be taken into account, the most suitable organization structure and managerial expertise required will be described, as well as the accounting system adequate to ascertain the profitability of each branch and of the combine as a whole.

4. Project Budget:

Components:

Duration:

Cost:

Agro-industry (consulting firm)

US\$ 80,000

Agency Overhead Costs:

5. Request Approved

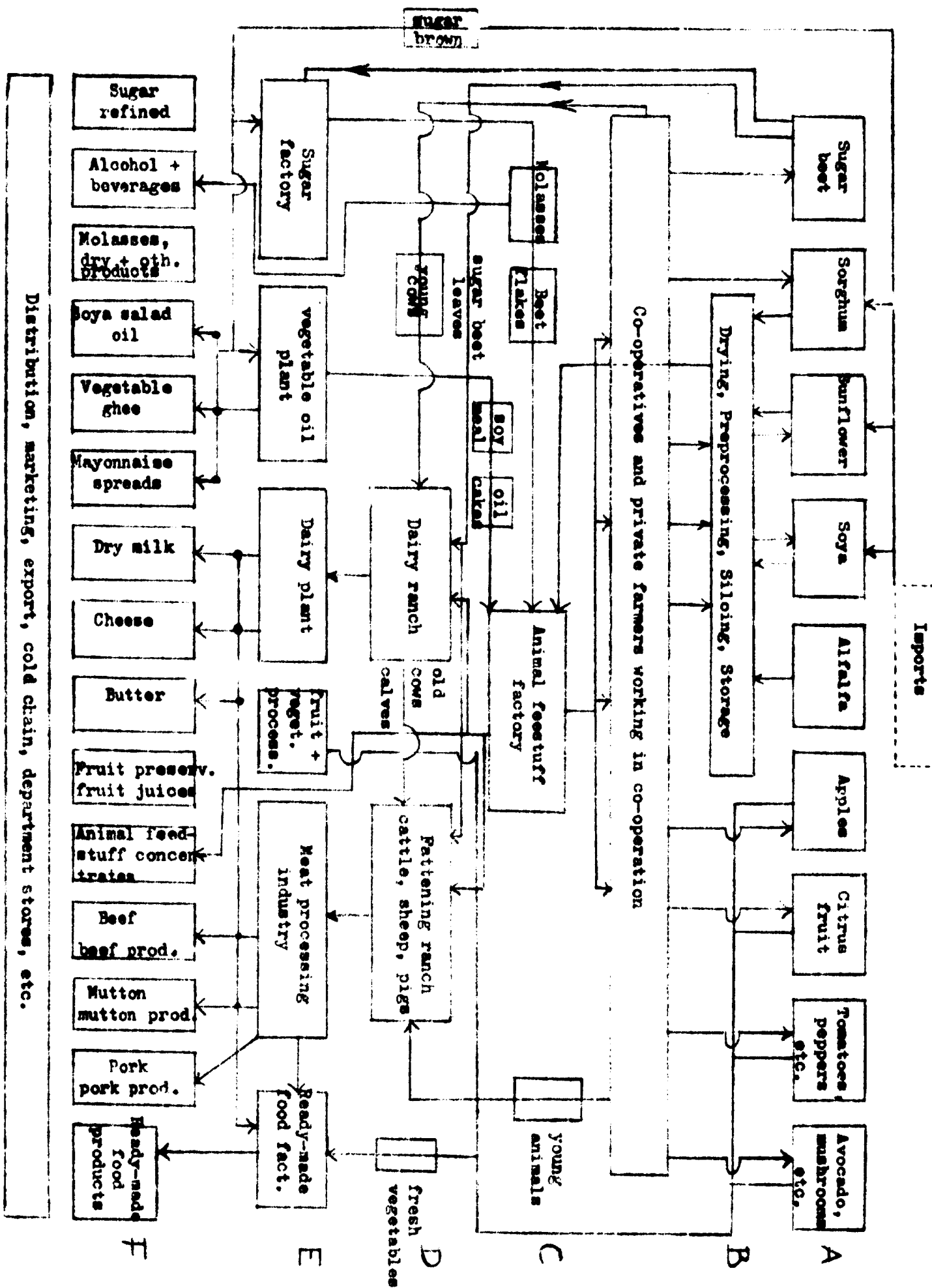
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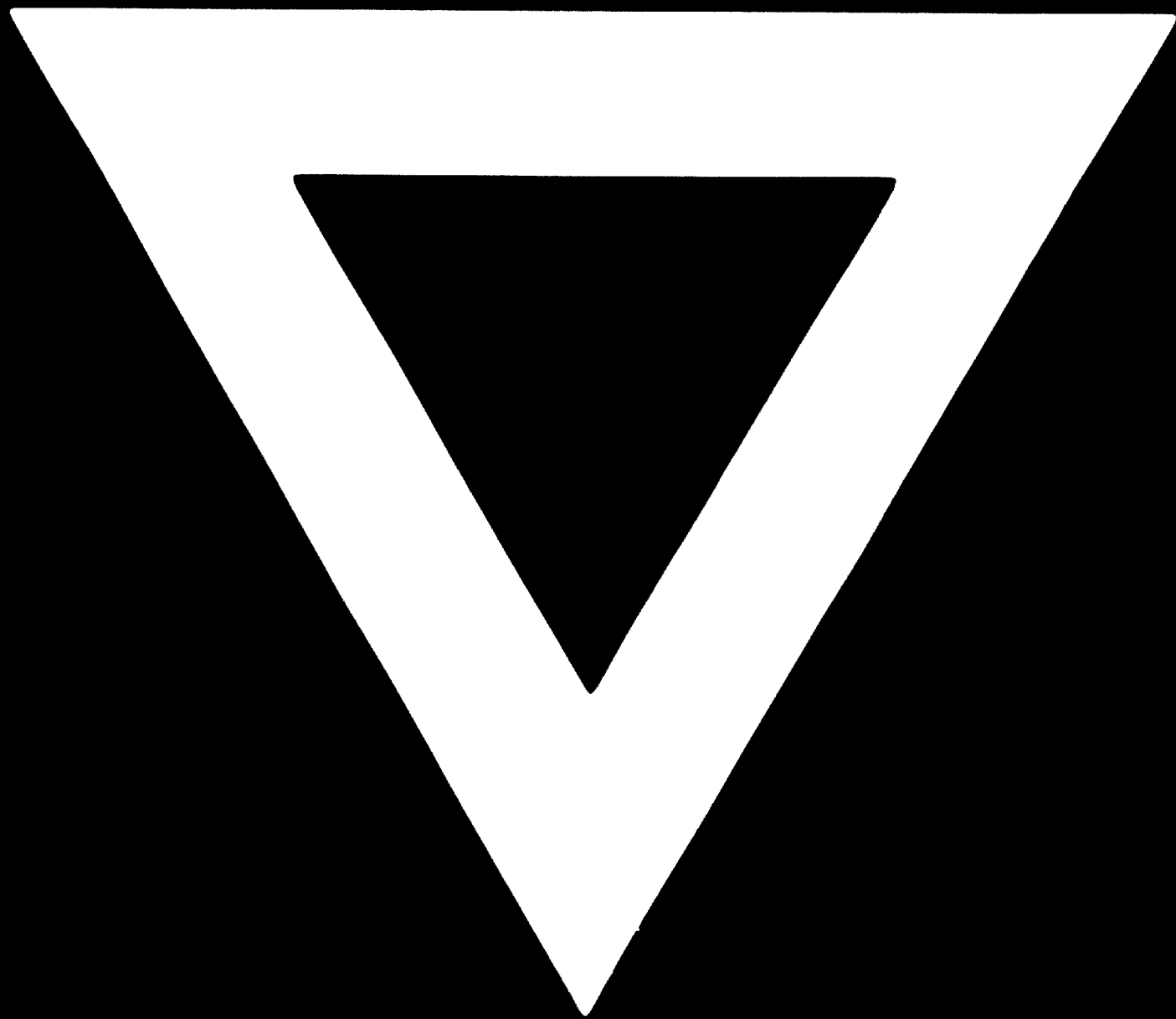
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Flow-chart for the agro-industrial complex in the Beka'a Valley



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