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THE VEGETABLE OIL INDUSTRY IN ARAB COUNTRIES IN WESTERN ASIA

I INTRODUCTION

This report is only concerned with the Arab countries in Asia, most of which belong to the Economic Commission for Western Asia (ECWA). For comparative reasons, other Arab countries in Africa are occasionally mentioned, but otherwise not considered. In a resumé made by the Industrial Development Centre for Arab States (IDCAS), and presented to the joint ECWA/UNIDO meeting on selected branches of the food processing industry in the Middle East, the total production of vegetable oil and fats in Arab countries was calculated at 470,000 t/year in 1970, and it was pointed out that approximately the same amount of crude oils and processed edible fats were imported. Furthermore, it was mentioned that the import of oils and fats would increase to approximately one million tons in 1985. In calculating this figure, the actual rate of increase in local production of oil seeds, and the increase in population as well as the estimated rise in the standard of living, has been considered. Although it has not been expressly mentioned in this resumé, the figures given seem to include the Arab countries in Africa, as they do not correspond with other available statistical data for the Arab countries in Asia.

From the surveys presented to the regional meeting in Beirut of the vegetable oil industry in the different Arab countries in Asia (ID/WO 201/2-4-7-9-10), it is seen that the actual annual production capacity of edible fats in the whole region (not including olive oil), is approximately 300,000 t/year and that this production is fairly evenly divided between Syria, Lebanon and Iraq whereas Jordan and Kuwait have only a very limited production and the other countries none at all.

However, only Syria bases its vegetable oil production mainly on locally grown seeds - all other countries are importing most of their raw material either as crude oil or, in the case of Lebanon, as soya beans.

According to "Trade Year Book FAO" Rome 1974, the total amount of imported crude oil was approximately 300,000 t/year. A further amount of 12,000 t/year of processed fat ready for consumption and approximately 25,000 t/year of butter, was imported.

During the years 1960 - 1970, the real increase in consumption was 44% in Iraq and 28% in Syria, or, on average, 7% per year. If we assume the same annual increase during the period 1973 - 1985, then the total consumption of vegetable fats would be nearly doubled to approximately 700,000 t/year. Under the assumption that the total population of the whole region would be about 60 millions in 1985, the per capita consumption would then be about 11 kg. per person per year, a figure which does not seem unreasonable, taking into consideration that Syria and Iraq already have a per capita consumption per year of more than 8 kg. and that most Western European countries have a per capita consumption of 20 - 25 kg. per year. As the local production of oil seeds today is already much too small to supply the vegetable oil industry with raw material for the production of the necessary amounts of edible fats to meet the consumption, it is completely unrealistic to believe that the region will be self-sufficient in oils and fats by 1985 even if several countries do already have established schemes or at least plans for an increased production of oil-bearing seeds. It must therefore be assumed, that at least 500,000 tons of crude oils, or a corresponding amount of oil-bearing seeds must still be imported by 1985. The amount of oil cake imported to the region as raw material for animal foodstuffs is 125,000 t/year ("Trade Year Book FAO, Rome 1974") and the actual production at least 150,000 t/year. Both Syria, Jordan and Saudi Arabia do however, have plans for increasing the production capacity for animal foodstuffs to 300,000 t/year at the end of the seventies and it therefore seems to be quite realistic to forecast a production of 500,000 t/year for 1975, only a small part of which can be supplied locally. Consequently, there is a very good case for establishing a couple of new solvent extraction plants to produce both oil and cake from

imported oil-bearing seeds. Theoretically, an extraction plant for imported soya beans with a capacity of 500,000 t/year would produce approximately 400,000 tons of cake, thus covering about 80% of the importation of this raw material for animal feedstuff needed in 1985 and 95,000 tons of oil corresponding to approximately 12% of the total oil consumption in 1985. If 500,000 tons of imported rapeseed was extracted, approximately 200,000 tons of oil and 300,000 tons of cake would be produced, or respectively 28 and 60% of the estimated consumption in 1985.

It is, of course, not conceivable that only one or two plants handling imported seeds or beans could supply the whole region with oil and cake. The large distances between the different countries of the region, transport difficulties and costs, the variety of economic conditions such as availability of foreign currency, the infra-structure in the different countries etc., make this unrealistic and impossible. However, the figures mentioned above indicate clearly enough the economic interest in local processing of imported seeds or beans.

Another point of view which must be taken into consideration when planning new factories, is the economy of scale in that factories that are too small are not economically viable. For the processing equipment itself, a rule of thumb is that the price of the equipment is only increased by about 50% if the installation capacity is doubled (see ID/WC 120/2, paper presented at the Expert group meeting on pre-investment considerations and economic production criteria in the oil seed processing industry held at UNIDO Vienna 16 - 20 October 1972).

Much the same is true of building, construction and erection costs, and practically no extra labour is required if the plant is laid out for a higher capacity from the beginning. Even if the economical calculations vary from case to case, it can be said that a vegetable oil refinery proper should, under no circumstances, have a capacity of less than 10,000 tons and preferably 20,000 tons or more of oil per year. A solvent extraction plant should have a capacity of at least 50 - 100,000 tons of seed a year and preferably 200,000 tons per year.

If we turn our attention to the utilization of the by-products, for instance soap stock or fatty acids, the advantages of bigger and more integrated industries are even more obvious. With proper modern technique, an oil refinery plant with a yearly capacity of 20,000 tons, treating crude oils of good quality with a maximum fatty acid content of 3%, the total amount of soap stock (dry matter) or fatty acids produced should not be more than 1/6 or approximately 1,000 t/year. Installing equipment for making soap out of such a small quantity of raw material, will inevitably have the consequence of high investment cost per produced unit of finished product. In even smaller refineries, the situation is of course further aggravated, and it becomes impossible to produce anything else than the cheapest quality of laundry soap. Even if there is still a market for this type of soap in the countries of the region, it should be remembered that the rising standard of living, and the increased sophistication of the consumer, will direct the market towards two main products i.e. a high grade toilet soap and an efficient washing powder. The cheapest raw material for the latter product is however, not fats or fatty acids, but petroleum. In most Western countries (as well as in Japan), the cheap laundry soap has virtually disappeared and the logic of the economy of scale has resulted in a concentration of the toilet soap manufacture to big factories having a capacity of at least 10,000 t/year.

Taking into consideration that the conditions vary extremely in the different countries of the region, more detailed recommendations can only be given for each country specifically. The factors which must be taken into consideration, are for instance, the type and amount of local production of oil bearing seeds, the possibilities for increasing cultivation of oil bearing seeds, with special attention given to climatic conditions and irrigation facilities, the type of final edible product already being produced or consumed in the country as well as new products which may conceivably be manufactured, the availability and suitability of imported raw materials, the transport facilities (or sometimes the lack of those facilities) and so on.

In the following section, the situation in each particular country will therefore be reviewed separately.

II. SPECIAL REVIEWS AND RECOMMENDATIONS FOR EACH COUNTRY

A. THE SYRIAN ARAB REPUBLIC

As already mentioned, Syria is the only country in the region which is practically self-sufficient in oil and fats, because the cultivation of cotton seed and olives have been, since a long time ago, well established there.

Small amounts of sunflower are also grown and experiments on soya growing are going on. The potential for increasing the production of raw material for the vegetable oil industry in Syria are however great, especially in the Euphrate basin and if proper methods for the cultivation of oil bearing seeds are used, it should be possible to increase the production considerably, even to the extent where oil seeds or crude oils could be exported. These possibilities are, however, not yet utilized and as a matter of fact, there was a slight decrease (about 14%) in the amount of cotton seed, and consequently, also in the supply of crude oil during the period 1965 - 1973.

However, more serious for the amount of oil available, is the low yield of oil obtained from the seeds. Whereas, the minimum oil content of the seeds is 18.5%, the average oil yield during the years 1965 - 1972 was less than 13%. One reason for the low yield is that the harvest, transport and storage conditions for the cotton seed are unsatisfactory. Although the point has already been mentioned in the report by Mr. Adnan Sheik Al-Kar (ID/WG.201/7), that existing storage facilities need improvement, it is stressed that proper handling of the seed prior to pressing and extraction, is of the utmost importance for the quality of the cotton seed oil.

The seeds should be transported in such a way that it is not broken, as broken seeds are much more exposed to oxidation and enzymatic degradation than whole seeds. The seeds should not be left in the field for a long time, especially during rainy weather, but should be brought to the delinting plant as soon as possible. Before storage, the delinted seeds should be dried to a water content of approximately 6% and the broken seeds should be separated from the undamaged ones. The seeds should then be stored in ventilated silos under temperature control so that fermentation, oxidation and hydrolysis is avoided.

Another reason for the low yields is that solvent extraction has not yet been introduced. With modern solvent extraction methods, only 0.5% of oil is left in the meal and with better and more modern equipment for the recovery of the oil, an absolute increase in the amount of oil of 5%, corresponding to a percentage increase of 38%, could be obtained without increasing the amount of cotton seed grown. This situation will, however, be improved when the new solvent extraction plant in Aleppo starts to work - probably in 1976.

The losses during refining are high too. This can be attributed to several reasons. Firstly, that the free fatty acid content is raised during storage; secondly, that some of the oil is refined by the old batch method and thirdly, that the enzymatic degradation, which may have taken place during storage, gives rise to a colour fixation of the oil so that a large excess of strong caustic soda must be used in the refining operation in order to reduce the colour. This excess of caustic soda will, however, give rise to high losses due to saponification of the neutral oil.

The dark colour of the crude cotton seed oil is also difficult to remove, if the seed is not properly dehulled (not only the husk or the shell proper should be removed, but also the thin black film surrounding the seed).

Furthermore, the temperature in the cooker should be carefully controlled, the expeller pressed water cooled, and the temperature when stripping the solvent from the oil, should be as low as possible.

The refinery losses (10%) reported are much too high and could, by controlling the above-mentioned factors, be reduced to 5-6%, so that at least 4% more refined oil could be obtained. The necessary improvements are of course easier and cheaper to introduce in bigger factories, and it seems to be recommendable to concentrate the processing on only two or three bigger plants. The factories in Hama, Damascus, Hama and Latakia are all too small to be of proper economical benefit.

The production of olive oil in Syria is quite important and amounts in good years to 15,000 tons, however, this industry is still in the "cottage industry" stage. Also, for the production of olive oil, the economy of scale is important even if the impossibility of storing olives over a longer period prevents the construction of big olive mills of the same size as for instance a cotton mill. In Italy and Spain, modern olive mills do however, often have an hourly capacity of 0.5 - 2 tons of olive oil. During the short season (3 - 4 months) the mills are operated in two shifts in order to treat the olives as soon as possible after harvesting. In this way, a virgin olive oil with a very low acidity (below 0.3%), a pleasant taste and good keeping qualities can be obtained. By modern processes, the oil content in the cake is also lower than 6%. In order to obtain these advantages, it is, however, absolutely necessary to organize the harvesting of the olives and the transport to the mills in a proper and effective way, but as the growing of olives is restricted to relatively small geographic areas, this should not be too difficult.

It seems to be advisable to induce the olive oil farmers into organizing themselves into cooperatives which should collectively operate relatively large mills. The husk or grignon oil obtained by solvent extraction from the cake, normally has a very high fatty acid content and is therefore normally used for soap-making, but if the acidity is below about 20%, the oil can be alkali-refined and deodorized and used as an edible oil.

RECOMMENDATIONS

In order to overcome the difficulties in the Syrian oil industry, it is recommended that suitable UNIDO experts investigate the problems with visits to the country; its industry and its governmental institutions. The following are a few recommendations that should be adopted:

- (a) An agricultural expert for a period of about 2 - 3 months to investigate the possibilities of extending the production of suitable oil bearing seeds in Syria.
- (b) An expert in harvesting, transporting, delinting and storing cotton seeds for a period of two months to recommend measures to avoid damage to the seed.
- (c) A specialist in oil refining for a period of three months to recommend improvements in the existing factories.
- (d) A specialist on olive oil to investigate improvements in the collaboration between olive farmers, the harvesting and transport of olives and the installation of a number modern and relatively big olive oil mills for a period of two months.
- (e) A specialist in oil seed processing (pressing and solvent extraction) for a period of three months.

B. IRAQ

The local production of oil seeds is far from sufficient to satisfy the local consumption. During the years 1968 - 1973, only half of the seeds grown was received by the industry, and the extraction and refining plants were working at less than half capacity. The five year plan does, however, foresee that the amount of seeds growing should be more than doubled between 1975 and 1979. As the intention is to put the emphasis on seeds with high oil content such as sunflower and safflower seeds, the amount of oil available in 1979 should be improved considerably if the plan is fulfilled. Whereas the amount of oil available from locally grown seeds was only about 6,000 tons in 1972 and 1973, it should be approximately 35,000 tons by 1979. Two new extraction plants are also planned, however, the local consumption for 1979 is estimated to be 102,000 tons, so that a considerable import of other oils, especially palm oil, will be necessary. As the main part of edible fats in Iraq is consumed as shortening or as vegetable ghee, palm oil is a most suitable raw material. Palm oil is a semi-solid fat and contains fractions with melting points up to 54%. By fractionating palm oil and re-mixing the fractions in suitable proportions, shortenings and vanaspathi of all desired melting points can be produced. The fractionation of palm oil can be carried out by three different methods - filtration; solvent fractionation; and by detergent fractionation. The first method is time consuming and labour consuming; the second has high operational costs; but the third is cheap in operation and much cheaper than the expensive hydrogenation method.

The different brands of shortenings or ghee substitutes manufactured in Iraq, vary very little in composition and properties, except for the melting point which depends on the season. It appears surprising that a country with

ten million inhabitants does not need a bigger variety of final products. An investigation regarding the market possibility for other products, for example margarine, should be carried out.

RECOMMENDATIONS

- (a) An expert for approximately 2 - 3 months to survey the actual and planned industrial production facilities
- (c) An expert in formulating shortenings and margarines to open up new markets. Period - two months.

C. LEBANON

Lebanon has in proportion to its population, the largest oil industry in the region. The total overall refining capacity is as big as that of Syria or Iraq and considerable amounts of finished products are exported. However, the raw material has to be imported and there seems to be small possibilities of growing sufficient amounts of oil seeds inside the country.

A modern solvent extraction plant, partly using imported soya beans as a raw material, is operating in the outskirts of Beirut and soya meal as a raw material for animal feedstuff is consequently also manufactured. The industry does, however, have altogether 11 - 12 plants, most of which are much too small to be economically viable. Besides, most of the equipment is old and not up to modern technical standards. Most of the smaller plants are working at a much smaller capacity than the installed one.

A concentration of a few larger plants is a necessity in the long run. Even some of the bigger plants are suffering from an insufficient supply of utilities such as water and electricity. The same viewpoints as mentioned under Syria/A are valid for the olive oil industry in Lebanon.

RECOMMENDATIONS

- (a) An oil extraction and refining expert to survey the situation of the entire industry and to propose a concentration of the production to a few factories. Period - three months.
- (b) A specialist in water supply and water purification to recommend best possible water supply.
- (c) A specialist on olive oil to investigate improvements in the collaboration between farmers; in the harvesting and transport of olives; and the possible construction of a number of modern and relatively big olive oil mills. Period approximately two months.

B. JORDAN

The vegetable oil industry in Jordan is not very well developed and the per capita consumption is only half of that in Syria or in Iraq. Approximately 6,000 t/year of vegetable ghee is produced from imported raw materials, especially palm oil. There does not seem to be much scope for extending the industry. It is surprising that the only two existing factories are inland, in Amman and Habis, in spite of the fact that all raw material is imported. The neighbourhood of Aqaba would seem to be a better location, unless more oil seeds could be grown locally.

About 6,000 t/year of olive oil is produced, but as in Syria and Lebanon, there are too many small old-fashioned and inefficient mills.

RECOMMENDATIONS

- (a) An agricultural expert to investigate the possibilities of growing oil bearing seeds within the country. Period - one month.

- (b) An olive oil expert to recommend the modernization of the olive oil industry. If suitable, the same expert could cover the three countries, Syria, Lebanon and Jordan so that time and money could be saved.

E. SAUDI ARABIA AND YEMEN ARAB REPUBLIC

The vegetable oil industry in both of these countries is virtually non-existent (with the exception of a very small production of cotton seed oil in Yemen). However, both of these countries have populations large enough to make local manufacture of edible oil and fats a distinct possibility. Furthermore, both countries import soya meal as a raw material for animal feedstuff.

The local production of oil seeds is completely insufficient to cover local consumption and the raw material must be imported for the foreseeable future.

Due to the local demand for both edible fat and animal feedstuff, an integrated factory having both extraction, refining and finishing lines should be considered.

In a further perspective, the possibilities for local growing of oil seeds should also be considered.

RECOMMENDATIONS

- (a) A UNIDO expert in vegetable oil production processing to investigate the suitable size and location of a possible oil production and refining plant. The sort of products to be produced, the type of raw material to be imported and the possibility of an integrated plant for simultaneous production of edible fats and animal feedstuff should also be considered. Period of time: about six weeks for each country.
- (b) An agricultural expert for evaluating the long range possibilities for local growing of oil seeds. Period of time approximately one - two months for each country.

**P. PEOPLE'S DEMOCRATIC REPUBLIC OF YEMEN, MUSCAT AND OMAN,
KUWAIT, QATAR, UNITED ARAB EMIRATES**

The vegetable oil industry in these countries is virtually non-existent and the population of each of them is too small to justify the installation of an oil industry. Also, very little is known about the marketing conditions in these countries as well as the possibility of growing oil bearing seeds locally. The only possibility for an oil industry in these countries, seems to be a joint venture between them or with other Arab countries, whereby an oil factory of a reasonable size is providing several countries with the finished products needed.

RECOMMENDATIONS

One or two of the UNIDO experts who are recommended to visit other Arab countries in the region, should be given the chance to visit these countries as well and include them in the general survey.

THE SUGAR INDUSTRY IN ARAB COUNTRIES IN WESTERN ASIA

I. INTRODUCTION

The sugar industry is a vital sector for the economy of Arab countries. Being a commodity imported by almost all the countries and having in the region the basic conditions to produce sugar, it represents a unique opportunity for agro-industrial development and co-operation. There exists in various countries both integrated agro-industrial plants and refineries. There are also plans for reorganization, expansion and modernization of the existing plants and the establishment of new ones. Presented in the following pages are country by country summaries of the main aspects of the sugar industry and the recommendations for a short term programme of technical assistance which on a country basis aims at solving immediate problems and planning the long range measures which are to be implemented both at the country and regional level.

II. Special Review and Recommendations for Each Country

A. IRAQ

Iraq's refined sugar demand for 1975 was estimated at 340,000 tons. From this total, twenty per cent is to be supplied by local production and eighty per cent from refined imported raw sugar. The annual per-capita consumption of sugar is thirty kilograms and in 1980 and 1985 it is estimated to be, respectively, thirty-four and thirty-six kilograms per-capita. On the basis of such consumption, the total market requirement would amount in 1985 to 500,000 tons of refined sugar. The Government's target is not only to supply the local market with sugar produced in the country, but also to export sugar. Such an objective implies a substantial increase in the production of raw materials, the modernization and expansion of the existing industrial plants and the establishment of new ones, especially integrated ag industrial sugar producing plants.

In order to specify recommendations, the following summary of the main factors affecting the sector is presented:

1. Raw Materials

Actually both raw materials - sugar beet and sugar cane - are being produced in Iraq. The sugar beet production in the northern part of the country is running on the basis of co-operation between "state-owned" companies and the private land-owners. This caused some difficulties in the application of the mechanization and all other up-to-date agricultural methods. The sugar cane production has been carried out only in the "state-owned" farms from the very beginning so that the production does not suffer from such difficulties. Insufficient mechanization and shortage of the skilled trained operators and management are ^{still} the main problems in the production of both raw materials, sugar cane and sugar beet.

New irrigated areas for production are under development and the Ministries of Agriculture and Agrarian Reform are responsible for the whole programme which is comprised of the establishment of new processing plants, training of personnel, agricultural mechanization, research, development and employment of modern

management methods. The most important areas of new development are the regions of Sulaymania, Great Musayab, Ishaqi, Hawija Khalis, Abu Ghraib and Aski Mosul for the sugar beet and Nahr Saad and Dijaila for the sugar cane.

In the last three years great effort was made to increase the production by both increasing the cultivated area and the productivity of the factories and the growing of crops. However, the results achieved are below the planned objectives, as can be seen in the following table:

	<u>Sugar Cane</u>	<u>Sugar Beet</u>
<u>Arable land (ha)</u>		
planned	2,000	2,800
actual	1,210	1,365
<u>Yield (t/ha)</u>		
planned	110.0	65.0
actual	85.0	48.0
<u>Quality of Raw Materials</u>		
sugar content	10.8	14.6
sugar's recovery	7.0	7.8
purity of raw material	81	81

In summary, concerning quality, sugar cane is eighty per cent in quality of what could be achieved in Iraq and the sugar beet is less than eighty per cent of that which could be achieved given the conditions of climate and soil prevailing in Iraq.

Finally, it must be said that, although there is very good co-ordination between competent Ministries some of the strategical questions are still open, like:

- convenience of some locations for raw material's production - sugar beet or cane;
- application of the up-to-date agricultural methods in the high production of raw material;

- production of stable semi-products, and optimization of by-products from both raw materials, with intention that their finalization be followed up near the market.

The answer to the above questions are particularly important when we consider that the increase of arable land will be on the order of:

- 6,000 ha for sugar cane
- and
- 11,000 ha for sugar beet production.

2. Industrial Processing Facilities

The existing plants are rather below the sizes recommended by modern technology. Most of the plants were designed to refine imported sugar and not to produce sugar from local raw materials. There are consequently, imbalances between the refinery and the raw sides of the sugar factories, especially in the ones which produce beet sugar; the cane sugar factories are more modern, more balanced and have a higher yield due to the better set up and continuous processes.

Therefore, in the programme of sugar production expansion in Iraq, priority should be given to the reconstruction and expansion of the existing plants in order to maximize their productivity.

3. Sugar Production Development Programme

As mentioned in the introduction, the estimated sugar demand in Iraq will be in 1985 half a million tons and the plan's objective is to supply such demand with locally produced sugar. Plans for reconstruction and expansion of the existing plants are under way and new sugar cane factories will be built in the regions of Nahr Saad and Dijaila to produce by the year 1980 about 80,000 tons per year of refined sugar from locally produced raw sugar. At the same time, the new beet sugar plant to be located in the Musayab will be producing about 50,000 tons

of refined sugar. With the expansion and the establishment of new plants, the sugar industry in Iraq would produce by 1980 about 300,000 tone of sugar per year. To reach such a production level will require the investment of about US\$ 200 million in the next five years and, if the production is to reach 700,000 tone of refined sugar in 1985, it will be necessary to invest another US\$ 350 million. Such estimates are only for the industrial plants. Concerning the agricultural side, in order to produce locally the raw material needed by 1980, maintaining the actual ratio of sixty to forty between sugar beet and sugar cane, it would be necessary to have about 65,000 and 30,000 hectares of arable land to grow respectively the beet and cane required. In comparison with today's area it would have to increase forty-eight times for beet and twenty-five times for cane.

The above are rough indications of the magnitude of the programme which would imply measures of management in order to shorten the time between harvesting and processing and it would be necessary to train at least two hundred highly specialised agricultural engineers and about one hundred processing engineers and numerous technicians.

Having in mind that all such development is intended to be carried out at the most modern technological level making the best possible use of all the resources, a multi-disciplinary approach is required to assist in the detailed planning and implementation of the whole project. In order to formulate the project, the following experts are required:

- (a) An agricultural expert for a period of about three months to assess the agricultural aspects of the sugar beet and cane production and the plans for development and to work out guidelines for further technical assistance;
- (b) An expert in harvesting, transporting and storing sugar raw material for a period of three months to recommend measures to avoid losses;

(c) A specialist in beet sugar production for a period of three months to recommend improvements in the existing factories;

(d) A specialist in cane sugar production for a period of three months to recommend improvements in the existing plants;

(e) A sugar engineer specialised in planning and management for a period of four months to review the existing plans and to formulate the requirements of technical assistance for the implementation of such plans.

B. LEBANON

The sugar economy in Lebanon is composed of private enterprises which produce refined sugar on an integrated basis from raw materials locally produced and refineries which refine imported raw sugar. The Government subsidizes the importing of raw sugar which is sold to the local refineries at prices lower than those prevailing in the international market.

The Government in promoting the country's industrial development intends to stimulate the domestic raw material production. The programme to make the country self-sufficient by 1980 will require high investment and co-ordination between the interest of beet sugar producers and the interests of the refinery owners.

The actual sugar demand in Lebanon amounts to about 70,000 tons per year with a rate of increase of about four per cent a year. The main installed capacity is for refining sugar which amounts to 130,000 tons of refined sugar per year. However, only about fifty-three per cent of such capacity is being actually employed. The existing equipment is, on the average, twenty-five years old, not up-to-date and new investment would be required to produce a better quality sugar and to increase the yield.

The present producing capacity for sugar beet is insufficient and its increase has been foreseen in the Beqa'a valley. Also, in the north of Lebanon arable land is available and could be used for the production of sugar beet. Actually under consideration, is the establishment of a 28,000 ton per year integrated agro-industrial sugar plant. The increase of the integrated agro-industrial production of sugar in Lebanon is technically feasible. The climate conditions are favourable, although no more than 3,000 hectares have been planted. The main reason for this is the preference given by the refineries to imported raw sugar. The existing policy concerning prices have been unfavourable to development of the local production of raw material. On the other hand, the low yield of 52.3 tone/hectare being achieved does not correspond to the favourable conditions of soil and climate.

In summary, the sugar industry in Lebanon actually presents various handicaps such as the low level of utilization of the available refinery capacities, the low ratio between raw material and refined sugar (from 100 kilograms of sugar beet only 8.3 to 11.2 kilograms of refined sugar is obtained), the arable land is not properly used and that the Government expends annually substantial amounts of financial resources to subsidize imported raw sugar. Finally, the by-products of the sugar industry have not been properly used.

In order to overcome the actual problems and to make further progress in this industrial sector, it is recommended:

- to identify total areas suitable for sugar beet plantations and to undertake measures to organize co-operation between private land owners and the industry, in order to make possible long-term contracts and profitable sugar beet production;
- to make use of agro-pedological methods and seed selection to improve the sugar beet production. The actual demand of 70,000 tons should be produced by the Lebanese sugar industry with a sugar beet plantation of 15,000 hectares;
- the sugar beet production should be a basis for the cattle growth development. Use of suitable rotational crop cycles should also be used to increase the crop yield;
- priority should be given to the optimization of capacity and technological level in the sugar factory Anjar, and after that it should be decided whether or not to set up one new sugar factory in the Beqa'a valley;
- the capacities of existing refineries which are well located, have to be taken into consideration when planning the establishment of new industrial capacities for beet sugar production. Integration of interests of the Lebanese Government on the one hand and of the private land and industry owners on the other hand, should be met on the level of a new limited company;

- further using of molasses should be planned in the production of raw materials for allied industries and so as to eliminate the export of molasses;
- the permanent interest for sugar beet planting should be ensured through the establishment of integrated agro-industries;
- the Lebanese Government should give its main support to the development of integrated agro-industries planned for the forthcoming increase of sugar and sugar beet production, keeping in mind, that it is the shortest way for the elimination of importation of raw sugar and the allied industries development;
- the schooling of domestical staff should be undertaken so that after 1980 the entire Lebanese sugar industry is based on domestic management.

The following short term of international technical assistance should be implemented in order to solve immediate problems and to elaborate a long range programme:

1. One sugar beet agricultural expert should be assigned for three months to review the agro-pedological methods being employed and to recommend measures to improve them.
2. One agro-industrial expert specialised in planning the co-operation between farmers and industry should be employed for three months to analyse the prevailing conditions in Lebanon and to suggest types of contracts and other means of technical and commercial co-operation among them.
3. A beet sugar engineer should assist the Government for four months to review the conditions in the actual producing plants in order to indicate the ways and means to improve their efficiency with particular emphasis on that concerning the by-products utilisation.
4. A beet sugar engineer specialised in the planning of agro-industry development should assist the Government for two

months to review the sugar industry development plans and to formulate a parallel plan for the international technical assistance.

5. In order to start a training programme, four local technicians should be trained for a period of six months each, starting in the second half of 1975.

C. SYRIA

The actual Syrian sugar market amounts to about 190,000 tons which is supplied in the following manner: seventy per cent from imported raw sugar which is locally refined, twenty-one per cent from imported sugar already refined and a one per cent from sugar locally produced. Although there are governmental controls limiting the consumption, the estimated total demand for 1960 is 290,000 tons of refined sugar.

The Government is implementing a programme through the Ministry of Agriculture and Agrarian Reform and the Syrian Company for Industrialization of Sugar and Agriculture which is aimed at increasing the agricultural production of sugar beet and increasing production and refining of raw sugar. The following information summarizes the actual and planned aspects of the Syrian sugar economy.

TABLE 1
ACTUAL AND PLANNED SUGAR BEET PRODUCTION

	<u>ADRA</u>	<u>EL CHAM</u>	<u>HAHA</u>
<u>Sugar Beet Producing Areas (ha)</u>			
Actual	2,110	4,550	6,760
Planned	8,500	20,000	20,000
<u>Yield (tons/ha)</u>			
Actual	31.0	30.7	27.3
Planned	36.0	32.0	32.0
<u>Percentage of Sugar in the Beet</u>	15.5	16.0	16.5
<u>Percentage of Sugar Extraction</u>			
Actual	10.9	11.5	12.2
Planned	11.4	13.1	13.7

The Syrian climate conditions permits two crops per year, one in autumn and the other in summer. However, the agriculture is not yet taking full advantage of such favourable conditions. The

Government is promoting the extension of the arable land especially through irrigation and increasing the level of agricultural mechanisation, accelerating the technical level of operators and modernising the farm management. In this respect it is of particular interest to mention the irrigation programme in the Chab region which is to serve as a model of an integrated state owned agro-industry which will co-operate with private land owners in the development of the sugar industry. According to the above data concerning the planned areas and expected yield, the production of sugar beet would increase to 1,603,000 tons. Further actions should be aimed at increasing the yield to about forty-five t/ha and the total of production to 2,187,500 tons per year. Finally, the further expansion of the planting area in the Euphrat basin should be considered.

Concerning the industrial production capacity the following table summarises the main information:

TABLE 2

ACTUAL REFINERIES AND RAW SUGAR PRODUCTION CAPACITIES

	<u>ADWA</u>	<u>EL CHAB</u>	<u>HUMB</u>
Sugar Beet Capacity (tons/day)	60	2,000	1,200
Raw Sugar Refining Capacity (tons/day)	200	300	300

According to the governmental plans which involve investments of about \$1.1 million Syrian pounds in expanding the actual capacity and the establishment of a new plant in Raqqa, the following should be the situation in 1980.

TABLE 3

PLANNED REFINERIES AND RAW SUGAR PRODUCTION CAPACITIES, 1980

	<u>ADWA</u>	<u>EL CHAB</u>	<u>HUMB</u>	<u>RAKKA</u>	<u>TOTAL</u>
From Sugar Beet (t/year)	7,200	24,000	14,400	28,800	74,400
From Raw Sugar (t/year)	28,000	42,000	42,000	64,000	176,000
Total General					250,400

Therefore, in 1980, the yearly demand of 290,000 tons would be satisfied with the local production of 250,400 tons and 39,600 tons of imported sugar. Such a situation in 1980 would be possible with the planting of 49,500 ha as mentioned in Table 1. If the Government wants the country self-sufficient 5,900 ha more should be planted and with such an increase, the total producing area would be 54,000 ha and the production of sugar beet would amount to 2,410,000 tons resulting in 290,000 tons of refined sugar. In each one of the hypothesis the following would be necessary:

- Existing programmes for the raw material production should be speeded up and enlarged in order to eliminate the importing of raw sugar. It is also advisable to make some changes of today's conceptions and relations between planting areas and planned industrial capacities.
- Special attention to the seed's selection should be paid in order to utilize the possibility of sugar beet cropping twice a year.
- Planning of the animal feedstuffs, using the sugar beet's remnants and molasses has to take a place in the industrial development programmes.
- It is of special interest to check how much it is possible to apply up-to-date technological achievements in the present reconstructions so that better productivity in future capacities will be ensured.
- To establish state owned integrated agro-industries and to promote the co-operation between the state owned farms and private land owners.
- Industrial development programmes should be harmonized with the raw material development programmes in order to eliminate the importation of raw sugar.

Having in mind that all such development is intended to be carried out at the most modern technological level making the best use of all the resources, a multi-disciplinary approach is required to assist in the detailed planning and implementation of the whole project. In order to assist the Government the following four experts are recommended:

- (a) An agricultural expert for a period of about three months to assess the agricultural aspects of the sugar beet production and the plans for development and to work out guidelines for further technical assistance;
- (b) An expert in harvesting, transporting and storing sugar raw material for a period of three months to recommend measures to avoid losses;
- (c) A specialist in beet sugar production for a period of three months to recommend improvements in the existing factories;
- (d) A sugar engineer specialized in planning and management for a period of four months to review the existing plans and to formulate the requirements of technical assistance for the implementation of such plans.

D. OTHER COUNTRIES

There are other countries like Jordan and the Kingdom of Saudi Arabia which have favourable soil and climate conditions which are adequate to produce sugar cane or sugar beet. The establishment of refineries to refine imported sugar is being considered, as well as in the case of Saudi Arabia, the establishment of integrated sugar agro-industries is currently under implementation. It should be advisable that a team of three experts, a sugar technologist, an industrial economist and an agronomist would assist the mentioned countries revising their plans and elaborating a programme of technical assistance. Such a mission should have a four months duration and their work would be co-ordinated by ICWA.

FRUIT AND VEGETABLE PROCESSING
INDUSTRY IN ARAB COUNTRIES
IN WESTERN ASIA

I. Introduction

In most of the Arab countries there exists plants for processing fruits and vegetables. The great majority of the existing plants started on a family basis and are now going through a process of modernization and adaptation to modern technology requirements in respect of plant size, methods of production, management and product commercialization. Most of the existing plants are not integrated and suffer the problems of the supply of raw material. Problems of quality control, standards, packaging, proper use of raw material, trained personnel and others are of concern to industries which are changing from small to medium and large scale plants, and are present in almost all the factories.

However, the industry is a very dynamic sector, which has great potential from all sides, such as local favourable conditions to produce adequate raw materials and increasing local demand for end-products and possibilities for export. In the following pages we present a summary of the most important facts and suggestions on how to overcome the actual main problems affecting this industrial sector.

II. Special Review and Recommendations for Each Country

A. IRAC

Northern, Southern and Middle of Iraq, comprising of sixteen districts produces a wide variety of fruits and vegetables. Some of the most significant of these, from the economic point of view, are at present dates, grapes, citrus, figs, watermelon, apricot, pear, olive, pomegranate, etc. Among vegetables tomato, peas, okra, egg plant, beans, broad beans, onion, cow peas, cucumber, squash and pepper are produced.

In addition, where conditions are suitable and adequate water supplies are available for irrigation, temperate to sub-tropical fruits and vegetables of many kinds are grown, and there is scope for further development and diversification.

However, the short seasonal production is in many cases in excess of the demand for fresh fruits and vegetables, and the excess production either has to go to waste or other markets in far distant areas have to be found.

The Government of Iraq, has for many years been aware of this problem and has sought corrective measures, such as developing new industries in suitable areas of actual and potential production of raw produce; by modernizing industries and techniques to enable safe and high quality goods to be produced; by setting standards for the production of wholesome products for local use and for export; by improving the competitive position of the country in the export market; by training technicians in modern methods of food processing; and by providing extension services.

The Government started actively setting up fruit and vegetable processing plants in different districts. The new plants will require urgent assistance in selecting the right variety of fruits and vegetables for processing, advice on proper harvesting with regard to size, stage of maturity, colour, etc., handling and transporting in proper containers, training of personnel in plant operation, developing suitable processing techniques, quality control and production control.

One of the important tasks the factories will have to undertake in the initial stages is product development including the introduction of new recipes and optimum processing conditions to utilize the surplus of fruits and vegetables in Iraq. They also have to undertake varietal studies to determine the suitability of the fruit for processing.

The Government requesting assistance to achieve these broad objectives, has decided that first priority should be accorded to the establishment and initial operation of a Food Processing Industry Centre.

The Food Processing Industry Centre will be established by the State Organisation for Food Industries and it will serve the State Company for Food Canning which belongs to the State Organisation. The head of the Food Processing Centre will report to the State Organisation's Director of the Department for Research and Training. While there will be one central location for the Centre, activities will also take place at the various factories belonging to this Company.

The Centre will carry out the following functions:

1. Staff training in the following fields:
 - (a) food processing techniques
 - (b) production planning and control
 - (c) sanitation techniques
 - (d) plant operation
 - (e) repair and maintenance
 - (f) quality control

2. Research and Development in the following fields:
 - (a) process and product development
 - (b) establishing of standards
 - (c) establishing of quality control systems
 - (d) packaging of food products

The initial phase of the Centre's activity will start late 1975 and will be in full operation in 1976. UNIDO being the UN executive agency to assist in the establishment and operation of the Centre should be officially requested to start the project's implementation.

B. JORDAN

The Government of Jordan places a high priority on the development of the fruits and vegetables processing industry in order to reduce the importing and increase the export of processed agricultural products. The Government further intends to give the farmers the necessary support in order to stimulate the agro-industrial development and to make use of favourable environmental conditions which permits two crops a year of various vegetables. The country has the potentials for increasing the production of agricultural raw materials in the newly developed areas irrigated with water from the River Jordan. Specifically, the Government intends to implement measures aiming at:

- increasing the out turn crops per hectare;
- extending harvesting seasons to enable the factory to achieve maximum production;
- making full use of the existing processing capacity, to diversify production, expand the factory and to establish new factories.

UNIDO will assist the Government by means of assigning experts and providing fellowships for the training of local personnel abroad. The assistance will be comprised of:

1. A general fruit and vegetable expert for three months to review the present conditions and to indicate new opportunities for investment.
2. Three experts for three months each to elaborate feasibility studies.
3. One tomato processing expert for three months concerned especially with quality control and packaging.
4. Four fellowships of six months each.

C. LEBANON

Food processing is the largest of Lebanon's industries, both by total size of investment and employment. Canning of fruit and vegetables, largely of domestic origin, has been going on for over thirty years. Exports have been growing, particularly with regard to fruit juices, marketed not only in the Middle East, but also in Eastern Europe. The industry produces a large scope of products including marmalade, tomato paste, stewed fruits, syrups, canned vegetables, fruit juices and ice cream. About nine canning plants are operating and, having in mind that the country presents very favourable conditions such as fertile soil, abundance of water, adequate distribution facilities, the Government intends to assist such plants to make full use of their potentialities and to expand, modernise and diversify the whole sector.

Particular emphasis in the government programme is given to the supply of raw materials and quality of the products.

The actions towards the modernisation of the sector will aim at:

- the up-grading of quality by use of suitable varieties of fruits and vegetables;
- the management of the factory will evolve the appropriate form of contract;
- fully qualified and practical field men will advise and supervise the producers;
- factory quality control of raw material will be rigid, constant and properly documented both for the management and the produce supplier;
- research will be undertaken to ensure that either by the processing of semi-processed products or the production of canned convenience foods from re-constituted materials, the factory will be viable for ten to eleven months continuous production;
- full laboratory facilities will be available for finished product quality control;

- research into concentration of citrus juices and the market demand will be carried out;
- extraction of essential oils and pectin will be considered;
- the dehydration, milling and compressing of residues as a cattle feed additive should be incorporated to increase profits and minimize waste disposal problems.

It is recommended that a team of three experts, one industrial economist, one fruits and vegetable processing specialist and an agronomist will assist the Government for a period of four months each with the objectives of advising in:

- the extension and modernization of existing factories;
- the feasibility of establishing additional plants;
- the co-ordination of raw material production with processing requirement to ensure:
 - (1) maximum production by the factories over a ten to eleven month period,
 - (2) adequate crop out turn per hectare over as long a harvesting period as possible to ensure maximum specialized production rentability;
- better use of existing industrial facilities by means of production diversification;
- planning a long term technical assistance programme.

D. GUAN

This country does not yet have installed fruit and vegetable processing plants. There is available land suitable for cultivation and there also exists adequate irrigation possibilities. Although the actual agricultural production is basically of a subsistence nature, a number of cash crops are grown and exported as raw materials (especially dates, limes, bananas and mangos). The Government places great emphasis on the industrialisation especially as a means for import substitution. It would be necessary to assess the growing potential of various types of products, to study the requirements and systems of irrigation, to establish research and training centres and to elaborate studies for the establishment of processing plants.

An expert should be recruited to assist in the assessment of production potential, planning cultivation methods, the need for irrigation and the methods to be employed. The expert would also submit plans for a viable research station/training centre. This should be a three months assignment.

Should the production study confirm an adequate supply potential an expert should be recruited to carry out a feasibility study for the installation of a processing plant. This assignment should also be for three months.

B. SAUDI ARABIA

The main processed products in this country actually are tomato juice and sauce, produced in a modern factory which operates in Riyadh. Prospects of increased areas of cultivation are good and the reclamation of 20,000 acres together with installation of 1,500 kms. of irrigation pipes and corresponding drainage is being effected. There are two small research stations attached to the Ministry of Agriculture.

The main immediate problem is the production of raw materials. At the same time the factory operations should be extended to a ten to eleven month period. Raw material supplies should be based on a fixed price, viable to the factory and fair to the grower.

In order to change the actual situation a short-term plan with the following objectives should be implemented:

- increase in raw material and out turn per hectare;
- contract buying of raw materials;
- contracts to specify the price quality, methods of harvesting and delivery;
- where production is effected by growers, factory field men should supervise planting, irrigation, fertilisation and pest control since this supervision will bring the produce in line with supplies grown on factory-owned land.
- surveys which should be carried out into the possibilities of growing other products suitable for processing;
- extension of production of new area, e.g. the Gulf area should be investigated;
- studies on the feasibility of can making and the manufacture of other containers should be made;
- the production of plastic piping for filter irrigation and plastic tunnelling for growing on irrigated land should be investigated.

An expert should be recruited to investigate the possibilities of crop diversification in all areas of the Kingdom. Such a mission would require three months and an expert should be recruited on a long-range assignment to initiate a programme of industrial development.

F. SYRIAN ARAB REPUBLIC

The Syrian Arab Republic is a country with vast potential for the production of fruits and vegetables. By proper utilisation of natural resources, particularly through the utilisation of the waters of the Euphrates, the country has the potential to become a net exporter of processed fruits and vegetables. Actually, the country is in need of developing new processes, overcoming technical difficulties encountered in promoting modern practices in the canning industry, and minimising the losses due to swelling of cans in the fruit and vegetable canning industry. The annual capacity of the canning factories is 6,000 tons of products canned in metallic cans of 1/2 kg., 1 kg. and 5 kgs. capacity. The main products are tomato paste, peas, apricot jams, various vegetables and fruits, and cooked meals. The main problems suffered in the canning industry are the bulging of cans, excessive loss of raw materials, and the inferiority of the end products.

In Syria there are four factories for canning of fruits and vegetables. All the four factories are publicly owned and are managed by the Union of Food Industries either directly as the canning factory in Jable or through the "Modern Conserve and Agricultural Industries Corporation". This corporation consists of five branches:

- Branch No. 1 - The fruit and vegetable canning factory in Ghouta.
- Branch No. 2 - The fruit and vegetable canning factory in Kaboun.
- Branch No. 3 - "Cold Storage" in Damascus
- Branch No. 4 - "Cold Storage" in Damascus
- Branch No. 5 - The Canned Fruit and Vegetable Factory in Maarib.

The General Directorate of the Corporation is situated in Damascus and its responsibilities are: planning and management of the production, supply of raw and auxiliary materials, supply of new equipment and supervision in maintenance of the existing one, selling of finished products, finance and administration.

Two out of the three existing factories - Branch No. 1 and Branch No. 2 - have been established before nationalisation of the industry which was carried out in 1964. The third factory - Branch No. 3 - in Moscow was erected some three years ago. All of the three factories have nearly the same assortment of canned fruits and vegetables. The main products are: tomato paste, apricot jam, canned peas. Other canned products such as canned green beans, cooked meals, are of less importance. There are many items which are produced in very small quantity - several tons per year.

The total production of the factories belonging to the corporation amounts in average 6000 tons yearly. In 1974 the total volume of the production was 6760 tons of different canned products.

The level of the mechanization in all factories is low except for the production of tomato paste. The shortage in machines for the preparation of raw material grading, peeling, snapping, dicing, etc., is very evident and these operations are in most cases carried out manually. The technical condition of retorts is in most cases quite inadequate for the safe sterilising process. Each of the three factories has its workshop for the manufacture of empty cans and the machines used for this purpose are obsolete. There is no doubt that the variable and in many cases, bad quality of the empty cans is the main reason for the losses in finished products.

The factories generally work a short period during the year due to the shortage of raw materials.

To overcome the present difficulties of this industrial sector and to further promote its development it should be recommended

1. Diversification should be studied in depth to ensure maximum employment of the factory for ten and preferably eleven months.
2. Production of convenience foods from reconstituted or semi-processed raw materials will be full in lines during slack harvesting periods.

3. Autumn and winter processing of citrus fruits, apart from production of segments and traditional packs should incorporate:
 - (a) Concentrated juices for reconstitution in both consumer and industrial bulk packs.
 - (b) Production of essential oils.
 - (c) Dehydration, milling and pressing of residues as a useful cattle feed ingredient.
4. Production of high grade fruits, fruit salads, and macedoine will also provide by-products such as pectin, also peach and apricot kernels.
5. Anticipating increased production market research should be initiated into homeland markets and markets abroad.
6. Research should be carried out into the most modern developments in storage (e.g. inert nitrogen) and transport (e.g. units, pallets, containers).
7. Efforts in the short term should be concentrated on crops where results can be obtained within a year or season e.g. tomatoes, vegetables and berry fruits.
8. Storage difficulties at factories should be checked to ensure they are adequate for avoiding loss through wastage of carry over stocks.
9. Training in efficient handling of raw materials with supervision will avoid losses to the factory which cannot be charged back to the producer.

All the above mentioned actions towards the industry's development should be concentrated in a Food Processing Centre which would assist the industries by means of:

1. Training personnel at various levels in various specialities, such as management, particularly with regard to operational controls; to train operators in the various activities such as better utilisation of the equipment, reduction of raw material wastage, etc. and to improve the repair and maintenance;

2. Establishing and applying standards for food products for local and export markets;

3. Carrying out research and development activities with the aim of improving production methods of food processing and developing of new products.

The Centre to perform the above tasks will be a Governmental organization assisted by UNIDO as the UN executive agency of the project.

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
UNITED NATIONS DEVELOPMENT PROGRAMME

Draft Project Data Sheet

1. Reference Data:

COUNTRY:

LEBANON

Project Title:

Reorganisation and expansion of the integrated vegetable oil processing industry.

Project Number:

- UNDP Ref.:

- UNIDO Ref.:

Origin and Date of Request:

Purpose of the Project: To assist the Government of Lebanon to solve the actual problems of the integrated vegetable oil processing industry, to plan its expansion and to start the implementation of the programme for such expansion.

2. Background Information: Lebanon has in proportion to its population, the largest oil industry in the region. The total overall refining capacity is as big as that of Syria or Iraq and considerable amounts of finished products are exported. However, the raw material has to be imported and there seems to be small possibilities of growing sufficient amounts of oil seeds inside the country.

A modern solvent extraction plant, partly using imported soya beans as a raw material, is operating in the outskirts of Beirut and soya meal as a raw material for animal feedst. ff is consequently, also manufactured. The industry does, however, have altogether 11-12 plants, most of which are much too small to be economically viable. Besides, most of the equipment is old and not up to modern technical standards. Most of the smaller plants are working at a much smaller capacity than the installed one.

A concentration of a few larger plants is a necessity in the long run. Even some of the bigger plants are suffering from an insufficient supply of utilities such as water and electricity. The production of olive oil is still in the cottage stage in Lebanon. Since the economy of scale is important, the Government intends to promote the reorganisation of the sector by means of merging enterprises.

It seems to be advisable to induce the olive oil farmers into organising themselves into co-operatives which should collectively operate relatively large mills. The husk or grigen oil obtained by solvent extraction from the cake, normally has a very high fatty acid content and is therefore normally used for soap-making, but if the acidity is below about 10 per cent, the oil can be alkali-refined and deodorised and used as an edible oil.

3. Description of the Project: Three experts, as follows, will implement the integrated projects:

- An oil extraction and refining expert to survey the situation of the entire industry and to propose a concentration of the production to a few factories. Period - three months.
- A specialist in water supply and water purification to recommend best possible water supply.
- A specialist on olive oil to investigate improvements in the collaboration between farmers; in the harvesting and transport of olives; and the possible construction of a number of modern and relatively big olive oil mills. Period approximately two months.

4. Project Budget:

<u>Components</u>	<u>Duration</u>	<u>Cost</u>
Oil extraction and refining expert	3 months	US\$ 9,000
Specialist in water supply and purification	3 months	9,000
Specialist in olive oil	2 months	6,000
		<u>24,000</u>

Agency Overhead Costs

5. Request Approved:

For UNIDO

Date:

For UNDP

Date:

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UNITED NATIONS DEVELOPMENT PROGRAMME

Draft Project Data Sheet

1. Reference Data:

Country: PEOPLE'S DEMOCRATIC REPUBLIC OF YEMEN, MUSCAT AND OMAN, SAUDI ARABIA, QATAR, UNITED ARAB EMIRATES

Project Title: Reorganisation and expansion of the integrated vegetable oil processing industry.

Project Numbers: - UNDP Ref.:
- UNIDO Ref.:

Origin and Date of Request:

Purpose of the Project: To assist the Governments of these countries to solve the actual problems of the integrated vegetable oil processing industry, to plan its expansion and to start the implementation of the programme for such expansion.

2. Background Information: The vegetable oil industry in these countries is virtually non-existent and the population of each of them is too small to justify the installation of an oil industry. Also, very little is known about the marketing conditions in these countries as well as the possibility of growing oil bearing seeds locally. The only possibility for an oil industry in these countries, seems to be a joint venture between them or with other Arab countries, whereby an oil factory of a reasonable size is providing several countries with the finished products needed.

3. Description of the Project: One vegetable oil UNIDO expert should visit these countries to make a general survey and to recommend further actions. The expert should be employed for two months.

4. Project Budget:

<u>Components</u>	<u>Duration</u>	<u>Cost</u>
vegetable oil UNIDO expert	2 months	US\$ 6,000

Agency Overhead Costs

5. Request Approved:

For UNIDO

For UNDP

Date:

Date:

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
UNITED NATIONS DEVELOPMENT PROGRAMME

Draft Project Data Sheet

1. Reference Data:

Country: SAUDI ARABIA

Project Title: Reorganization and expansion of the integrated vegetable oil processing industry.

Project Number: - UNDP Ref.:
- UNIDO Ref.:

Origin and Date of Request:

Purpose of the Project: To assist the Government of Saudi Arabia to solve the actual problems of the integrated vegetable oil processing industry, to plan its expansion and to start the implementation of the programme for such expansion.

2. Background Information: The vegetable oil industry in the country is virtually non-existent. However, the country's population is large enough to make local manufacture of edible oil and fats a distinct possibility. Furthermore, the country is importing soya meal as a raw material for animal feedstuff.

The local production of oil seeds is completely insufficient to cover local consumption and the raw material must be imported for the foreseeable future.

Due to the local demand for both edible fat and animal feedstuff, and integrated factory having both extraction, refining and finishing lines should be considered.

In a further perspective, the possibilities for local growing of oil seeds should also be considered.

3. Description of the Project: Two experts, as follows, will implement the integrated projects:

- A UNIDO expert in vegetable oil production processing to investigate the suitable size and location of a possible oil production and refining plant. The sort of products to be produced, the type of raw material to be imported and the possibility of an integrated plant for simultaneous production of edible fat and animal feedstuff should also be considered. Period of time - about 4 weeks.
- An agricultural expert for evaluating the long range possibilities for local growing of oil seeds. Period of time, approximately one month.

4. Project Subjects:

<u>Comments</u>	<u>Duration</u>	<u>Cost</u>
A UNIDO expert in vegetable oil production processing	1 month	US\$ 3,000
An agricultural expert	1 month	3,000
		<hr/>
<u>Agency Overhead Costs</u>		6,000

5. Request Approved:

For UNIDO
Date:

For UNDP
Date:

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
UNITED NATIONS DEVELOPMENT PROGRAMME
Draft Project Data Sheet

1. Reference Data:

Country: SYRIAN ARAB REPUBLIC
Project Title: Reorganization and expansion of the integrated vegetable oil processing industry.
Project Number: - UNDP Ref.:
- UNIDO Ref.:

Origin and Date of Request:

Purpose of the Project: To assist the Government of the Syrian Arab Republic to solve the actual problems of the integrated vegetable oil processing industry, to plan its expansion and to start the implementation of the programme for such expansion.

2. Background Information: See attachment.

3. Description of the Project: Five experts, as follows, will implement the integrated projects:

- An agricultural expert for a period of three months to investigate the possibilities of extending the production of suitable oil bearing seeds in Syria.
- An expert in harvesting, transporting, delinting and storing cotton seeds for a period of two months to recommend measures to avoid damage to the seed.
- A specialist in oil refining for a period of three months to recommend improvements in the existing factories.
- A specialist on olive oil to investigate improvements in the collaboration between olive farmers, the harvesting and transport of olives and the installation of a number of modern and relatively big olive mills for a period of two months.
- A specialist in oil seed processing (pressing and solvent extraction) for a period of three months.

4. Project Budget:

<u>Components</u>	<u>Duration</u>	<u>Cost</u>
agricultural expert	3	US\$ 9,000
- harvesting, transport expert	2	6,000
- oil refining expert	3	9,000
- olive oil specialist	3	9,000
- oil seed processing expert	3	9,000
<u>Agency Overhead Costs</u>		<u>41,000</u>

5. Project Approved:

For UNIDO
Date:

For UNDP
Date:

BACKGROUND INFORMATION:

Syria is the only country in the region which is practically self-sufficient in oil and fats, because the cultivation of cotton seed and olives have been, since a long time ago, well established there.

Small amounts of sunflower are also grown and experiments on soya growing are going on. The potential for increasing the production of raw material for the vegetable oil industry in Syria are however great, especially in the Euphrate basin and if proper methods for the cultivation of oil bearing seeds are used, it should be possible to increase the production considerably, even to the extent where oil seeds or crude oils could be exported. These possibilities are, however, not yet utilized and as a matter of fact, there was a slight decrease (about 14%) in the amount of cotton seed, and consequently, also in the supply of crude oil during the period 1965 - 1973.

However, more serious for the amount of oil available, is the low yield of oil obtained from the seeds. Whereas, the minimum oil content of the seeds is 18.5%, the average oil yield during the years 1965 - 1972 was less than 13%. One reason for the low yield is that the harvest, transport and storage conditions for the cotton seed are unsatisfactory. Although the point has already been mentioned in the report by Mr. Adnan Shohk Al-Kar (ID/WG.201/7), that existing storage facilities need improvement, it is stressed that proper handling of the seed prior to pressing and extraction, is of the utmost importance for the quality of the cotton seed oil.

The seed should be transported in such a way that it is not broken, as broken seeds are much more exposed to oxidation and enzymatic degradation than whole seeds. The seeds should not be left in the field for a long time, especially during rainy weather, but should be brought to the dehulling plant as soon as possible. Before storage, the dehulled seeds should be dried to a water content of approximately 6% and the broken seeds should be separated from the undamaged ones. The seeds should then be stored in ventilated silos under temperature control so that fermentation, oxidation and hydrolysis is avoided.

Another reason for the low yields is that solvent extraction has not yet been introduced. With modern solvent extraction methods, only 0.5% of oil is left in the meal and with better and more modern equipment for the recovery of the oil, an absolute increase in the amount of oil of 5%, corresponding to a percentage increase of 38%, could be obtained without increasing the amount of cotton seed grown. This situation will, however, be improved when the new solvent extraction plant in Aleppo starts to work - probably in 1976.

The losses during refining are high too. This can be attributed to several reasons. Firstly, that the free fatty acid content is raised during storage; secondly, that some of the oil is refined by the old batch method and thirdly, that the enzymatic degradation, which may have taken place during storage, gives rise to a colour fixation of the oil so that a large excess of strong caustic soda must be used in the refining operation in order to reduce the colour. This excess of caustic soda will, however, give rise to high losses due to saponification of the neutral oil.

The dark colour of the crude cotton seed oil is also difficult to remove, if the seed is not properly dehulled (not only the husk or the shell proper should be removed, but also the thin black film surrounding the seed).

Furthermore, the temperature in the cooker should be carefully controlled, the expeller pressed water cooled, and the temperature when stripping the solvent from the oil, should be as low as possible.

The refinery losses (10%) reported are much too high and could, by controlling the above-mentioned factors, be reduced to 5-6%, so that at least 4% more refined oil could be obtained. The necessary improvements are of course easier and cheaper to introduce in bigger factories, and it seems to be recommendable to concentrate the processing on only two or three bigger plants. The factories in Hama, Banassur, Hama and Latakia are all too small to be of proper economical benefit.

The production of olive oil in Syria is quite important and amounts in good years to 35,000 tons, however, this industry is still in the "cottage industry" stage. Also, for the production of olive oil, the economy of scale is important even if the impossibility of storing olives over a longer period prevents the construction of big olive mills of the same size as for instance a cotton mill. In Italy and Spain, modern olive mills do however, often have an hourly capacity of 0.5 - 2 tons of olive oil. During the short season (3 - 4 months) the mills are operated in two shifts in order to treat the olives as soon as possible after harvesting. In this way, a virgin olive oil with a very low acidity (below 0.5%), a pleasant taste and good keeping qualities can be obtained. By modern processes, the oil content in the cake is also lower than 6%. In order to obtain these advantages, it is, however, absolutely necessary to organize the harvesting of the olives and the transport to the mills in a proper and effective way, but as the growing of olives is restricted to relatively small geographic areas, this should not be too difficult.

It seems to be advisable to induce the olive oil farmers into organizing themselves into cooperatives which should collectively operate relatively large mills. The husk or grignon oil obtained by solvent extraction from the cake, normally has a very high fatty acid content and is therefore normally used for soap-making, but if the acidity is below about 20%, the oil can be alkali-refined and deodorized and used as an edible oil.

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UNITED NATIONS DEVELOPMENT PROGRAMME

Draft Project Data Sheet

1. Reference Data:

Country:

YEMEN ARAB REPUBLIC

Project Title:

Reorganization and expansion of the integrated vegetable oil processing industry.

Project Number:

- UNDP Ref.:
- UNIDO Ref.:

Origin and Date of Request:

Purpose of the Project: To assist the Government of the Yemen Arab Republic to solve the actual problems of the integrated vegetable oil processing industry, to plan its expansion and to start the implementation of the programme for such expansion.

2. Background Information: The vegetable oil industry in the country is virtually non-existent (with the exception of a very small production of cotton seed oil). However, the country's population is large enough to make local manufacture of edible oil and fats a distinct possibility. Furthermore, the country is importing soya meal as a raw material for animal food stuff.

The local production of oil seeds is completely insufficient to cover local consumption and the raw material must be imported for the foreseeable future.

Due to the local demand for both edible fat and animal feedstuff, an integrated factory having both extraction, refining and finishing lines should be considered.

In a further perspective, the possibilities for local growing of oil seeds should also be considered.

3. Description of the Project: The experts, as follows, will implement the integrated project:

- A UNIDO expert in vegetable oil production processing to investigate the suitable size and location of a possible oil production and refining plant. The sort of products to be produced, the type of raw material to be imported and the possibility of an integrated plant for simultaneous production of edible fats and animal feedstuff should also be considered. Period of time - about four weeks.

- An agricultural expert for evaluating the long range possibilities for local growing of oil seeds. Period of time, approximately one month.

4. Project Budget

Comments

A UNIDO expert in vegetable oil
production processing
An agricultural expert

Duration

1 month
1 month

Cost

USD 3,000
3,000

6,000

Agency/Contract Code

5. Human Resources

For UNIDO
Notes

For UNDP
Notes

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UNITED NATIONS DEVELOPMENT PROGRAMME

Draft Project Data Sheet

1. Reference Data:

Country:

IRAQ

Project Title:

Reorganization and expansion of the sugar processing industry.

Project Number:

- UNDP Ref.:

- UNIDO Ref.:

Objectives and Date of Report:

Purpose of the Project: To assist the Government of Iraq to solve the actual problems of the sugar processing industry, to plan its expansion and to start the implementation of the programme for such expansion.

2. Background Information: See attachment.

3. Description of the Project: Five experts, as follows, will implement the project:

- an agricultural expert for a period of about three months to assess the agricultural aspects of the sugar cane and beet production and the plans for development and to work out guidelines for further technical assistance;
- an expert in harvesting, transporting and storing sugar cane and beet for a period of three months to recommend measures to avoid losses;
- a specialist in beet sugar production for a period of three months to recommend improvements in the existing factories;
- a specialist in cane sugar production for a period of three months to recommend improvements in the existing plants;
- a sugar engineer specialized in planning and management for a period of four months to review the existing plans and to formulate the requirements of technical assistance for the implementation of such plans.

4. Project Budget:

<u>Comments</u>	<u>Duration</u>	<u>Cost</u>
an agricultural expert	3 months	US\$ 9,000
an expert in harvesting, transporting and storing sugar raw material	3 months	9,000
a specialist in beet sugar production	3 months	9,000
a specialist in cane sugar production	3 months	9,000
a sugar engineer specialized in planning and management	4 months	12,000

48,000

3. INTERNAL SECURITY

For 1953
Notes

For 1954
Notes

background information

Iraq's refined sugar demand for 1975 was estimated at 340.000 tons. From this total, twenty per cent is to be supplied by local production and eighty per cent from refined imported raw sugar. The actual per-capita consumption of sugar is thirty kilograms and in 1980 and 1985 it is estimated to be, respectively, thirty-four and thirty-six kilograms per-capita. On the basis of such consumption, the total market requirement would amount in 1985 to 500.000 tons of refined sugar. The Government's target is not only to supply the local market with sugar produced in the country, but also to export sugar. Such an objective implies a substantial increase in the production of raw materials, the modernisation and expansion of the existing industrial plants and the establishment of new ones, especially integrated agro-industrial sugar producing plants.

In order to specify recommendations, the following summary of the main factors affecting the sector is presented:

1. Raw Materials

Actually both raw materials - sugar beet and sugar cane - are being produced in Iraq. The sugar beet production in the northern part of the country is running on the basis of co-operation between "state-owned" companies and the private land-owners. This caused some difficulties in the application of the mechanisation and all other up-to-date agricultural methods. The sugar cane production has been carried out only in the "state-owned" farms from the very beginning so that the production does not suffer from such difficulties. Insufficient mechanisation and shortage of the skilled trained operators and management are the main problems in the production of both raw materials, sugar cane and sugar beet.

New irrigated areas for production are under development and the Ministries of Agriculture and Agrarian Reform are responsible for the whole programme which is comprised of the establishment of new processing plants, training of personnel, agricultural mechanization, research, development and employment of modern

management methods. The most important areas of new development are the regions of Sulaymanya, Great Musayab, Ishaqi, Hawija Khalis, Abu Ghraib and Aski Mosul for the sugar beet and Nahr Saad and Dijaila for the sugar cane.

In the last three years great effort was made to increase the production by both increasing the cultivated area and the productivity of the factories and the growing of crops. However, the results achieved are below the planned objectives, as can be seen in the following table:

	<u>Sugar Cane</u>	<u>Sugar Beet</u>
<u>Arable land (ha)</u>		
planned	2,000	2,800
actual	1,210	1,365
<u>Yield (t/ha)</u>		
planned	110.0	65.0
actual	85.0	48.0
<u>Quality of Raw Materials</u>		
sugar content	10.8	14.6
sugar's recovery	7.0	7.8
purity of raw material	81	81

In summary, concerning quality, sugar cane is eighty per cent in quality of what could be achieved in Iraq and the sugar beet is less than eighty per cent of that which could be achieved given the conditions of climate and soil prevailing in Iraq.

Finally, it must be said that, although there is very good co-ordination between competent Ministries some of the strategical questions are still open, like:

- convenience of some locations for raw material's production - sugar beet or cane;
- application of the up-to-date agro-economical methods in the high production of raw material;

- production of stable semi-products, and optimization of by-products from both raw materials, with intention that their finalization be followed up near the market.

The answer to the above questions are particularly important when we consider that the increase of arable land will be on the order of:

6,000 ha for sugar cane

and

11,000 ha for sugar beet production.

2. Industrial Processing Facilities

The existing plants are rather below the sizes recommended by modern technology, but most of the plants were designed to refine imported sugar and not to produce sugar from local raw materials. There are consequently, imbalances between the refinery and the raw sides of the sugar factories, especially in the ones which produce beet sugar; the cane sugar factories are more modern, more balanced and have a higher yield due to the better set up and continuous processes.

Therefore, in the programme of sugar production expansion in Iraq, priority should be given to the reconstruction and expansion of the existing plants in order to maximize their productivity.

3. Sugar Production Development Programme

As mentioned in the introduction, the estimated sugar demand in Iraq will be in 1985, half a million tons and the plan's objective is to supply such demand with locally produced sugar. Plans for reconstruction and expansion of the existing plants are under way and new sugar cane factories will be built in the regions of Nahr Saad and Dijaila to produce by the year 1980 about 80,000 tons per year of refined sugar from locally produced raw sugar. At the same time, the new beet sugar plant to be located in the Musayab will be producing about 50,000 tons

of refined sugar. With the expansion and the establishment of new plants, the sugar industry in Iraq would produce by 1980 about 300,000 tons of sugar per year. To reach such a production level will require the investment of about US\$ 200 million in the next five years and, if the production is to reach 700,000 tons of refined sugar in 1985, it will be necessary to invest another US\$ 350 million. Such estimates are only for the industrial plants. Concerning the agricultural side, in order to produce locally the raw sugar needed by 1980, maintaining the actual ratio of sixty to forty between sugar beet and sugar cane, it would be necessary to have about 65,000 and 30,000 hectares of arable land to grow respectively the beet and cane required. In comparison with today's area it would have to increase forty-eight times for beet and twenty-five times for cane.

The above are rough indications of the magnitude of the programme which would imply measures of management in order to shorten the time between harvesting and processing and it would be necessary to train at least two hundred highly specialized agricultural engineers and about one hundred processing engineers and numerous technicians.

Having in mind that all such development is intended to be carried out at the most modern technological level making the best possible use of all the resources, a multi-disciplinary approach is required to assist in the detailed planning and implementation of the whole project. In order to formulate the project, the following experts are required:

- (a) An agricultural expert for a period of about three months to assess the agricultural aspects of the sugar cane and beet production and the plans for development and to work out guidelines for further technical assistance;
- (b) An expert in harvesting, transporting and storing sugar raw material for a period of three months to recommend measures to avoid losses;

- (c) A specialist in sugar beet production for a period of three months to recommend improvements in the existing factories;
- (d) A specialist in sugar cane production for a period of three months to recommend improvements in the existing plants;
- (e) A sugar engineer specialised in planning and management for a period of four months to review the existing plans and to formulate the requirements of technical assistance for the implementation of such plans.

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UNITED NATIONS DEVELOPMENT PROGRAMME

Draft Project Data Sheet

1. Reference Data:

Country:

LEBANON

Project Title:

Reorganization and expansion of the sugar processing industry.

Project Number:

- NDP Ref.:

- UNIDO Ref.:

Origin and Date of Request:

Purpose of the Project: To assist the Government of Lebanon to solve the actual problems of the sugar processing industry, to plan its expansion and to start the implementation of the programme for such expansion.

2. Background Information: See attachment.

3. Description of the Project: Five experts, as follows, will implement the project:

- one sugar beet agricultural expert should be assigned for three months to review the agro-pedological methods being employed and to recommend measures to improve them;

- one agro-industrial expert specialized in planning the co-operation between farmers and industry should be employed for three months to analyse the prevailing conditions in Lebanon and to suggest types of contracts and other means of technical and commercial co-operation among them;

- a beet sugar engineer should assist the Government for four months to review the conditions in the actual producing plants in order to indicate the ways and means to improve their efficiency with particular emphasis on that concerning the by-products utilization;

- a beet sugar engineer specialized in the planning of agro-industry development should assist the Government for two months to review the sugar industry development plans and to formulate a parallel plan for the international technical assistance;

- In order to start a training programme four local technicians will be trained for a period of six months each, starting the second half of 1975.

4. Project Budget

Summary

a sugar beet agricultural expert
a agro-industrial expert specialized
in planning the co-operation between
farmers and industry
a beet sugar engineer
a beet sugar engineer specialized in
the planning of agro-industry
development
training for four local technicians
each for

<u>Duration</u>	<u>Cost</u>
3 months	USD 9,000
5 months	9,000
4 months	18,000
2 months	6,000
6 months (each)	19,200
	<hr/>
	75,200

5. Budget Summary

For UNRRA
Date:

For UNRRA
Date:

background information.

The sugar economy in Lebanon is composed of private enterprises which produce refined sugar on an integrated basis from raw materials locally produced and refineries which refine imported raw sugar. The Government subsidises the importing of raw sugar which is sold to the local refineries at prices lower than those prevailing in the international market.

The Government in promoting the country's industrial development intends to stimulate the domestic raw material production. The programme to make the country self-sufficient by 1960 will require high investment and co-ordination between the interest of beet sugar producers and the interests of the refinery owners.

The actual sugar demand in Lebanon amounts to about 70,000 tons per year with a rate of increase of about four per cent a year. The main installed capacity is for refining sugar which amounts to 130,000 tons of refined sugar per year. However, only about fifty-three per cent of such capacity is being actually employed. The existing equipment is, on the average, twenty-five years old, not up-to-date and new investment would be required to produce a better quality sugar and to increase the yield.

The present producing capacity for beet sugar is insufficient and its increase has been foreseen in the Beqa'a valley. Also, in the north of Lebanon arable land is available and could be used for the production of beet sugar. Actually under consideration, is the establishment of a 20,000 ton per year integrated agro-industrial sugar plant. The increase of the integrated agro-industrial production of sugar in Lebanon is technically feasible. The climate conditions are favourable, although no more than 3,000 hectares have been planted. The main reason for this is the preference given by the refineries to imported raw sugar. The existing policy concerning prices have been unfavourable to development of the local production of raw material. On the other hand, the low yield of 52.5 tons/hectare being achieved does not correspond to the favourable conditions of soil and climate.

In summary, the sugar industry in Lebanon actually presents various handicaps such as the low level of utilization of the available refinery capacities, the low ratio between raw material and refined sugar (from 100 kilograms of sugar beet only 5.3 to 11.2 kilograms of refined sugar is obtained), the arable land is not properly used and that the Government expends annually substantial amounts of financial resources to subsidize imported raw sugar. Finally, the by-products of the sugar industry have not been properly used in the allied industries, although part of them have been exported as part of jams, juices and beverages.

In order to overcome the actual problems and to make further progress in this industrial sector, it is recommended:

- to identify total areas suitable for sugar beet plantations and to undertake measures to organize co-operation between private land owners and the industry, in order to make possible long-term contracts and profitable sugar beet production;
 - to make use of agro-pedological methods and seed selection to improve the sugar beet production. The actual demand of 70,000 tons should be produced by the Lebanese sugar industry with a sugar beet plantation of 15,000 hectares;
 - the sugar beet production should be a basis for the cattle growth development. Use of suitable rotational crop cycles should also be used to increase the crop yield;
 - priority should be given to the optimization of capacity and technological level in the sugar factory Anjar, and after that it should be decided whether or not to set up one new sugar factory in the Beqa'a valley;
 - the capacities of existing refineries which are well placed, have to be taken into consideration when planning the establishment of new industrial capacities for beet sugar processing.
- Integration of interests of the Lebanese Government on the one hand and of the private land and industry owners on the other hand, should be met on the level of a new limited company;

- further using of molasses should be planned in the production of raw materials for allied industries and so on to eliminate the export of molasses;
- the permanent interest for sugar beet planting should be ensured through the establishment of integrated agro-industries;
- the Lebanese Government should give its main support to the development of integrated agro-industries planned for the forthcoming increase of sugar and sugar beet production, keeping in mind, that it is the shortest way for the elimination of importation of raw sugar and the allied industries development;
- the schooling of domestic staff should be undertaken so that after 1960 the entire Lebanese sugar industry is based on domestic management.

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
UNITED NATIONS DEVELOPMENT PROGRAMME
Draft Project Data Sheet

1. Reference Data:Country:

SYRIA

Project Title:

Reorganization and expansion of the sugar processing industry.

Project Number:- UNDP Ref.:
- UNIDO Ref.:**Origin and Date of Request:**

Purpose of the Project: To assist the Government of Syria to solve the several problems of the sugar processing industry, to plan its expansion and to start the implementation of the programme for such expansion.

2. Background Information: See attachment.**3. Description of the Project:** Four experts, as follows, will implement the project:

- an agricultural expert for a period of about three months to assess the agricultural aspects of the sugar beet production and the plans for development and to work out guidelines for further technical assistance;
- an expert in harvesting, transporting and storing sugar raw material for a period of three months to recommend measures to avoid losses;
- a specialist in beet sugar production for a period of three months to recommend improvements in the existing factories;
- a sugar engineer specialized in planning and management for a period of four months to review the existing plans and to formulate the requirements of technical assistance for the implementation of such plans.

4. Project Expenditure:CommentsDurationCost

an agricultural expert	3 months	US\$ 9,000
an expert in harvesting, transporting and storing sugar raw material	3 months	9,000
a specialist in beet sugar production	3 months	9,000
a sugar engineer specialized in planning and management	4 months	12,000

39,000

5. Financial Accounts

For 1963
Date:

For 1964
Date:

Background Information:

The actual Syrian sugar market amounts to about 190,000 tons which is supplied in the following manner: seventy per cent from imported raw sugar which is locally refined; twenty-one per cent from imported sugar already refined and nine per cent from sugar locally produced. Although there are governmental controls limiting the consumption, the estimated total demand for 1960 is 290,000 tons of refined sugar.

The Government is implementing a programme through the Ministry of Agriculture and Agrarian Reform and the Syrian Company for Industrialization of Sugar and Agriculture which is aimed at increasing the agricultural production of sugar beet and increasing production and refining of raw sugar. The following information summarizes the actual and planned aspects of the Syrian sugar economy.

TABLE 1

ACTUAL AND PLANNED SUGAR BEET PRODUCTION

	AREA	YIELD	BEET
<u>SUGAR BEET PRODUCTION AREA (ha)</u>			
Actual	2,130	4,550	6,760
Planned	6,500	20,000	20,000
<u>YIELD (TONS/HA)</u>			
Actual	33.2	10.7	37.3
Planned	30.0	10.0	32.0
<u>PERCENTAGE OF BEET IN THE AREA</u>			
Actual	15.5	10.0	16.5
<u>PERCENTAGE OF BEET IN THE BEET AREA</u>			
Actual	10.9	11.5	10.2
Planned	11.4	13.1	13.7

The Syrian climate conditions permits two crops per year, one in autumn and the other in summer. However, the agriculture is not yet taking full advantage of such favourable conditions. The

Government is promoting the extension of the arable land especially through irrigation and increasing the level of agricultural mechanisation, ameliorating the technical level of operators and modernizing the farm management. In this respect it is of particular interest to mention the irrigation programme in the Ghaz region which is to serve as a model of an integrated state owned agro-industry which will co-operate with private land owners in the development of the sugar industry. According to the above data concerning the planned areas and expected yields, the production of beet sugar would increase to 1,603,000 tons. Further actions should be aimed at increasing the yield to about forty-five t/ha and the total of production to 2,182,500 tons per year. Finally, the further expansion of the planting area in the Euphrat basin should be considered, in which a total of 800,000 ha could be available.

Concerning the industrial production capacity the following table summarizes the main information:

TABLE 2

ACTUAL REFINERIES AND RAW SUGAR PRODUCTION CAPACITIES

	<u>ADNA</u>	<u>EL GHAB</u>	<u>HAMA</u>
Sugar Beet Capacity (tons/day)	600	2,000	1,800
Raw Sugar Refining Capacity (tons/day)	200	300	300

According to the governmental plans which involve investments of about 81.1 million Syrian pounds in expanding the actual capacity and the establishment of a new plant in Rakha, the following should be the situation in 1980.

TABLE 3

PLANNED REFINERIES AND RAW SUGAR PRODUCTION CAPACITIES, 1980

	<u>ADNA</u>	<u>EL GHAB</u>	<u>HAMA</u>	<u>RAKHA</u>	<u>TOTAL</u>
From Sugar Beet (t/year)	7,200	24,000	14,400	28,800	74,400
From Raw Sugar (t/year)	28,000	42,000	42,000	64,000	176,000
Total General					<u>250,400</u>

Therefore, in 1960, the yearly demand of 290,000 tons would be satisfied with the local production of 250,400 tons and 39,600 tons of imported sugar. Such a situation in 1980 would be possible with the planting of 48,000 ha as mentioned in Table 1. If the Government wants the country self-sufficient 5,500 ha more should be planted and with such an increase, the total producing area would be 54,000 ha and the production of beet sugar would amount to 2,410,000 tons resulting in 290,000 tons of refined sugar. In each one of the hypothesis the following would be necessary:

- Existing programmes for the raw material production should be speeded up and enlarged in order to eliminate the importing of raw sugar. It is also advisable to make some changes of today's conceptions and relations between planting areas and planned industrial capacities.
- Special attention to the seed's selection should be paid in order to utilise the possibility of sugar beet cropping twice a year.
- Planning of the animal feedstuffs, using the sugar beet's remnants and molasses has to take a place in the industrial development programmes.
- It is of special interest to check how much it is possible to apply up-to-date technological achievements in the present reconstructions so that better productivity in future capacities will be ensured.
- To establish state owned integrated agro-industries and to promote the co-operation between the state owned farms and private land owners.
- Industrial development programmes should be harmonised with the raw material development programmes in order to eliminate the importation of raw sugar.

UNITED NATIONS ECONOMIC DEVELOPMENT ORGANIZATION

TECHNICAL ASSISTANCE PROGRAMME

Draft Project Data Sheet

1. Reference Data:

Country: JORDAN

Project title: fruits and vegetables industry development

Project Number: UNDA/86/1

UNDA/86/1

Origin and Date of Request:

Purpose of the Project: To assist the Government in assessing the possibilities of further development of the fruits and vegetables processing industry.

2. Background Information: The Government of Jordan places a high priority on the development of the fruits and vegetables processing industry in order to reduce the importing and increase the export of processed agricultural products. The Government further intends to give the farmers the necessary support in order to stimulate the agro-industrial development and to make use of favourable environmental conditions which permits two crops a year of various vegetables. The country has the potential for increasing the production of agricultural raw materials in the newly developed areas irrigated with water from the River Jordan. Specifically, the Government intends to implement measures aiming at: - increasing the output crops per hectare; - extending harvesting seasons to enable the factory to achieve maximum production; - making full use of the existing processing capacity, to diversify production, expand the factory and to establish new factories.

3. Description of the Project: (1) One fruit and vegetable processing expert will review the existing conditions in the country concerning imported processed fruits and vegetables, actual and potential production of raw materials etc., and will suggest opportunities for establishing new industrial plants. (2) To start the systematic training programme for operators. The expert will identify four candidates for training abroad.

4. Project Budget:

Component

Duration

Cost

1 fruit and vegetable processing expert 1 months

US\$ 9,000

4 fellowships 6 months (each)

US\$19,200

28,200

5. Request approved:

For UNDA
Date:

For UNDP
Date:

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
UNITED NATIONS DEVELOPMENT PROGRAMME

Draft Project Data Sheet

1. Reference Data:

Country: JORDAN

Project Title: Tomato processing industry development.

Project Number: - UNDP Ref:
- UNIDO Ref:

Origin and Date of Request:

Purpose of the Project: To review the present conditions in the tomato processing plant and suggest means for overcoming actual problems.

2. Background Information: The existing tomato plant needs to improve its operational conditions, to diversify the production line, to improve the quality and packaging of the products.

3. Description of the Project: One tomato processing expert will review the operational conditions of the existing factory and will recommend ways and means to improve the production methods, to up-grade the products and their packaging.

4. Project Plant:

<u>Components:</u>	<u>Duration:</u>	<u>Cost</u>
One tomato processing expert	Three months	US\$ 9,000

5. Request approved:

For UNIDO

Date:

For UNDP

Date:

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
UNITED NATIONS DEVELOPMENT PROGRAMME

Draft Project Data Sheet

1. Reference Data:

Country: LEBANON

Project Title: Development of the fruit and vegetable processing industry.

Project Number: - UNDP Ref:

- UNIDO Ref:

Origin and Date of Request:

Purpose of the Project: To review the prevailing conditions in the fruit and vegetable industry and to assist in overcoming the actual problems.

2. Background Information: Food processing is the largest of Lebanon's industries, both by total size of investment and employment. Canning of fruits and vegetables, largely of domestic origin, has been going on for over thirty years. Exports have been growing, particularly with regard to fruit juices, marketed not only in the Middle East, but also in Eastern Europe. The industry produces a large scope of products including narmalade, tomato paste, stewed fruits, syrups, canned vegetables, fruit juices and ice cream. About nine canning plants are operating and, having in mind that the country presents very favourable conditions such as fertile soil, abundance of water, adequate distribution facilities, the Government intends to assist such plants to make full use of their potentialities and to expand, modernize and diversify the whole sector.
3. Description of the Project: A team of three experts, one industrial economist, one fruit and vegetable processing specialist and an agronomist will assist the Government for a period of four months each with the objectives of advising on: (1) The extension and modernisation of existing factories; (2) The feasibility of establishing additional plants; (3) The co-ordination of raw material production with processing requirement to ensure: (a) maximum production by the factories over a ten to eleven month period; (b) adequate crop out turn per hectare over as long a harvesting period as possible to ensure maximum specialized production rentability; (4) better use of existing industrial facilities by means of production diversification; (5) Planning a long-term technical assistance programme.

4. Project Budget:

<u>Comments</u>	<u>Duration</u>	<u>Cost</u>
1 fruit and vegetable processing expert	4 months	US\$ 12,000
1 industrial economist	4 months	12,000
1 agronomist	4 months	12,000
		<u>US\$ 36,000</u>

5. Request Approved:

For UNIDO

Date:

For UNDP

Date:

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UNITED NATIONS DEVELOPMENT PROGRAMME

Draft Project Data Sheet

1. Reference Data:

Country: OMAN

Project Title: Development of the fruits and vegetables processing industry.

Project Number: - UNDP Ref:
- UNIDO Ref:

Origin and Date of Request:

Purpose of the Project: To advise the Government in more efficient ways of starting the processing of fruits and vegetables in the country.

2. Background Information: This country does not yet have installed fruit and vegetable processing plants. There is available land suitable for cultivation and there also exists adequate irrigation possibilities. Although the actual agricultural production is basically of a subsistence nature, a number of cash crops are grown and exported as raw materials (especially dates, limes, bananas and mangoes). The Government places great emphasis on the industrialisation especially as a means for import substitution. It would be necessary to assess the growing potential of various types of produce, to study the requirements and systems of irrigation, to establish research and training centres and to elaborate studies for the establishment of processing plants.

3. Description of the Project: An expert should be recruited to assist in the assessment of production potential, planning cultivation methods, the need for irrigation and the methods to be employed. The expert would also submit plans for a viable research station/training centre. This should be a three months assignment.

4. Project Budget:

<u>Comments</u>	<u>Duration</u>	<u>Cost</u>
Fruit and vegetable processing expert	3 months	US\$ 9,000

5. Request approved:

For UNIDO
Date:

For UNDP
Date:

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
UNITED NATIONS DEVELOPMENT PROGRAMME

Draft Project Data Sheet

1. Reference Data:

Country: SAUDI ARABIA

Project Title: Development of the fruit and vegetable processing industry.

Project Number: - UNDP Ref:

UNIDO Ref:

Origin and Date of Request:

Purpose of the Project: To assist the Government in implementing short-term measures to improve the actual processing plants performance and to plan long-term action towards the industry's development.

2. Background Information: The main processed products in Saudi Arabia actually are tomato juice and sauces, produced in a modern factory which operates in Riyadh. Prospects of increased areas of cultivation are good and the reclamation of 20,000 acres together with installation of 1,500 kms of irrigation pipes and corresponding drainage is being effected. There are two small research stations attached to the Ministry of Agriculture. The main immediate problem is the production of raw materials. At the same time the factory operations should be extended to a ten to eleven month period. Raw material supplies should be based on a fixed price, viable to the factory and fair to the grower.
3. Description of the Project: A team of two experts will assist the Government for three months each in order to implement a plan aimed at: (1) Increasing the raw material and out turn per hectare; (2) Contract buying of raw materials; (3) Contracts to specify the price, quality, methods of harvesting and delivery; (4) Where production is effected by growers, factory field men should supervise planting, irrigation, fertilisation and pest control since this supervision will bring the produce in line with supplies grown on factory-owned land; (5) Surveys which should be carried out into the possibilities of growing other products suitable for processing; (6) Extension of production of new area, e.g. the Gulf area should be investigated; (7) Studies on the feasibility of can making and the manufacture of other containers should be made; (8) The production of plastic piping for filter

irrigation and plastic tunnelling for growing on irrigated land should be investigated.

To plan long-term action towards the sector's further development an expert should be recruited to investigate the possibilities of crop diversification in all areas of the Kingdom. Such a mission would require three months and an expert should be recruited on a long-range assignment to initiate a programme of industrial development.

4. Project Budget:

<u>Components</u>	<u>Duration</u>	<u>Cost</u>
1. Fruit and vegetable processing specialist	3 months	US\$ 9,000
2. Agronomist	3 months	US\$ 9,000

5. Amounts Required

For UNIDO

Inter:

For UNDP

Inter:

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
UNITED NATIONS DEVELOPMENT PROGRAMME

Draft Project Data Sheet

1. Reference Data:

Country:

JORDAN

Project Title:

Reorganization and expansion of the integrated vegetable oil processing industry.

Project Number:

- UNDP Ref.:

- UNIDO Ref.:

Origin and Date of Request:

Purpose of the Project: To assist the Government of Jordan to solve the actual problems of the integrated vegetable oil processing industry, to plan its expansion and to start the implementation of the programme for such expansion.

2. Background Information: The vegetable oil industry in Jordan is not well developed and the per capita consumption is only half of that in Syria or in Iraq. Approximately 6,000 t/year of vegetable ghee is produced from imported raw materials, especially palm oil. There does not seem to be much scope for extending the industry. It is surprising that the only two existing factories are inland, in Amman and Habis, in spite of the fact that all raw material is imported. The neighbourhood of Amman would seem to be a better location, unless more oil seeds could be grown locally.

About 6,000 t/year of olive oil is produced, but as in Syria and Lebanon, there are too many small old-fashioned and inefficient mills.

3. Description of the Project: Two experts, as follows, will implement the integrated project:

- An agricultural expert to investigate the possibilities of growing oil bearing seeds within the country. Period - one month.
- An olive oil expert to recommend the modernization of the olive oil industry. If suitable, the same expert could cover other countries.

4. Project Budget:

Components

an agricultural expert
an olive oil expert

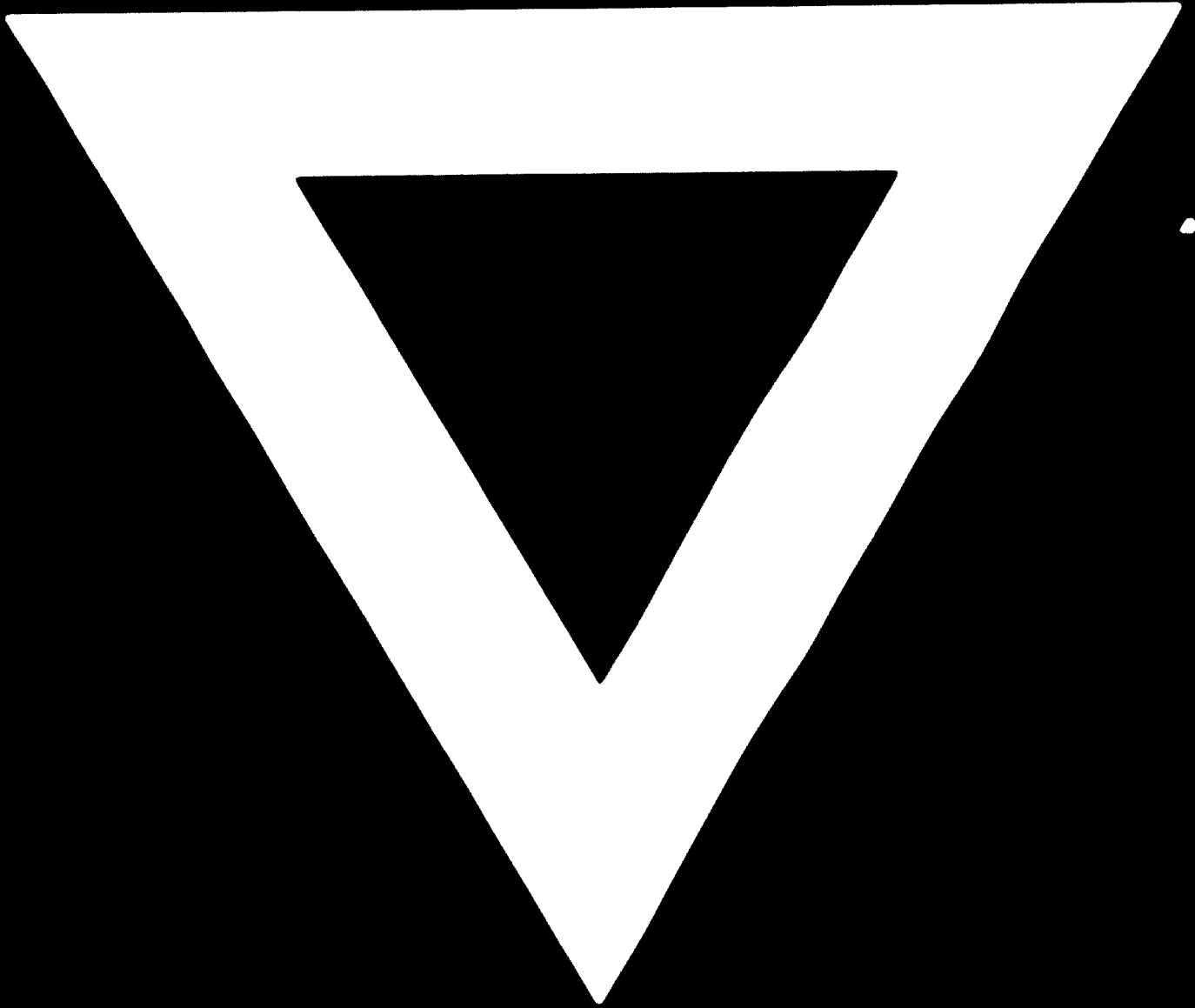
Duration

1 month
1 month

Cost

USD 3,000
3,000
6,000

5. Recent Activities



75.08.20