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PRE-FEASIBILITY STUDY FOR THE
PROCESSING OF CITRUS FRUIT

UC/PAL/84/187

(2) WEST BANK AND GAZA STRIP

Terminal report*

Prepared by the
United Nations Industrial Development Organization

Based on the work of D. Istanbuli,
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INTRODUCTION

This study was prepared by two Palestinian experts residing in the occupied territories and one internationally recruited expert. The Palestinian experts prepared the bulk of the study comprising the market and demand analysis, the materials and inputs, the location and site and the technical chapter. The internationally recruited expert prepared the financial analysis utilizing the COMFAR software. Palestinian experts living in the heart of the problem brought to bear their first hand knowledge and experience of the local situation and raised issues peculiar to it.

The authors wish to indicate that the ideas, findings and recommendations in this study could not have been presented without the help and participation of a number of individuals in the occupied territories. For his help in participating with the team, working out and supervising data collected on raw material the authors are grateful to Mr. Abbudl Rahman Abu Arafah. The authors wish to acknowledge their debt to the backstopping officer of UNIDO for his patience and guidance and to UNIDO for their financial assistance in realising the study.

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Chapter 1

EXECUTIVE SUMMARY

1.1 Project Background and History

The project concept is to study the viability of establishing a plant for the processing of citrus fruit in the occupied territories of Palestine. The study will define all aspects pertinent to the planning and execution of such a processing plant. These include the main problems that are likely to be encountered in the process of establishing the plant. The plant will produce concentrated and natural strength juices out of raw fruits supplied from local farms. Most of the citrus fruit grown in the West Bank and the Gaza Strip needs to be exported. The main export markets have been the Arab countries and East Europe. However, exports to these markets have fluctuated either due to political factors or to competition from other exporting countries. Moreover, the Gaza Strip produces large quantities of low-grade citrus which fetch low prices in the export market. Therefore, the establishment of a processing plant which will absorb the low-grade products will enhance their export value and contribute to an increased price for the higher trade. The main objective therefore is to create a market for the abundant citrus production in the occupied territories and strengthen the industrial base of that region.

The project idea emerged in the early 80's, when the first initiative was brought into light by Gazan citrus dealers and producers. A committee has been set up to promote the idea of building a citrus processing plant in the occupied territories. After having solved numerous problems of legal, financial and also of political nature, a legal company has been established and registered in 1985 with the initial capital of 50.000 Jordanian Dinars and a collateral of 50.000 US\$. Also in 1985 UNIDO was approached to assist in the preparation of the pre-feasibility study.

1.2 Market and Plant Capacity

The Israeli authorities require that 80% of the output has to be exported to neighbouring Arab countries or to other foreign markets, except Western Europe. This condition has to be accepted by project promoters and the market and demand study has been done accordingly.

Market Size

Domestic demand for the processed citrus products is not large enough to warrant the setting up of a plant. Domestic demand could reach 6 000 tons per year. Therefore, a sizeable quantity of the plant's products should be exported. The envisaged volume of exports of processed citrus

products is insignificant if compared to the volume of world trade in those products. The potential markets would be by order of importance: the Arab markets, the East European markets and perhaps the West European markets. The success of marketing the products will depend mainly on the policies of the Israeli authorities which so far have not been favourable, and to a lesser extent the administrative restrictions imposed by the importing countries.

Based on the market demand analysis a plant with a capacity of 25 tons per hour is proposed. This means that a seasonal supply of 25,000 tons of citrus fruits are needed. This quantity represents only 17 percent of total Gazan citrus production. It would be supplied mainly through grading and packing houses from lower grades.

Types of final product should be confined, in the early stages of implementation, to pure single strength and concentrated juices. Nectars, however, are suggested to follow in the third year. Drinks - carbonated and non-carbonated, - candied peel, or jams will be processed only after careful and elaborate market research is undertaken.

The pure concentrated citrus juice - or other processed fruits in the future is suggested to constitute at least 80% of processed fruits. Pure concentrated juices are considered as primary commodity in many export markets. Further processing of concentrated juices into final products for direct consumption is not necessarily desirable by importing countries; except for some developing countries, including Arab states; and even in these states competition would be very keen. In 1967, the E.E.C. common external tariff escalated from 1.5% for raw materials/primary commodities/, and energy to 10.7% for semi-finished goods, and 11.7% for capital goods, and similar escalations characterized the U.K. and the U.S. tariff structures... Non tariff barriers too/quotas, "voluntary" agreements to restrict exports strict health regulations on food imports, etc/have apparently increased considerable in the last ten years and appear to bear more heavily on exports of developing countries.

It is advised that the proposed plant has a branch of a representation in Amman-Jordan in order to cope with policies of access to the Arab markets. A well informed Jordanian source declared that the government is about to pass a law whereby all juice and drinks factories be prohibited from adding artificial citrus flavours, and are obliged to add a certain proportion of pure concentrated citrus juice in their blends. The same source added that another law would also be passed whereby a 5% subsidy of total value of exported agricultural products be granted for promoting agricultural exports. These two notions may provide justification to the previous suggestion. In any case should these laws be effected, marketing pure concentrated citrus juice to Jordanian factories would certainly have a tremendous and continuous demand.

Marketing problems of the proposed product have directly influenced the plant capacity. There exists numerous uncontrollable variables that influence marketing in both local and export markets. Competition, level of economic activity, and consumers' changing behavior are seemingly affecting marketing to a lesser extent than the effect of governmental policies.

It seems important that the suggested plant be multi-purpose plant for processing non-citrus fruits such as grapes, plums, and tomatoes. These types were not included in this study. Should the study prove the viability of processing citrus, then processing of non-citrus would surely add to such viability; especially since investment costs would be at the minimum, surplus of raw material are available, overhead costs would also be nominal.

Market segmentation is advised in order to avoid "occasional marketing". It seems also important that provisions have to be taken for product storages away from the plant site in order to overcome sudden restrictions over exports from that location. Such provisions may appear costly, but they have to be included to save the image of the plant at export markets.

Local markets, under present conditions, will absorb less than 20 percent of the products. At the early stages, only Jerusalem, Jericho and Nablus are suggested as market targets. Exports will be confined to Jordan and Eastern Europe for the first three years of operation.

The production program has been designed having all marketing and also political constraints in mind. The following structure of output is foreseen for full capacity /in percent/.

1. Concentrated juice	30%
of it:	
- Shamuti orange	9%
- Valencia orange	59%
- grapefruit	22%
- lemon	10%

2. Natural strength juice	53%
of it:	
- Shamuti orange	14%
- Valencia orange	65%
- grapefruit	21%
3. Nectars	14%
4. Peels /and other organic wastage/	3%

1.3. Materials and Inputs

Fresh citrus fruits constitute the main raw material for the plant. There are four major types:

- oranges - two kinds: early oranges /Shamuti/ and late oranges /Valencia/
- grapefruits
- lemons

No additional substances are needed as the objective is to squeeze the fresh fruits and get 100% pure juice without any preservatives or chemicals added. All fruits are in abundant supply in the Gaza strip and in the West Bank, the annual crop exceeding 150.000 tons, with Valencia itself reaching often 100.000 tons. The plant will use mainly low grades which normally face enormous marketing problems and therefore are available at low prices.

Except for raw citrus fruits, some auxiliary materials will be needed, in particular packaging. The juice will be packed in cardboard packs and cartons of 250 cc and 1 litre, and in 3 litres metal cans. All packaging material will be supplied from local manufacturers.

1.4. Location and Site

Five alternatives have been considered as possible location for the proposed plant site: Tulkarm, Jericho, Jerusalem-Bethlehem zone, the Gaza Strip, Gaza town. Among them Gaza town has been selected as being the most suitable location on the basis of the following merits:

- marketing problems of fresh citrus fruits are the most acute in the Gaza region,
- Gazan citrus groves are nearly three times larger than those in the West Bank,
- citrus production is more concentrated,
- Gazan citrus producers and dealers are better prepared to invest in such a project,
- a company has been already established in Gaza,
- all necessary facilities /infrastructure, manpower, etc/ are readily available in Gaza.

Within Gaza itself, the plant should preferably be located in the "A" zone south-west of the city, where 470 hectares is left within the municipal boundaries of the city for industrial and housing purposes.

The total area needed for the plant will be approximately 1 hectare and the estimated cost of this land is ca. US\$ 150.000.

1.5. Project Engineering

The technology suggested is a traditional one, involving less sophisticated machinery and equipment, but insuring a uniform high quality and sound sanitary conditions. No decision was reached, however, upon a specific type of equipment to be selected. The general description of technical process in this study is based upon offers obtained from British /APV/ and Italian manufacturers. The equipment supplied by them meets the "appropriate technology" requirement, is priced at reasonable level and can be used also for other types of juices, especially tomatoes and grapes.

Proposed plant capacity is 25 tons of fruits per hour, to be operated mostly for one shift per day, six days a week and 24 weeks per season. The production process will consist of four main sections:

- fruit delivery and handling,
- juice and oil extraction,

- natural juice de-aeration and pasteurization, and filling line,
- concentration and filling /for concentrated juice/.

The CiF price of the production equipment will be around US\$ 840.000. But the plant will need some auxiliary and service equipment at the approximate cost of US\$ 685.000. In addition to that an initial stock of spares and tools should be secured at cost of US\$ 50.000.

Civil engineering works will be carried out by local contracting companies at estimated cost of ca. 1 million US\$.

1.6. Manpower

The plant will employ 72 people altogether, of which 59 will be directly involved in the production process. Although there should be no major problem with the availability of unskilled and semi-skilled workers, there may be difficulties to hire adequate personnel for managerial and administration posts. Therefore it is assumed that main technologist and production engineer will be foreign expatriates, at least for the first three years.

The total cost of manpower will be ca. US\$ 485.000 annually, of which US\$ 330.000 will be the cost of direct manpower. The average share of surcharges and fringe benefits in the total wage bill will be around 40%.

1.7. Plant Organization and Overhead Costs

The organizational structure of the plant will rely on three main departments - production department, sales and marketing department, and administration and finance. The production department will play the dominant role with 46 people employed and headed by production engineer. Also directly reporting to the General Manager will be a technology development section, including laboratory and headed by main technologist.

The administration and factory overhead costs will be roughly US\$ 260.000, including cost of indirect personnel, rents, insurance fees, office supplies, communications, effluent disposal and other items.

1.8. Implementation Schedule

The total initial investment cost of the plant will be around US\$ 3.9 million. This will be increased in the first year of operation by additional US\$ 0.6 million to cover initial working capital requirements. The implementation period is scheduled to last 18 months, the investment expenditures being distributed over this period in the following way:

	<u>in US\$ 000</u>
First half year period	860
Second half year period	1520
Third half year period	1515

It is assumed that the construction can start effectively on the 1st July, 1987 and can be completed on the 31st December, 1988. Thus, the first year of production would be 1989.

1.9. Financial Analysis

Total investment cost of the project is US\$ 3.9 million, with the following structure:

- land	- 4.1%
- civil works	- 25.3%
- machinery	- 51.6%
- incorporated fixed assets	- 1.3%
- pre-production expenses	- 17.7%

The initial working capital requirements are US\$ 590.000 and have to be covered at the beginning of the operation period.

Total production cost will vary from US\$ 4.5 mill. to US\$ 6.1 million depending on the output level and timing. The dominant position is taken here by cost of raw materials /citrus fruits/

- 1.9 to 2.9 million US\$ annually. Sales and distribution costs will reach more than 1 million US\$, other raw materials, packaging, consumables ca. 0.6 million US\$, and manpower ca. 0.5 million US\$. Sales revenues at full capacity will exceed 7 million US\$, of which almost 80% coming from exports.

The following selling prices have been assumed for the purpose of this study:

<u>Concentrated juice</u>	<u>Unit Price US\$/ton</u>
Shamuti orange	1500
Valencia orange	1500
Grapefruit	1350
Lemon	1100
<u>Natural juice</u>	
Shamuti orange	950
Valencia orange	900
Grapefruit	900
Orange nectar	450
Peels	15

These are prices obtained by the company and not the retail prices.

Financial structure of the project is based on a large proportion of equity funds, covering 75% of total investment cost, with a loan from public sector contributing another 25%. The equity, in turn is split between private sector /50%/ and public sector /25%/ in order to keep the balance between the public and private interests.

The loan will be charged with the 6% interest rate, and will have to be repaid over five years with one year grace period.

The examination of financial liquidity of the project proves its very sound position. A small deficit of funds appears in the first year of operation, when the plant is run

at 60% capacity utilization rate. In all other years the project produces a substantial surplus of funds. Profitability measures confirm solidly this observation. The IRR on equity is 22%, the IRR on investment is 20% and net present value of the project at 10% discount rate is US\$ 2.3 million and US\$ 2.2 million respectively.

The payback period of the project is about 4.5 years.

1.10. Conclusions and Recommendations

Although the overall appraisal of the project shows that it is commercially viable, it has to be kept in mind that its profitability is highly sensitive to the selling price. Specifically, the break-even margin for the price is only 14-15%, which means that if the average selling price decreases by more than that, the project would bring losses.

Moreover, it has to be kept in mind, that the financial plan is a mere proposal still to be negotiated with the project's promoters. At this stage it was simply not possible to fix all the details of financing, defining exact contributions of particular sources of funds and specifying the accurate cost of loan financing. So it is important to remember that the present report is a pre-feasibility study which would require further investigation in certain aspects. However, the results obtained in this study could be a basis for a positive recommendation of the project and fully justifies further efforts to bring the project idea successfully to the implementation stage.

Chapter 2

PROJECT BACKGROUND AND HISTORY

In the process of preparing this study, several objectives were set out to be achieved. The study should clearly define in purely technical terms, all aspects pertinent to the planning and execution of such a project. It should consider and cover main problems that interested entrepreneurs might need to know, in order to be more aware of, and mobilized towards solving the many problems that are expected to be encountered in the process of establishing the plant. It should rely on information and other studies of relevance and adapt the findings to the objective realities of the occupied Palestinian territories. First hand data should be collected and analyzed; for this reason the team prepared two questionnaires; one for gathering data on raw materials and the other on local markets. Personal interviews were held with several institutions and individuals who were presumed as having direct relation to, or knowledge about the proposed study. The data gathered were analyzed and the findings were the primary guideline for this study. Pertinent official or academic data were also studied and analyzed. Thus interested groups, it is hoped, might find broad guidelines for future evaluation of the viability of the proposed project. The team surely do not claim that this study covers every aspect and problem, but hopefully this study may help give more insight to the idea under investigation.

2.1. Determinants of Agricultural Development

The political environment, together with its legal forces and procedures has a major impact over economic development in general. The very fact that the occupied Palestinian territories are being under a prolonged military occupation, and governed by a foreign body that is reluctant in accelerating development makes it necessary for the private Palestinian sector to fully undertake and seriously consider industrialization - in its preliminary terms: processing and other extractive industries -

as a strategy for economic growth, in order to safeguard the Palestinian society's own existence.

The social-cultural environment is changing, slowly perhaps but it may have tangible impact over consumption patterns. Such an impact is felt on products available in markets. Consumption changing needs and wants are being satisfied by Israeli manufactured goods, or by foreign goods majorly imported through Israeli agents. Thus Palestinian trade is losing to outside producers.

The major problem facing the Palestinian society in the occupied territories is that most of the investment in agriculture and allocations for increasing production were not met by a similar increase in the value of production. Marketing policies and procedures imposed over both local and export markets makes it almost impossible for producers to have fair returns. Production inputs on the other hand, and for various agricultural crops, are being supplied by, or through Israeli industries and agencies. Prices of inputs are increasing in most cases.

The military government tight control over the whole economy of the occupied territories - including trade monetary regulations different taxations, and limitations over utilizing land and water resources - makes it difficult to allocate more investment in agriculture. Furthermore government allocations to institutions relevant to agricultural development - i.e. research, extension, marketing... etc. - have dropped down very sharply. Even allocations for basic services and welfare activities - i.e. transport, housing education, electricity ... etc. - are also very limited.

A fourth major determinant might be the lack of organization and coordination among the private sector to pursue and exert legitimate pressure over the authority to facilitate agro-based industries. Outside assistance and support in this respect is also unfelt.

What is missing then is surely not raw material, or technical skills to some extent, or even capital for investment.

The financial capabilities of some classes in the occupied territories - especially some Gazan main citrus producers and traders - are presumed to be up to initiate industrial development. But private capital investment under uncertain conditions is of course unlikely to occur unless some assurances of a relatively smooth flow of products and margins of profit are seen in the horizon.

Because of these complex determinants on agricultural development in general and Gazan citrus production in particular, the proposed plant might be viewed as an instrument for elevating prices of citrus fruits. Hence it is likely to prove profitable for citrus producers to at least continue to maintain their orchards. But such determinants on the other hand, have influenced, among other factors, the decision of plant capacity to be limited to only 17-25 percent of total Gazan citrus production.

2.2. Project Background

2.2.1. The Importance of Citrus for the Occupied Territories

Agriculture plays a major role in the occupied West Bank and Gaza Strip's economy. Agriculture contributes more than one third to the national income in the West Bank and Gaza.

In Gaza, citrus products are considered the main agricultural product. 34 percent of all agricultural lands are used for citrus. Income from citrus products reached 46 percent of the total agricultural income. This is despite the fact that citrus income does not exceed 40 million dollars a year in comparison to twice that income up to 1978.

West Bank citrus production equals only 40 percent of what is produced in Gaza. West Bank citrus contribution does not exceed 10 percent of the total agricultural production. Citrus groves do not exceed 3 percent the total cultivated area. Citrus production in the West Bank is important despite its small ratio. Citrus is mainly located in Tulkarm and Qalqilia,

where 17.000 dunums are planted with citrus. In the Jordan Valley, 4.000 dunums, and in the Jenin area 2.700 dunums of citrus are planted.

Judging from these figures we can conclude that the general economic situation in Gaza can be greatly affected, positively or negatively, by the citrus season much more so than in the West Bank.

Another reason why West Bank citrus has less marketing problems is the variation in production. For example, 30 percent of West Bank citrus crops are from varieties that are easily marketed. These products are only slightly affected by competition because of their small quantities. Shamouti oranges and lemons, which represent 40 percent of total citrus production, have better marketing opportunity in comparison with Valencia oranges and grapefruit.

2.2.2. Gaza as Preferred Location for the Factory

Based on available figures, it is clear that the location where the problem of marketing exists is in Gaza Strip.

Citrus agriculture in Gaza Strip has fluctuated in quantity and quality over the period between 1967-1984. Planted areas have decreased by 11 percent /9.000 dunums approximately/. But there has been some positive development of production as a result of increased dependency on advanced production methods. Since most citrus orchards were planted at the early sixties, citrus crops, in 1966 did not exceed 45.000 tons. In 1967, it reached 60.000 and in 1969 it was 108.000 tons, while in the period between 1980/1981-1983/1984 there was an average of 163.000 tons. Yet, despite this rise we can see a steep drop in production during the period from 1971-1984. So in the four years between 1973/1974-1976/1977 a total of 213.000 tons was produced yearly. But during the past four years, this level of production has dropped reaching an average of 163.000 tons which is a drop of 24 percent.

The various varieties, however, were not affected in the same way. Shamouti orange groves held their area while the areas planted with lemon increased at a yearly rate of 34 percent. Areas planted with Valencia oranges dropped considerably. So in one year /1981-1982/ the areas planted with Valencia decreased by 1.820 dunums. /1/.

In general we can estimate that an average of 500-600 dunums a year are converted from citrus production to other types of agriculture. In other words 7 out of 1.000 dunums a year will no longer be planted with citrus trees.

On the production sphere, varieties have fluctuated in different ways. Shamouti oranges have kept their production quantity at a minimum of 36.000 tons and a maximum of 50.000 tons. Valencia oranges dropped from 120.000 tons to 90.000 tons. Grapefruit dropped from 35.000 to 10.000 for reasons having to do with size of areas planted. Lemons, despite its small contribution, kept a steady production. /2/.

Gaza Strip is considered as having a cash citrus crop because of its large exports with branded citrus production reaching a rate of 95 percent exportation. Farmers, therefore, depend, to a large extent, on variables in the outside world which they have no control over. Production needs, like irrigation equipment and fertilizers, fuel, costs of packaging /which have been rising sharply/, all these factors make prices fluctuate at an unsatisfactory rate for farmers. Therefore, and as long as the profit margin is solely dependent on export markets, profits will fluctuate depending on these markets and other economic and political factors.

The war of 1967 was the major turning point for Gaza citrus products. Up to that year, the Gaza Strip was connected directly with the Egyptian authorities and administration. Economically, the Egyptians considered the Strip as a separate economic unit that is very much independent. Gazan farmers were able to take advantage of economic relations between Egypt and other countries. In particular, the Eastern European markets were opened.

Gazans also took advantage of the special privileges provided by the special status that was given to the Strip. Gazans had a say in the size of exports and were allowed to use the Gaza port for export.

After 1967, the situation changed dramatically. Economic ties were broken and political constraints affected the Gazan economic scene. It took a while to return things to normal in regard to exports to Eastern Europe. Later, the closure of Gaza's only port was another negative turning point. With this closure, Gazan exports were completely dependent on the Israeli authorities and their ports. On the other hand, Gazan exports which consisted of 100 percent citrus fruits and which were not affected by price fluctuations became only part of a larger export market that included Israel and the West Bank, and therefore Gazan citrus represented only 12 percent of this market. The Gaza exports also faced competition from the products that had better conditions; namely the support of the government.

Even without the government support to Israeli products, the mere presence of large competitive markets was exhaustive for the Gaza citrus producers.

2.2.3. Israeli Citrus as a Competitive Product.

Since 1948 the Israeli citrus groves have grown from 125.000 dunums in 1948/1949 season to 430.000 in the 1974/1975 season. But after the climax in 1974/1975 Israeli citrus lands regressed to 370.000 dunums at the present. In the 1948/1949 season the Israeli produced 273.000 tons and climaxed in 1981/1982 with 1.8 million tons. Today the yearly average is around 1.5 million tons.

Along with the increase in area and in production, the Israeli exports also increased. From 155.000 tons in 1948/1949 exports is about 750.000 tons. 1974/1975.

Israelis consume only 10 percent of their production which

is about 150.000 tons annually. 46 percent of the fresh fruits are exported outside the country /750.000 tons/. The remaining 44 percent /680.000/ are processed where 95 percent of the processed products are also exported.

Israeli citrus varieties are almost the same as Gaza's. Oranges are 55 percent of the production, 35 percent of which is Shamouti and 20 percent Valencia. Grapefruits reach 30 percent, lemons 5 percent while tangarines and other varieties reach a total of 10 percent.

During the past few years, the marketing possibilities for Gaza citrus growers had been reduced. Western Europe and some of the Eastern European markets have been closed to Gaza exports. Iran which had taken nearly 40 percent of production from Gaza in 1981 has also been closed. The difficulty in marketing due to high competition in the Mediterranean area made the situation so bad that some growers did not bother to pick their products. The amounts left unpicked can be estimated at 3.000 tons. On some occasions, farmers are forced to pick their products in order not to damage the trees from rotten fruits. The picked fruits are often distributed for free to charitable organizations and refugee camps. In 1981, 4.000 tons were picked and distributed this way.

Generally, the exported quantities are those that are sent to the seven packing factories throughout the Gaza Strip. These packing plants work 5-7 months a year with an average capacity of 20.000 tons for each plant. Despite the special conditions provided by these plants to properly grade and pack citrus products, such plants are often found in disarray because of the bad economic situation. This disarray causes lack of control over grading and pricing of competing products. /3/. So, while the prices for the Spanish, and Turkish citrus products averaged US\$ 500 in 1981, the Gazan products did not get half that price. In 1982, with the drop in citrus prices to US\$ 400, the Gaza products again did not surpass half that price also. /4/.

Despite the high Israeli production, Israeli processing plants have imported 9-18 thousand tons a year from Gaza. Normally the quantities exported to the Israeli plants are sent after grading. But sometimes when the prices are very low, Israeli factories buy the products directly from citrus producers.

2.2.4. Processing as Means to Enhance Marketing

In theory, it can be safely stated that there is no problem in marketing fresh fruits in the neighbouring Arab states, which import an annual average of 300.000 tons. But the problem, as has been explained, is not the restrictions on marketable quantities but low prices. One of the problems is the fact that it is difficult to control the quantity of the exported products. Many citrus producers, who like to increase their own sales, sell large quantities of lower grades which bring down the prices of all fruits.

The establishment of a local plant will give an opportunity for local marketing of the lower grades while at the same time giving the upper grades a better opportunity to get fair prices. The most important aspect, however, is the fact that the new plant will allow the market to be much more stable as it will guarantee the local marketing of a large quantity of fruits.

If it is agreed that there is a need for a processing plant, then the Gaza Strip is the more feasible location, not only because it reduces transportation costs, but because it allows a first hand follow-up on the production and pricing. The only option for establishing the plant in the West Bank is if it were impossible to establish it in Gaza.

2.2.5. Political and Socio-Economic Factors Affecting the Establishment of the Proposed Plant

In an attempt to protect its own citrus production, and in compliance with its own political drives to solely control,

utilize, and exploit resources - including water and labour resources of the occupied territories, the Israeli occupying authority, by different means and ways, is likely to be more reluctant in authorizing the establishment of the proposed plant. But for drawing in foreign capital and enhancing trade with the Arab world, one may find some advocates, who are in power, for the establishment of such a plant. By a glance at the history of negotiations between Gaza entrepreneurs and the military governor of Gaza, one can detect the underlying policies set for authorizing the implementation of this project. There was, at first, a complete rejection of the whole idea; but later there was a conditional agreement. The main conditions were: that at least 80 percent of the plant's products be exported to the Arab world, and no exports to Western Europe be permitted.

At present prevailing political and economic constraints, and perhaps for the future to come, the possibility of increasing areas for agricultural production in general and citrus in particular, is very limited. The fact that Gaza water resources are being drained, because of different natural and human factors, including diversion of its main sources generating within Israeli boundaries, restricts such possibilities, in as long as no actions are taken to control these factors. Hence, the proposed project can only be viewed as a tool for overcoming marketing difficulties of fresh fruits, and for maintaining present areas of citrus groves. The ultimate goal of the proposed plant, therefore, is seen as having direct relations to public interests.

The fact that citrus production is the main business in Gaza Strip implies that most domestic capital is geared - directly or indirectly - to help promote this section. The establishment of the proposed plant, then would be welcomed by citrus producers and dealers. Capital formation also implies some political and social influence. In the absence of a national government, political influence is divided between those who hold the capital and the majority who have not. Institutions, social or economic, representing small holders and other masses are apt, and certainly entitled, to play a role in protecting public interests.

It is true that the average per capita incomes in Gaza Strip are considerably low. But it is also true that funds for the establishment of the proposed project could, to a certain extent, be raised by few Gazan business men who generally are citrus producers or dealers. It can be fairly stated that a substantial proportion of citrus incomes are in the hands of individuals whose income is much more above average. Whereas small citrus holdings are in fact in the hands of the majority who may well be characterized as poor, raising funds from these small producers is questionable.

It seems also important to note, in this respect, that the establishment of the proposed plant has to rely on local private investment to a great extent, and on outside financial help. But, for the above mentioned factors, the amount of private investment and the degree of its influence and control over the project should be fitted in such a way that private interests may not be sought at the expense of public interests.

Perhaps outside participation in funding the proposed project might aid to establish the balance between public and private interests and avoid future conflicts that may arise between both sectors. It is possible for outside financial participation to condition its help for fostering and stimulating local private investment, and at the same time in requiring fair wages, fair working conditions, fair quality for consumers, and particularly fair prices to citrus producers. One may be inclined, therefore, to suggest equal distribution of shares between both private and public sectors as reasonable means for establishing the proposed plant for safeguarding all interests.

As will be elaborated in Chapter 3 present and perhaps future conditions dictate that a sort of presence of the plant should be maintained in Amman-Jordan for satisfying export policies from the occupied territories to the Arab world. Such presence may take the form of a branch of the company or a joint venture with Jordanian investors. In either form, this fact has to be considered as an important element that promotes effective

marketing of the proposed plant's products, and hence it will contribute to the economic development of the project.

In so far as the world trade of processed citrus is concerned, the proposed plant will produce only 1.7 per thousand of international production. The plant's impact over the Mediterranean area will represent only 1 percent, and even at the Israeli scene, the plant will only produce 3 percent as compared to Israeli processed citrus.

2.3. History of the Project

Until 1980, citrus production in Gaza was not generally facing any problem in marketing. But since 1981, marketing problems resulted in considerable price drop. This drop affected the production and the general economics of citrus production. Consequently, the idea of setting up a factory to take advantage of low prices and help improve the economics of citrus growing, was developed.

2.3.1. First Initiative

The first person to think of this idea and bring it into light was a Gazan citrus dealer and producer Ahmad Ghurrab. He set up a committee to organize citrus production in Gaza and to establish a factory for citrus products. Another organization which was involved in the same idea was the Charitable Organization for Helping Gazans, which is headed by former Gaza Mayor and prominent personality Rashad Shawwa. These two organizations carried out one united effort which was to collect the needed funds to establish this project. The idea of fund raising was based on getting citrus growers involved in supporting this project. Fund raising was based on collecting 100 Jordanian fils for every box of citrus fruits. The campaign resulted in raising 1 million dollars. Initiators of the idea also made contact with international machinery manufacturers the most prominent of which was the Italian company Petouzi. This company was assigned the task of

carrying out a feasibility study. But this study included mostly information about the company's machinery. The military governor of Gaza sharply rejected the idea and ordered that the collected funds be returned to its originators. The initiators, under pressure, agreed to return the money. /1/.

Another effort was made. The idea was to establish a plant in an indirect way by buying an old Israeli factory /capacity 45 tons daily/. The idea was that this unfunctioning plant be transferred to Gaza, repaired, improved and put to work. The Israelis refused this scheme until the department of agriculture in Gaza, which was feeling the bad situation, recommended it. The Israelis agreed after a number of conditions were put forth, the most important of which was that the machinery should not be renewed and that the product not be marketed locally. The initiators agreed, against their will, hoping that these conditions might be relaxed later. An agreement was reached to buy the plant for 150.000 US\$ with 12.000 US\$ to be paid in advance, while the rest to be paid within six months. But after the purchase, it was revealed that the plant was owned by an American company named Marcos which had been leasing it to the Israelis. The agreement clearly stipulated that ownership could not be transferred. As a result of this case, the project was stopped and the case was transferred to courts.

After these incidents and after further complications regarding the legality of Labour Laws, the initiators started organizing a legal company with the aim of establishing a factory. All the necessary requirements for registering the company were completed, but there were complications. The authorities established who should be its members. So, for example, the authorities crossed out the name of Rashad Shawwa. /5/. After a number of attempts, it was finally possible for the company to be registered after paying 22.000 dollars in registration fees and costs. The company today has a capital of 50.000 Jordanian Dinars provided by the following shareholders: Ahmad Shurrab,

/1/ - Interviews with the initiators

Ghazi Shawwa, Ismael Ahmad Ali, and Ghazi Abu Khair. But the registration of the company was conditional on a number of conditions. The shareholders had to put up 50.000 dollars as a collateral that these conditions be adhered to:

- /1/ The plant will be established in the industrial complex prepared by the Israeli authorities north of Gaza. The land is leased out by the authorities on a price that will be determined later.
- /2/ No maintenance to be done except with prior approval from the authorities.
- /3/ A guarantee of 50.000 dollars in the name of the board of directors should be given in case any of the conditions are violated.
- /4/ 80 percent of the production to be exported to the Arab world through the bridges.
- /5/ A prior approval from the Jordanian authority must be received before exproation begins.
- /6/ The military governor has the right to close the plant without any reason.
- /7/ The plant will be established in the name of the board of trustees head, Mr. Ahamd Shurrab.

Upon hearing these conditions, shareholders refused to sign the draft agreement. The representative of the company met with the Israeli minister of agriculture at the time while the minister was visiting the Gaza Strip. The minsiter told the public audience at that time that he was not comfortable to these conditions. Later on the conditions were frozen.

At present, the situation can be summarized as follows:

- /1/ A registered company with a legal license since 1985 exists.
- /2/ The company has an office in Gaza.
- /3/ There is an indirect approval to buy a used plant.
- /4/ A number of bodies are trying to use the plant for industrialization purposes.

They include:

- /a/ The above mentioned company headed by Ahmad Shurrab.
- /b/ The Gaza Citrus Producers Cooperative headed by Zuhair Rayyes.
- /c/ The Union of Citrus Producers headed by Hashem Shawwa.

The authorities seem to have agreed to remove all the conditions except the condition which stipulates that 80 percent of the exports be done across the bridge to Arab countries. /6/.

REFERENCES

1. Sawalha, F. Marketing problems of citrus fruits in Gaza Strip, Rural Studies Centre, Al-Najah University, Nablus, W.B. 1983 p. 7 /Arabic/.
2. Agricultural Department Reports - Gaza Strip.
3. Gaza Citrus Producers Union - A Letter to the Farmers, August 20, 1984.
4. F.A.O. Trade Year Book 1984, Vol. 36.
5. Interview with Mr. Rashad Shawwa, Gaza, February 23, 1985.
6. Interview with the Packing House Manager, Mr. Ismael Ahmad Ali, March, 1985.

Chapter 3

MARKET AND PLANT CAPACITY

3.1. Basic Facts Regarding Agro-Based Industries.

3.1.1. The need for establishing agro-based industries in the occupied Palestinian territories is undoubtedly becoming more pressing. Although the last two decades have witnessed rapid adoption of technologies for efficient and adequate utilization of agricultural production, yet both marketing policies and techniques have lacked behind, and failed to cope with the abundance of agricultural production. Obviously, producers were facing continued losses. This has discouraged further saving and investment to meet culminating costs of input and, of course, frustrations and loss of interest in agriculture as a profession. No one can deny the interdependent relationship of production from one side and marketing and processing from the other side. Effective marketing and processing will presumably foster higher prices, increase volume of production, satisfy consumer needs, and it may also encourage farmers to tighten up their ties with land and natural resources.

3.2.1. It can be stated that the occupied Palestinian territories have a comparatively strong basis for agro-based industries. Surplus in olive production, citrus, grapes, plums, and tomatoes are an on going problem - especially during the last five years - facing agricultural producers. If one is to select priorities, surely processing citrus, grapes and tomatoes come at top choice. There is no doubt that investment and export are considered as positive factors that enhance national income. It seems justifiable, for those who are concerned with the Palestinian society under occupation, to question reasons beyond the failure to invest in such industries. Perhaps the uncertainties of the situation prevailing in the occupied territories makes investors, local or foreign, refrain from investing in such projects. It is

a sad fact that the occupying authorities' policies, explicit or implicit, are hindering any effort from even trying to invest in processing agricultural products. Evidence for such policies is not hard to be traced, since strategies of the occupying authorities are directed toward deepening dependency of agricultural production on either export-oriented type of agriculture to the Arab world, or continued discouragement of farmers in order to abandon their land and seek opportunities elsewhere.

3.1.3. One may speculate, however, that policies are subject to change. Investment in industrial projects - neither agricultural nor having connection with local resources - took place and developed. It is important then that provisions have to be undertaken for capturing any opportunity that may arise for investing in agro-based industries. The question, therefore, is whether the scene is ready for processing industries; whether skilled labour and managerial force with values, attitudes, and know-how tailored to industrialization exists; whether markets local or export, are available; and whether investment in processing industries is viable.

It is towards these targets that this study is directed. It was the task of the team to put before those interested, and concerned groups some basic information about the viability of a citrus juice processing plant. It is hoped that the study will succeed in trying to broaden aspects of enquiry in a seemingly rather unique and uncertain situation and location.

3.2. Policies Affecting the Proposed Project.

3.2.1. The Israeli Citrus Board.

In theory and in accordance with international laws, the Israeli Citrus Board should have no authority over the occupied

territories. In practice, however, one should speculate the indirect effects of such a "Board" on the proposed plant in both supplies and direction of output. The Israeli Citrus Board holds the authority over Israeli citrus processing firms in terms of quota's of citrus fruit supplies. A certain percentage of citrus fruits are being supplied by Gaza citrus. Citrus producers, for their misfortune, have no influence over the "Board" and may be affected by its decisions. Provisions, then, have to be undertaken by management of the proposed plant for overcoming any expected intervention by the "Board", especially for prices of citrus fruits. The "Board's" prices may be considered as opportunity costs for citrus producers.

3.2.2. Foreign Trade and Exchange Policies.

One of the most important aspects of these policies is at ordering imports of machinery and equipment. Banks ask for cash margin which amounts to 30 percent of cost price of imported goods. This amount is deposited in Israeli shekel /IS/ account. Interest rate varies from day to day, but presumably will not be less than 48 percent. This account remains in IS till the receipt of documents, and later the bank purchases the foreign currency to be transferred. The Bank charges from 1 - 1.5 percent on opening of Letter of Credit /L.C./, plus half percent for purchases of foreign currency, plus costs of telexes.

If cash against documents /C.A.D./ will be asked by the exporter, there will be no need to open L.C., but the importer should mention the name of his banker so as, when goods are being shipped, documents required to release goods from the bank will be mailed through banks for checking all documents, and documents will not be handed to the importer unless total value is paid by the importer. If shipment is F.O.B. or C and F insurance policy is needed which amounts to 2-5 percent of cost of total goods.

3.2.3. Taxes.

Equipment for industry do not have to deposit 10 percent of total costs, but the importer has to pay upon clearing the goods 2,5 percent tax, 2 percent Galil tax and 15 percent Value Added Tax.

3.2.4. Tarrif Policies and Subsidies.

The management of the proposed project is encouraged to seek legal advice in this matter. Wedding imports of equipment with taxation is a procedure being practiced by Israeli firms. Exports of products also are supposed to be tax exempted.

3.2.5. Military Orders.

A full appreciation, on the part of management should be undertaken, of how difficult is the task for keeping a smooth running of the proposed project. If, for any reason, military orders were issued that hinder the full utilization of the project, actions have to be taken for overcoming such difficulties. Examples: work permits and visas for foreign technicians. Quota of water, electricity supply, export of products... etc.

3.3. Local Demand and Market Potential.

3.3.1. Several steps were undertaken for determination of local demand and market size concerning the proposed product. It seemed necessary, in this connection, to review available and pertinent literature and formal statistical data. It was also important to assess ideas, views, and judgement of wholesalers dealing with similar products.

It is evident that domestic products of Gaza and the West Bank are facing a form of competition which is in favour of Israeli products. The unfair competition is not only backed by

a long and well established technical know-how, but also by implicit or explicit policies imposed over trade within markets of the occupied territories. The only hope for a new product, under such monopolistic competition, is that it should have some novelty and special characteristics from one side, and that it should be backed by a well designed promotional program from the other side. Needless to mention that the new product should meet and satisfy consumers needs, and be affordable.

In so far as processed citrus products are concerned, one can locate a huge variety of such products in local markets of the occupied territories. Almost all soft drinks available are imported either from Israeli processing plants, or from foreign countries, generally through Israeli importers. The only exception is for the two carbonated drinks plants in Gaza - Seven Up, and Star, and the newly established plant - Royal Crown Cola, in Ramallah town, West Bank. But the predominant market share is for Israeli products. Eight Israeli citrus processing plants, and a few more intermediate blending and bottling companies provide markets with brands, varieties, and sizes that cover the shelves of almost every retail store. Main products are citrus concentrated syrups, drinks with various strengths, and nectars. Pure, natural strength juices are of lesser scale. Other products like marmalades, candied citrus fruits, and pastries stuffed with citrus puree are also available. Closely connected with citrus juices and drinks, and perhaps most competitive of citrus beverages, are the carbonated drinks. Markets of the occupied territories are abundant with famous international brands like Coca-Cola, Schweppes, 7-Up, Sprite and Royal Crown Cola /R.C./, to name but a few. Still the market is also filled with local and Israeli bottling companies such as Tempo, Tropi, Star, Happy, Crystal and the like. Needless to mention the directly imported carbonated or non-carbonated soft drinks especially from Western Europe. It is far from easy to ascertain each brand's market share, nor each probable competitive effect upon the proposed product. But, one may realize, in a situation where almost total monopoly of markets is under direct control

of the occupying authority, the difficulties that prospect Palestinian industrialists would face in marketing their products in their own markets.

3.3.2. A fact which must be recognized is that the elongated period of Israeli occupation has directly affected consumption patterns of most Palestinians. The traditional mainly agricultural society, with its norms and values, is now shifting towards wage-earner consumer type of society. Villages are about to become places for dwelling rather than productive units of society. Labour forces engaged in agriculture have significantly decreased, and were absorbed /in early stages of occupation/ and exploited as wage-earners - comparatively low wages, in non or semi-skilled jobs - in Israeli construction firms and other agencies. At that stage, a conspicuous rise in per capita income had been achieved, and consequently, the elasticity of demand for food stuffs had tremendously increased. Perhaps it is rather more surprising to indicate that though wage-earners have been affected, in recent years, by the dramatic inflation and sudden decrease of wages, yet the rate of consumption, especially for beverages, has not been affected. This suggests that a static consumption pattern has been established within the Palestinian society. This fact suggests that income elasticity of demand for foods and beverages is relatively high in the occupied territories; and demand for foods and beverages will continue to expand at the expense of other commodities if per capita income increases. Data concerning expenditure /1/ revealed that 46.3 percent of total expenditure in the West Bank was allocated for food stuffs in 1978, while it was 57.5 percent in Gaza. Mellor /2/ has suggested that "Typically in a low-income country, the income elasticity of demand is about 0.8 or perhaps somewhat higher ... The proportion of total expenditure allocated to food is also high. In a typical low-income country, on the order of two thirds of consumer income is spent on food... a low level of intake and a general lack of importance attributed to specific foods may be reflected in a small base of consumption but will

not necessarily be reflected in low income elasticities. A striking example could be sighted from the West Bank, where a newly established factory, /commenced in 1985/ for carbonated drinks under the license of Royal Crown Cola Co. International U.S.A. has astonishingly not only penetrated the almost saturated market of the West Bank, but also competed with the internationally famed brands of Coca Cola and Schweppes.

3.3.3. Available official data /3/ fail to ascertain each brand's market share. Data indicate, however, that West Bankers have spent more on beverages than on five other food stuffs, namely: hot drinks, alcohols, milk and milk products, eggs , and pastries. Furthermore, Appendix 1 shows clearly such a trend, but adds that yearly expenditure on beverages has increased for the four successive years of 1979/October 1982.

It can fairly be concluded, then, that West Bank consumers of beverages are increasing in number as well as in amounts of beverages consumed per person.

It is noteworthy to indicate that there was no effect upon expenditure on beverages as a result of inflation, Israeli currency devaluation, or the seemingly obvious decrease of per capita income. Though inflation during 1979-1982 had scored 380 percent, 190 percent, and 200 percent respectively, beverage rate of consumption by West Bankers had risen to almost 200 folds during the same period, 1979-October 1982.

With these formal data in hand one can generally state that there is a basis for concluding that it is possible to absorb part of the proposed product in local markets of the occupied territories.

But such a general statement, though may have a sound basis, cannot serve, by itself, the main objectives of this study. It seems relevant that, in order to speculate more adequate market potential, one would have to resort to collecting first hand data in spite of the greater costs and longer delay. Direct contact with processing firms may not be an appropriate procedure, for more than psychological reasons. It was decided to interview

the presumably more knowledgeable sources of beverage consumption rates in the occupied territories, namely beverage dealers and wholesalers.

3.3.4. The demographic factors are presumed to influence higher demand on food stuffs in general. /a/ Natural population growth, though have been adversely affected by immigration, is expected to grow in the following years to its normal average /2.5 percent/. /b/ Palestinians of the Gulf States, Jordan and Saudi Arabia do pay yearly visits to their homeland, especially during summer. Estimates of Palestinian visitors to the occupied territories in 1983 reached 13.000./A relatively low figure if compared with other years/. It is assumed that such visitors would play a dual role for the proposed product. First, they are considered as prospective heavy consumers during their stay in the occupied territories, and back at their respective residence. Second, they can be considered as promoters of the product at their respective residential countries. /c/ The occupied Palestinian territories have the unique historical and religious opportunity that attracts pilgrims and tourists from all over the world. In 1983, the number of tourists who arrived to Israel reached more than one million. Jerusalem, is not optional in most tourists' agenda. Average person-night per tourist reached 2.1 in the same previous year. /4/ Arab Jerusalem hotels do have a share of hosting tourists. Tourists are presumed to be prospective consumers of the proposed product.

3.3.5. Wholesalers Interviewed

It has already been noted that Palestinians of the occupied territories are shifting towards a consuming society. Their behavioral attitudes toward consumption are changing continuously as they are being daily exposed to a huge variety of products, and to all sorts of publicity and advertisement that encourages consumption. It is far from easy to assess their motives that lead them to consume a certain product, and to predict their

preference. No research concerning such motivation has been concluded, at least not to the knowledge of the team who prepared this study. It seems important, for the purpose of this study, to enter the realm of the unknown. There is a need to know the present and perhaps predict future size of the local market concerning processed citrus products. To estimate current market size, one has to identify available products sold in the market through wholesalers. Equally important is the future growth of the product, one has also to look at the factors and trends that influence the juice market and make forecasts of future growth. Such knowledge may help in shaping the network of probable distribution and assignment of wholesalers. Prevailing prices of citrus products are also important to ascertain for projecting prices of the new product. Wholesalers then are perceived as being the most relevant source of information. Their knowledge, experience, and perception of processed citrus products should be ascertained.

3.3.6. An almost complete list of wholesalers dealing with processed citrus products was prepared. Twenty seven wholesalers were contacted and interviewed, four of whom were from Gaza. The main problematic areas that were of major concern for the purpose of this study, would be summarized as follows:

- /a/ Market size of citrus drinks, concentrates, and nectars; segmented by different localities. Estimate of the percentage of users vs. non-users.
- /b/ Prices of different brands.
- /c/ Sizes of packaging.
- /d/ Prevailing commission rates and other incentives on sales.
- /e/ Perceptions and expectations of the proposed product for possible market penetration.

Other seemingly pertinent data where wholesalers' knowledge, opinions, and motives concerning:

- /a/ The concept of pure natural strength juice as opposed to drinks nectars, and syrups.

/b/ The benefits of pure citrus juice, and if such a juice meets a need for families, and types of those families.

/c/ Preferences of consumers between carbonated or non-carbonated drinks.

3.3.7. Analysis of Data

3.3.7.1. Size of demand: The size of demand, as derived from data on local consumption - Appendix 3, is different from one locality to another. This difference is due to such factors as population density, weather conditions, availability of citrus fruits, habitual factors, as well as cultural factors. Nearly five thousand tons of different blends of citrus products were found to be consumed by Palestinians and others in the occupied territories. Consumers spend nearly two million two hundred thousand dollars, with an average price of US\$ 0.65 per litre.

Citrus concentrated syrups consumed in the occupied territories reached about five hundred thousand litres, with an average price of US\$ 0.9 per litre.

With the exception of the relatively more urbanized, central region, it can be stated that the majority /74.4 percent/ of Palestinians are relatively low consumers of citrus beverages. It seems that consumption of citrus beverages is mostly confined to tourists, passing-by inhabitants, labourers commuting to their jobs, and individual younger generations. It can be fairly stated that citrus beverage is not a habitual every-day family food /Appendix 1/.

Natural strength, high quality juices or pure citrus concentrated juices are seemingly not available, except for relatively very small scale, in certain localities like Jerusalem. Out of the total quantities consumed /4779.600 litres/, concentrated citrus syrups represented only 10.3 percent. This fact may also be considered as an indication that the product has not yet entered habitual family use.

3.3.7.2. Stratification of Consumption by Localities.

The difference in consumption of various locations involves not only quantities and qualities, but also involves sizes of filling. Hebronites were characterized as consuming very small size, low quality drinks, mostly presumed for children consumption /36 percent/. The rest of citrus drinks were filled in one litre or less /62 percent/. This indicates that consumption is individual rather than being for family use.

Both internal and external tourism, together with the warm winter and very hot summer, distinguished Jericho's consumption from all other towns. Jericho's special location close to border bridges may also play a major role as a "reserve" storage for exported products.

The relatively low consumption rates of Gaza, Tulkarm and Jenin may be justified in terms that such localities are main producers of citrus fruits. Fresh fruits are available for almost six months a year, with relatively moderate price.

The fact that per capita income is low in Gaza, especially among the masses of Palestinian refugees who constitute the majority of population, makes this region the last consumer of citrus beverages.

Consumption of citrus nectars may be considered as an indicator for high-income classes and for the only available three litre size of nectar packaging it may also have some relevance with family consumption. Nablus citizens consumed nearly 21 percent of total nectars in the West Bank. Ramallah and Behlehem citizens together consumed almost 17 percent of total nectars.

In so far as size of packaging is concerned, citizens of these three towns also prefer consumption of citrus beverages in larger packaging, and they consume greater quantities of concentrated syrups. It may be cautiously stated that such localities are tending towards family consumption of citrus beverages. One may be more inclined to stress this as a fact for Nablus

without fearing errors, since nearly 43 percent of citrus beverage are being filled in larger packaging 1 litre and above, see Appendix 1, excluding concentrated syrups. Jerusalem has its own uniqueness. The most holy places for the three religions being located at Arab Jerusalem, keep hotels, restaurants and coffee shops busy for nearly most of the year in hosting tourists. As a central city, Jerusalem is "a stop over" for labourers commuting to their jobs. Because it is adjacent to Israeli Jerusalem, Arab Jerusalemites may have established changing attitudes towards food consumption. Family citrus beverage consumption, perhaps, is now being considered as a new food trend. It is in Jerusalem where 56% of total concentrated syrups were consumed. Citrus nectar consumption was about 62.5 percent of total nectar distributed in the West Bank.

3.3.7.3. Wholesalers Perception of the Proposed Product.

Most of wholesalers indicated their readiness to promote and market the proposed product /85 percent/, and stated no major difficulties to be faced, provided that quality be standardized and packaging be attractive.

Only about 30 percent of wholesalers indicated that prices should be competitive to those available in the market. The rest showed readiness to market the proposed product for relatively higher prices. This was a very significant remark and one would be careful in accepting it. In questioning about justification for such readiness, the following remarks were quoted:

" It is a national product, we have a duty to encourage it". This remark reveals emotional involvement which may help in promotion, but not in pricing.

"The market is full with /coloured sweetened water/, not pure juices. Consumers should pay for quality".

"Competitive prices depend on similar degrees of concentration. There are different prices for different brands."

These remarks indicated an objective and knowledgeable judgement by wholesalers, and expressed expertise on their part.

"I distribute only to high-class retail stores whose customers ask for quality, not for price."

This remark reveals the image of special stores, as well as defines a segment of the population who accept higher prices. Almost all wholesalers indicated that the size of the market has increased considerably for the last three years. But showed bitterness of less profits they gain nowadays in spite of their increased distribution.

They blamed the economic policies imposed, especially for the continued devaluation of local currency.

The majority of wholesalers indicated that the prime competitor of the proposed product would be the carbonated drinks. They estimated the market share of carbonated drinks to be not less than 60 percent. But only few of them were inclined to accept competition of carbonated drinks as being less effective than competition of similar non-carbonated drinks.

Wholesalers see carbonated drinks as keeping away probable customers, of citrus beverages. While in the case of other similar non-carbonated drinks the problem of competition is more easy, the choice of the consumer counts. Shifting to a new product is more probable as long as the consumer is convinced that he is getting a better quality.

Commission rates, as expressed by wholesalers, differed slightly from one wholesaler to another /3-6 percent/ depending on services offered by them. Little promotional efforts are rendered by them since they usually carry already advertised merchandise.

Part of wholesalers /nearly 30 percent/, however, are store-keepers. They buy goods directly from manufacturing firms or through firms' representatives and sell goods to retail stores, hotels, restaurants, and coffee shops. Some of them do retail

business in a very small scale. They do not deliver goods, and sell products for cash. They hold fixed wholesale pricing and get products for a special discount, usually 6 percent as mentioned by the majority of them.

This type of wholesalers is involved in promotion and sometimes even in providing credit facilities /not more than a month/. It is note worthy to indicate that such wholesalers expressed that some provisions be met by the manufacturing firm, such as: on-time delivery, ability to meet emergency needs, and commitment to carry back defected products.

3.4. Export Markets

3.4.1. A notion that has to be clear at the outset of this discussion is that the volume of expected products for export is hardly to be affecting world trade of citrus juices; but it surel, will be directly affected by world trade. It can be fairly stated that the total output of the proposed product, as long as it is related to Gazan citrus fruit production, can easily be consumed by one international marketing dealer..

Knowledge of the international volume of trade with citrus juice concentrates, and of prevailing prices, and future price expectations indicate that Brazil, being one of the larges exporters of citrus juice concentrates, is predominantly controlling international prices. Some recent information reveals that Brazil is expected to increase its production for next year - 1985/1986 - and prices are expected to decrease by nearly 22 percent /from US\$ 1800 per ton of concentrated orange juice in 1984/1985 to US\$ 1400 per ton for next season. /5/. In so far as this information is correct, one has to take it into consideration. An even more reliable source indicated that trends in demand for orange juice concentrate declined at an estimated 7 percent in 1982/1983.

This was attributed to European import demand for Brazilian C.O.J. "Because of the appreciation of the US dollar, European processors manufactured an increasing amount of citrus nectars

less concentrate per unit as pure juice. International prices for citrus products tended downward in 1982/1983. The export quota system introduced for 1982/83 by Brazil, which accounts for about 70 percent of world trade, allowed prices of F.C.O.J. to be maintained at around US\$ 1200 per ton". /6/.

It is obvious that penetration of international markets will be a very difficult process, though the volume of the proposed product is somewhat negligible in comparison with the volume of the international trade, and though the pricing of the proposed product might be competitive because of the comparatively less production costs involved. One should not neglect the fact that international producers are well established in the market and have undergone a long way in the technological development of products that suit and satisfy consumers' needs. Needless to mention that international trade is subject to inter-governmental mutual agreements.

3.4.2. Three alternative regions, however, are suggested as being probable export markets for the proposed product. Each region will be analyzed separately, though the three are considered non-producers of citrus fruits.

3.4.2.1. Western European Markets: In theory, this region is supposed to be ideal as an alternative market. /As was suggested to the team by a visiting British marketing dealer: "all products of the proposed factory - including peels - can be marketed there for a long period of time, provided that the product meets certain specifications/. But practically, export to Western Europe was explicitly excluded by the Israeli military governor of Gaza, as mentioned by various interested dignitaries of Gaza. Marketing to Western Europe may be considered only after certain measures be undertaken. First, and foremost that the military government permits such export. Second, a contract be issued with one or more marketing dealers of firms. Third, compliance with international quality standards and other specifications. Fourth, a com-

petitive price that allows for marginal profit. Israel exports to the European markets both fresh and processed citrus fruits. Its export of processed citrus reaches 90 percent of citrus directed for processing. /7/. Though the proposed factory will constitute only 3 percent of Israel's volume, yet Israeli policies are not expected to allow this volume, no matter how small, to compete with its products abroad.

There is still another factor to be considered. Western Europe, though being a producer of citrus fruits, yet it imports citrus fruits and concentrated citrus juice and re-exports juices of different blends for direct consumption to developing countries including Arab states. It is important to note that should export to Europe be decided and permitted, only concentrated citrus juice is considered. Juice for direct consumption, no matter how high and appealing the quality may be, cannot compete with European products. Lawson /8/ clarified this by stating : "Although Common Market tariffs are being lowered, they clearly give preference to goods produced internally... there will be a conspicuous competitive advantage to E.E.C. producers".

Western European markets may be considered for future development of the proposed project. Changing policies imposed over Palestinians in both Gaza and the West Bank, perhaps, may be encouraged by the E.E.C.

3.4.2.2. Eastern Europe:

Eastern Europe is a traditional market for Gazan citrus fruits. As long as it is not an Israeli market, no export permit problems or competition problems are expected to arise. Export of concentrated citrus juices should be viewed as a reduction of volume of trade, hence cutting down shipment costs. It is presumed that a portion of citrus fruits exported to Eastern Europe is directed for processing. Should this be the case, it is of mutual benefit to substitute quantities of citrus fruit directed to processing for corresponding amounts of concentrated juices. Such a procedure needs to be negotiated with East European authorities.

Another problem in trade with Eastern Europe arises from their policy of barter trade. Such a policy is not in preference with Gazan traders. Goods imported for those exported are subject to Israeli measures of tariff. Maybe this issue has to be analysed in purely commercial terms. Identification of barter commodities that has an ample local demand and bears less tariff is not enough and has to be valued in terms of its effect over prices of the same local commodity. A striking example can be sighted from the 1983 barter trade. Sheep were imported to Gaza for the export of citrus fruit. Israeli authorities have not only charged taxes, but also ordered the slaughter of these sheep in Gaza. This procedure had adversely affected both prices of local sheep in all the occupied territories, and the value of citrus exported to Eastern Europe.

Eastern European markets, however, should be considered as an option for exporting the proposed product.

3.4.2.3. The Arab World - Political Implications

Export to some Arab states appears to be the most promising and least complicated. It may also be viewed as legitimate and perhaps the only outlet, as previous analysis has shown. Israeli policy makers explicitly encourage export to the Arab World. Benefits /harvested/ are not only economical, but political implications also seem to be one of the main motives behind encouraging export to Arab states. It is because of these implications, perhaps, that Arab League embargoed imports from the occupied territories soon after the 1967 war. The assumption that it would be easy to penetrate Arab markets is then misleading. The occupied Palestinian territories cannot be treated as sovereign Arab states. The Arab League's decision allowing the flow of 50 percent of West Bank products through Jordan to Arab states was based on the grounds that Jordan has held legal sovereignty over the West Bank prior to the 1967 war. A Jordanian certificate of origin is the only assurance for West Bank products to be permitted for Arab markets. Unfortunately,

this decision does not apply to the Gaza Strip, since Jordan held no sovereignty over Gaza before 1967. Jordan, being more apprehensive of the suffering of Gazan citrus producers, had complied to their pleas and a Hashemite Royal decree issuing a Jordanian certificate of origin for Gazan citrus had been passed in the seventies. It is because of this decree Gazan citrus fruits are allowed to penetrate Arab markets.

It seems that arduous negotiations and pleas have to be launched again from the part of project sponsors before being so optimistic for exporting the proposed product to Arab markets. Perhaps it is advisable also to take this fact into consideration in the process of selecting the location and site of the proposed plant.

There are still more examples of relevance. Israeli authorities made it clear that issuing a license for establishing the proposed plant is conditioned by exporting 80 percent of its products to Arab States, thus leaving local markets of the occupied territories to be almost solely "manipulated" by similar Israeli products.

But such a condition means that sponsors of the project have either to exert more legal pressure - if possible - over such a condition, or to convince the Jordanian government to bypass the Arab League's decision of exporting only 50 percent of products, if, in the first place, negotiations were successful.

It is important to realize that export marketing procedures and regulations, enforced on the armistice borders on the Jordan river, will play a major role in production programme. Sponsors of the proposed project have to reach separate agreements with both the Jordanian and Israeli authorities, regarding transportation facilities and procedures. Such agreements will determine the kind of product and size of packaging. Sponsors of the project may also have to consider the possibility of establishing a branch of the plant in Amman for blending and re-filling of juices, nectars, or drinks for direct consumption rather than to undertake this process at the plant.

3.4.2.4. The Arab World - Market Demand and Trends

There is no doubt that the buying power in some Arab states like Saudi Arabia and the Gulf States is of tremendous magnitude. It can be fairly stated that demand for food in general and beverages in particular, will continue to rise for years to come. Per capita income in these states "rank at or near the top of a world scale, with a combined weighted average of about US\$ 6.000 per capita ... they still lack even the rudimentary elements of a modern economy as reflected in a broad industrial base ...". /9/.

In so far as growth rate is concerned, /Appendix 1 / these countries rank also at high level, with an estimated total population of nearly 15 million in 1986.

These Arab countries are citrus non-producers. Hot wheather conditions prevail for almost most of the year. Such conditions encourage consumption of beverages. Statistical data concerning value of imported beverages reveal that demand for beverages has tremendously increased for six successive years, /1975 - 1980/ /10/ /Appendix 3/. Saudi Arabia's expenditure on imported beverages has exceptionally increased by nearly four hundred folds during the period of 1975 - 1980. In U.A.E. and Qatar the increase for the same period was a little more than forty folds.

The preceding discussion has suggested that demand for beverages in such Arab States is promissing for a considerable time to come. But, assuming that the proposed product would easily penetrate such markets is with no doubt oversimplify- ing the whole issue. Apparently, the proposed product is expected to face severe competition from other similar products that are well established in the same markets. Markets, so promissing as oil producing Arab States, had long ago been a target for producers from all over the world, the Western Hemisphere as well as the Far East.

The problem in Arab markets, then, is not that of demand but it is rather the severe competition from other well established international producers of beverages; most of whom

are producing at economy scale, and who master the technical know-how together with marketing and promotion expertise.

Perhaps it is advisable, at least for the initial period of the proposed project, to hire and utilize the expertise of a foreign selling agency for distribution and promotion of the proposed product in some Arab countries. Depending on goodwill, kinship relations, and other emotional or nationalistic factors for promotion is far from being adequate. There are some observational remarks which indicate that behavioral inclinations, and market motivation of Arab consumers, in general, tend to be in favour of "foreign" brands of commodities.

Resorting to the respective governments for assistance by issuing high tariffs on foreign imports or similar other procedures is also naive and inappropriate. Most of oil producing countries hold no restrictive policies over imports, including tariffs. On the other hand, assistance of respective governments may be sought for launching programs to promote the proposed production on nutritional grounds. It is here, perhaps, where stress on nationalistic and regional cooperation factors may prove appropriate.

In so far as prices are concerned, comparatively low prices per unit is, perhaps, not enough by itself for market penetration in Arab states. After all consumers do expect lower prices for an "Arab" product. Price elasticity of demand, then may only be effective after the new product would have established itself in the market, and consumers were habitually accustomed to it. Then, a study of price elasticity of demand may be of relevance to consider a raise in the price of the product.

Establishing connections with wholesale marketing dealers motivated by considerable commissions and other incentives may prove to be fruitful measures for market penetration and promotion. Recruiting Palestinians in respective Arab countries for the cause of promoting the product is perhaps a third relevant procedure of consideration.

One of the important factors which may have an effect on types of juices to be produced for export to Arab countries is the expected development plans of these countries. Food processing, including citrus juices and other beverages, is expected to be considered. As a matter of fact such industry has already been established in some Arab countries. Regional co-operation for pooling such industries or attracting Arab investment is hampered by the fact of Israeli occupation among other obstacles. It might be of relevance, therefore to consider export of concentrated citrus juice to such plants. Since prices of concentrates are governed by world price, it is expected that the proposed project may fairly compete with other similar products on the basis that transport and production costs are presumably less.

3.5. Demand and Market Size - Conclusions

To recapitulate the whole issue of market demand, it can be fairly stated that:

3.5.1. The proposed project, being the first of its kind in the occupied territories, would surely help absorb some of the flooded market of fresh citrus fruits, and would be regarded as a positive factor in improving prices of fresh fruits. It may also alleviate the pressing problem of unemployment; and its product may serve and satisfy consumers' needs.

3.5.2. By reviewing wholesaler's perceptions and attitudes, and available formal data, on local market size, it can be concluded that there is a possibility for absorbing and consuming a new product. But the size of market share would not be enough to provide for a feasible plant capacity of any processing plant. Hence, such a project should be viewed as being export-oriented. It is also important to note that as long as the present political conditions prevail, it is most appropriate not to start with a large plant; since marketing policies are

apt to change at any time. A moderate plant size seems more appealing that can also provide basis for similar industry to be established in the future.

Local markets are being monopolized by a wide variety of Israeli and foreign citrus based products. But market penetration is possible provided that the new product holds special characteristics /high quality and appealing packaging/. Total local consumption may reach up to six thousand tons per year. Past data indicate yearly increase of consumption by 100 percent. Future increase, however, is expected to reach not less than 40 percent per year for at least three years to come.

3.5.3. Local market segmentation is advised in two ways. One, in terms of localities, Jerusalem, Jericho, and Nablus seem to be the primary target markets in the initial operation of the proposed plant. Two, in terms of income, medium and upper-income classes together with visitors and tourists are presumed to be corresponding with the type of product suggested.

3.5.4. Since packaging is considered as a strong marketing tool, it can create a promotional value to the product. It is suggested that the firm decides for special, well-designed, higenic packages. The sizes of packaging, as derived from the responses of wholesalers, are suggested: 25 centilitre packages for individual consumption, one litre packages for dual use: individual and family. Both packages are suggested for pure natural strength juice. Five kilograms package size for pure concentrated juices. This is important to encourage family consumption, and coffee shops.

3.5.5. A reasonable price raise over market prices, but carefully calculated, may be endured by local consumers.

3.5.6. A pre-production promotional program based on publicity and advertisement is a precondition to insure success and to bring about awareness and knowledge of the new product.

3.5.7. Market demand in neighbouring Arab states of Jordan, Saudi Arabia, Kuwait, and Gulf States, is of tremendous magnitude. If export barriers are solved, supply may well be short of demand for time to come, even if most of citrus fruits available in the occupied territories were processed.

3.5.8. Demand for pure concentrated citrus juice seems to have better opportunities in export market. Customers would mostly consist of processing plants and, to a lesser extent, for direct consumption.

Blending and refilling concentrated juices in Jordan, would perhaps, have more chances for export to the Arab world.

3.5.9. Utilizing foreign expertise in marketing is recommended during the first period of implementation. Locally, available channels of distribution are best selected from wholesalers who own stores, provided that incentives be adequate, in addition to special discounts.

3.6. Marketing Strategy

3.6.1. As was indicated earlier, agricultural production in general is facing difficulties of marketing. Processing a portion of this production may help in solving the problems of surpluses and enhancing prices of fresh fruits and vegetables. The needs and wants of the local Palestinian consumers for food-stuffs are being satisfied through Israeli food processing industries. The main mission of the proposed project, therefore, is to help in solving those two major problems facing the Palestinian producers as well as consumers. In other words, the mission of the proposed project may be defined as being an auxiliary apparatus for development of citrus fruits and other fruits and vegetables in the occupied territories; and as providing local and export markets with products that satisfy the needs and wants of the consumers.

3.6.2. In a situation like the occupied Palestinian territories, planning an effective marketing strategy or even planning for agro-based industries in general, and for better utilization of local resources, will certainly involve a high degree of uncertainty. It is especially true since both strategies of the occupying authority and the occupied society are not identical, if not contradictory. This limitation should be carefully considered, and provisions for overcoming it must be introduced: by alertness and sensitivity against any changes in policies and regulations, by capturing any opportunity that enhances and develops the proposed project, by periodic revision of market demand, and also by including margins of safety in the production program especially for export production. It is important to make sure that any sudden and abrupt changes in regulations will not result in delays of products, especially at times when demand is at its peak. It is important, therefore, to make provisions for storage of products as well as inputs. Though such provisions may appear costly, yet it might save the image of the plant and expected losses as a result of delays. An illustration may be the closure of "Boarder Bridges" at pilgrimage season in Saudi Arabia. Annual rent of such storages is estimated in schedule 5-2.

3.6.3. Products of the proposed project are presumably entering an almost saturated local market, and a rather complicated export market. The new product, therefore, must have some special characteristics. Consumers would not be stimulated to try and buy a new product that is exactly matching available products. Pureness /no additives, preservatives, or colouring/ is the quality suggested for initial penetration of the new product to the market. Branding is another aspect of special characteristics of the product. This seems more important in the local market at the initial stage rather than export market, since most export is presumably to be sold as concentrated

juices - usually for further processing. The final product takes the brand of the last processor. Labeling also is used not only to add appeal to packages but also they involve some requirements by law.

3.6.4. An important aspect that should take priority in marketing strategy is to avoid "occasional marketing". A decision for marketing - export or local - to a certain market implies continuity, commitment, and expansion for a long period of time. Thus, it is advisable to segment the local market as well as the export market. The management of the plant is advised to evaluate the plant's capacity and identify target localities and communities that the plant can best serve. Target market strategy is seen as most advisable for the suggested plant for present and future development of the project.

In earlier discussions attention was paid to such a strategy. For local markets the initial localities were identified as being Jerusalem, Jericho, and Nablus. Further segmentation was suggested in terms of income-class, where the relatively upper-income class and tourists were identified as probable target consumers who may have the greatest purchase interest in the proposed pure natural strength juice. In future, the management may find it appropriate to extend its products to further localities and, of course, to different income groups with new blends. Furthermore, there would be strong differences in consumption preferences between younger and older consumers.

It can be fairly stated that the younger generation is more likely attracted to drinks rather than pure juices, and even more certainly, to carbonated drinks rather than non-carbonated. Geographic and demographic segmentation, then, will vary and be targeted along with future development of the proposed project.

In so far as export markets are concerned, previous analysis has also reached a point where two main external markets

were identified, namely: Eastern Europe and Jordan. Saudi Arabia and Arab Gulf States as well as Western Europe should only be considered after careful evaluation of both plant capacity and market possibilities.

3.6.5. Political constraints, prevailing at present time, may lay some dark shadows on the "smooth" export marketing. It seems relevant to speculate the possibility of establishing a branch of the plant in Amman-Jordan, or to enter a joint-ownership venture; the purpose of either would be to blend and mix concentrated juices and filling the final product for direct consumption. This possibility may appear imperative, should policies of transportation across "Boarder Bridges" deny permits for adequate transportation of products.

3.6.6. Considering price strategies, one may look at various variables involved that may affect, in a way or another, pricing decisions. Some of these variables are: production costs, competition and demand, promotional pricing, and regulative pricing policies.

Production costs should be looked at as fixing the minimum prices of the product. This general rule, however, may on some occasions be deviated from. In as long as production costs are cut down, the more likely the management would be in a comfortable position for fixing prices above production costs. Management, sometimes, may be forced to cut down its prices below production costs, but this procedure should be temporary and built upon future expectations of price boom and in connection with product mix pricing.

In the beverage trade, size of demand is most probably related to prices. In other words, a decrease in price will eventually result in higher demand. This strategy is most tricky to management, since the reactions of competitors are not predictable. Consideration of competitive prices in local markets is very important, especially at the initial stage. Product

pricing it most probably more yielding if it was set not too high nor too low above or under competitive prices of similar products. Certainly demand will play a major role in the process of fixing prices. Continuous research on demand will be needed, since demand is most probably to be considered as the major determinant of the highest price.

In the initial period of production, as well as on certain occasions later on, management may look at providing for some discounts for wholesalers, retailers, and consumers. Price reduction as a promotional device is a strategy that is most likely to produce many advantages to the management. Wholesalers who get special discounts for selling certain quantities in a given period may be well motivated and encouraged to put more effort in marketing the product.

Sometimes, it is out of the management control that prices are restricted by "outsiders". In case of export markets, for example, prices could be maintained at around a certain figure. This figure is controlled by demand and by major international suppliers. Regulative pricing is also seen in some instances where distributors may refuse to sell at a certain price, or, when governmental policies may interfere to fix maximum prices. Such regulative measures should be examined before setting out pricing strategy.

3.6.7. Planning for an effective strategy of marketing, one should emphasize the importance of market research and market intelligence. Both tools are needed for future planning. Much of the proposed project growth will depend upon such a strategy. Decisions have to be reached upon, for example, future market penetration, which segments of consumers, developing new products or by-products, increasing sales and consumption for same consumers... etc.

3.7. Determinants of Plant Capacity

The availability of raw material - citrus peels - if considered apart of other factors, would call for far higher plant

capacity than what is suggested. The major determinants of plant capacity seems to be directly affected by the political unique and unprecedented situation of the occupied territories. The proposed plant capacity has been determined on the following assumptions:

3.7.1. That the prevailing political conditions will continue for a longer period. Local markets, therefore, will remain to be dominated by similar Israeli products. Consequently, proposed products will be export-oriented to neighbouring Arab markets, and to some extent, Eastern Europe. The export-product in this case, should be pure concentrated citrus juices for further processing in respective countries. Local markets will consume a small percentage of the product, provided that it is of high quality in order to be able to compete with Israeli products. Local target market is the relatively high-income class, visiting Palestinians, and tourists. Jerusalem, Nablus, and Jericho are being the main localities of distribution.

3.7.2. That political conditions would change in the near future. Thus, two assumptions may be of relevance. One, that ties between Gaza and the West Bank are going to be limited to their minimum. In this case, the proposed products should remain the same as the first assumption, with the exception that export products for the Arab world would change route, and be limited to shipment by sea; and that almost all products should be export-oriented. Two, that self-determination for a free Palestinian state be declared - no matter what ties it would have with Jordan, Egypt, or even Israel, /since trade with Israel, of that is the case, would be on equal basis/.

In this situation, restructuring of the whole economy is going to be the primary task of the emerging state. The proposed product will play a major role as an import-substitute, but the plant capacity should then consider also its major role in exports. For securing foreign exchange is an important factor for further development of the new state.

3.7.3. The team is suggesting that plant capacity should take the first assumption into consideration. The logic behind which plant capacity has been decided for present conditions, is reinforced by two important factors. First, though basic production inputs /citrus fruits/ are available in far larger amounts than what is suggested to be processed. Yet possible local and export market penetration is not expected to fully overcome difficulties, at least for the first period of implementation. Second, it seems necessary, not only for the uncertainties of future political outcomes, but also for economic utilization of machinery and equipment, that another processing plant be established in the West Bank. Thus, provisions for raw material have to be considered for this plant. Furthermore, both plants should consider processing non-citrus fruits.

Hence, the suggested plant capacity has considered these factors among other factors, but of course not at the expense of a feasible economic size.

3.8. Sales and Distribution System.

3.8.1. Previous analysis has suggested three locations as being main centers for distributing the proposed product in local market. Namely: Jerusalem, for the southern region of the West Bank, Nablus for the northern region, and Jericho. Thus, three main distributing dealers /wholesalers/ might be involved in marketing the proposed product. The firm should identify the types of wholesalers available /evaluate their past performance, scale of operations, number of retailers dealing with them, availability of storage space, transportation, and number and sellers/ and then choose the three suggested wholesalers.

It seems that in so far as local markets are concerned the three centers of distribution may constitute an adequate network of distribution. The main objective of the administration for the distribution network should be: storing, handling and moving products to reach customers at the right time and place.

The development of local distribution structure may be centered around a limited number of distributors, but efficient wholesalers who are chosen carefully, and who may be serving the plant on commission or contractual basis. This approach, though may seem traditional, yet it helps in minimizing costs of distribution, eliminating duplication of such a service, and helping management to have a larger control over sales development. A certain geographical area being allocated for each wholesaler also helps in price uniformity of the product, and in minimizing conflict among wholesalers.

3.8.2. The most important element in the establishment of the distribution network is warehousing. It was mentioned in other chapters, that management has to make provisions for warehousing not only at the plant's site, but also in at least two other locations for local markets and exports. It can be advocated here, that a third warehouse should be located in Amman Jordan. Production and timing of product orders may, on many occasions, not match - a problem which has to be solved by warehousing or the plant will lose its market. The number of warehouses, and whether owned by the firm or rented, should be decided upon by the management through balancing the level between sales and distribution costs. Overestimation may result in losses to the plant or at least decreasing profits.

3.8.3. Efficient and coordinated transportation is, perhaps, the most important item of distribution costs. The only choice for management to decide upon concerning means of transportation is limited to trucks. The same mode of transportation is available for export to, or through Jordan. But this will be discussed later on. It is suggested that the proposed project provide for two vehicles and three forklifts to be used for transporting raw material to the plant, and products to warehouses and dealers.

Order processing, inventory carrying, and other administrative actions add up to the total costs of distribution. These major factors that are involved in distribution require a high degree of coordination in order to satisfy the customer's needs and wants. Those wants may be summarized as being: delivery of the product on the right time and the right quantity in the best shape with minor damages.

3.8.4. Export Markets, The Arab World.

Distribution channels for export markets are subject to political barriers and marketing policies governing exports from the occupied territories. It is important, for such reasons as well as for lack of experience from the part of the new management, to hire a foreign selling dealer. A sales dealer, after careful selection, is hired on a contractual basis to distribute the proposed product at export markets without territorial limits over the selected locations, or even others. He may be given the authority of selling an agreed percentage of the firm's products. He may also provide the firm with specifications for the product, and have an influence on the prices and conditions of sales. By this arrangements, the management will not have to worry about export sales to Arab countries or elsewhere. The written formal agreement between the sales dealer and the firm should include, among other terms, pricing-order handling procedures, commission rates, and product specifications.

This procedure though seems to add up to costs of sales and distribution, yet it might be justified in terms of the following advantages:

/a/ Facilitating access to markets, and helping in the promotion of the product. Thus, making it easy for management not to worry about marketing in initial production, and until the new brand becomes known in outside markets. It has already

been mentioned that Arab consumers are more inclined for preferring dealing with foreign names.

- /b/ Assuring for both consumers and sponsors of quality that follows special standards. Quality control over products in the occupied territories is questionable.
- /c/ Satisfying the needs, and perhaps the conditions that lenders or foreign investors may ask, if financial assistance would be considered, or foreign investment ventures might be sought.
- /d/ Helping in acquiring training and expertise in marketing and sales business.

3.8.5. Since communication channels between the occupied territories and the rest of the Arab world is limited through Jordan, a sales representative of the suggested firm is advised to be stationed in Amman for facilitating order handling procedures, open new territories and provide first hand information about prices, client reactions, levels of competition... etc. The sales representative is recommended to be appointed by the firm, and be under the direct supervision of the sales manager.

3.8.6. Packages and containers are also considered an important element of distribution costs. It is referred here to the second material used to protect the primary packaging of the product, usually made of cardboard boxes. Such packaging helps also in easier and mechanical handling of the product. Export shipment of natural juices or drinks may also need a third container for more protection.

3.8.7. If a decision was taken by the management, and an agreement was reached with the Eastern European authorities, two alternative transportation systems are available, with relatively similar costs. /1/. Shipment by sea through Israeli ports /Gaza port is closed/. /2/ Shipment by refrigerated

trucks through Jordan. It is noteworthy to indicate that Jordanian, Turkish, and Bulgarian trucks are available in Jordan and may be contracted to ship the proposed products to Europe.

3.8.8. Costs of Distribution

/a/ TRANSPORTATION COSTS:

Inside the occupied territories	US\$ 10/ton
To Amman Jordan	US\$ 20/ton
Shipment by sea to Europe	US\$130/ton
Refrigerated trucks Amman - Europe	US\$110/ton
Refrigerated trucks Amman-Saudi Arabia or Gulf States	US\$ 40/ton

/b/ INSURANCE:

Products have to be insured while on their way to any destination. Rates of insurance differ from one company to another, and by transportation facility. An appropriate rate is 2.5 percent of product costs.

/c/ PACKAGING:

The second and/or third packaging is estimated as follows:

US\$ 0.20 per box of 24 litre fillings/1 liter each
US\$ 1.00 per box of 6 cans / five kgs filling
US\$ 0.10 per box of 12 packages/250 m.litre each
US\$ 1.00 per box /third packaging/ of 10 boxes
US\$ 1.00 per box /No. 12/250 m.l. each box/

/d/ WAREHOUSING:

Rents or construction costs of warehouses are dealt with in other chapters.

/e/ ADMINISTRATION:

Order receiving, inventory carrying, order processing, telexes, administration of shipping, billing, filing,

and other administrative work are also cost items of distribution. They usually account for not less than 15 percent of total physical distribution costs.

Some scholars of marketing indicate that costs of marketing products may reach 12 percent of each dollar spent by the final consumer. /11/. The preceding analysis, however, estimated marketing costs to reach 15 percent of the expected total sales revenue.

3.8.9. Promotion and Advertisement

It is clear that a newly established firm has to make its best for promoting its products. The prospective consumers must go through the whole process of awareness, knowledge, attraction -motivation, preference, and conviction /12/ before they buy any new product. Advertisement seems to be of primary concern for the initial stage of production; since this stage calls for more advertising in order to spread a certain image in the minds of the whole public about the new product. Advertisement is presumed to be more effective in developing awareness and knowledge, and it can reach a wide variety of publics. The Jordanian television network will serve the purpose for both publics in Jordan and in the occupied territories.

The decision of selecting a tool or a mix of tools for promotion is subject to various factors, such as the competitive situation, the market share targeted, and the available budget. The task of setting a budget for promotion and of selecting the tools, perhaps, is the most challenging for management. But, in spite of the methods used for setting the promotion budget, one may suggest the following procedure for the sake of setting out a relevant budget of the initial period. This method, however, should be modified later on. It is also advisable to split the promotion budget among other tools besides advertisement, especially discounts and incentives after commencement of the project. Factors involved in the suggested method are:

1. Expected Sales Revenue,
2. Estimated Market Share,
3. Cost of Advertisement,
4. Commissions and Special Discounts.

The estimated sales revenue, if compared with total production costs, may be considered as a good indicator, for the initial period, of how much the firm can afford to allocate for promotion.

Estimated market share enables management to determine the number and sequence of advertisement of TV. Knowledge about segment of customers will also be considered later on for the determination of time of advertisement and in which feature program. Since advertisement is aiming in the initial period to cover most of the public, it would be appropriate then to place advertisement at the middle of the special nightly feature film series, /After 8 P.M. new bulletin/ and special Friday children's program. Cost of advertisement on TV can be estimated in accordance with rates of each 30 seconds effect. US\$ 200 per effect at the middle of nightly feature film, US\$ 120 per effect at the middle of weekly children's program.

As an example, it is supposed that management has decided on putting two effects of advertisement per week at the middle of the nightly feature film, and one effect at the middle of Friday's children program. Also, that advertisement starts on March and continues till October. This would add up to US\$ 16.640 budget for advertisement on Jordan TV.

3.9. Steps of Marketing Strategy. A Concrete Example.

Perhaps the following steps would constitute a concrete example for management on how to set-up a marketing strategy.

3.9.1. After going through the selection of markets, and deciding upon the size of sales and sizes of packaging, the management may aim to sell 2.852.000 litres of pure natural strength juices in the first year, and 1.162 tons of pure citrus concentrated juice. About 91 percent of concentrated juice will be for export, and 32 percent of natural strength juice will also be exported to Jordan. Concentrated juice allocated for Jordan is 53 percent, and 47 percent to Eastern Europe. From Jordan, export to the Arab world and other countries will be examined.

The second year will aim for sales of 1.650 tons of pure concentrated juice, and 2.580 tons of natural strength juice. Almost the same percentage of distribution to both local and export markets will be followed.

In the third year, however, nectars will be introduced with size of sales of 2.200 tons. Percentage of juice for exports will be 88 percent but concentrated juices will remain the same. The management also will provide for processing other non-citrus pure juices in the third year /grapes and tomatoes/.

3.9.2. Juices will be presented in two size packages: 1 litre, and 250 m.litre. Concentrated juices will be presented in 5 kg. tins. Concentrated juices for export markets will be filled in 250 kg barrels. By the third year, sizes of packaging will be reconsidered.

3.9.3. Prices per litre of natural strength juice would be around US\$ 0.90 for both local and export markets. Prices of concentrated juices for export will be governed by international trade price. But local prices per litre of concentrated juice will be US\$ 1.35 for grapefruit, US\$ 1.10 for lemon, US\$ 1.50 for V. orange. A discount of 4 percent of list price to be offered for wholesalers /locally/. Wholesalers will get additional incentive discount of 1 percent provided that each of them sell over 15 thousand litre a month.

3.9.4. A promotional budget of US\$ 42.000 will be spent over the first years./One percent of expected sales, besides 1 percent allocated as incentives to wholesalers/. This budget will be divided as follows:

US\$ 12.000 for advertisement on Jordan Television

US\$ 8.000 for advertisement in two daily newspapers, one local and one Jordan

US\$ 6.000 for market research in Saudi Arabia and Gulf States

US\$ 12.000 for pre-implementation publicity

US\$ 4.000 for in-service training of sales people.

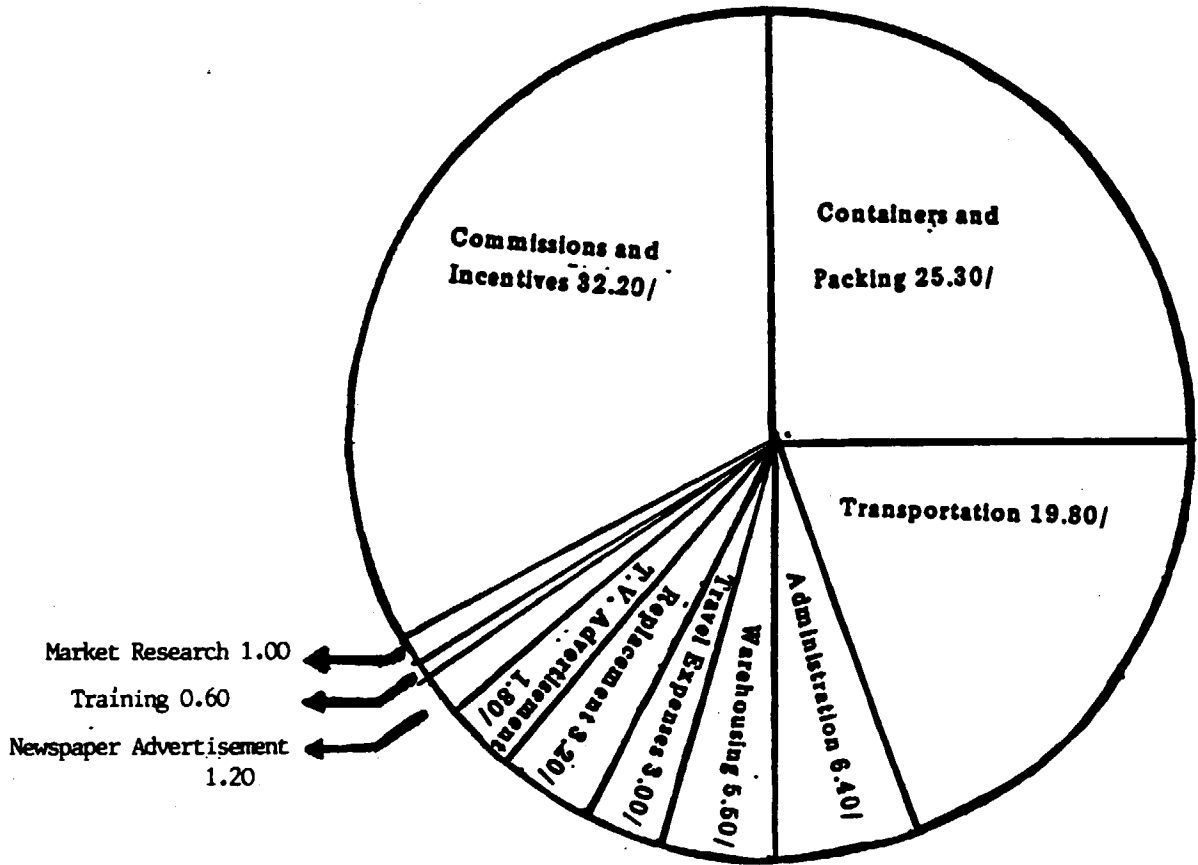
Advertisement will emphasize the nutritional value of the product, and its pureness /no additives, colouring, or preservatives/.

3.9.5. The product will start with high quality and will continue to retain and improve quality. The management will aim at middle and high-income class of the population for the first two years of production. The youth generation will be the next market target of management. Processing firms in export markets will also be targeted as well as middle and high income consumers in Jordan. Hotel restaurants and coffee shops may be emphasized as probable continuous clients. Family consumption will be encouraged.

3.9.6. Prices are going to be slightly increased in the third year if competition permits. Advertisement and other promotional tools will also continue with same percentage of sales budget. Marketing and technological research will be increased within the third year by 30 percent.

3.9.7. By the fourth year, the management will be having a clear picture of alternative by-products, i.e. candied peels,

blended drinks, non-citrus pure juices and drinks, marmalades, and carbonated drinks.



Items of Sales and Distribution Costs as a percent of total costs

Chapter 3

REFERENCES

1. Statistical Abstract of Israel, 1977.
2. Mellor, John W. The Economics of Agricultural Development, Cornell University Press, Ithaca and London, 1980, pp. 57-60.
3. Judea, Smaria, and Gaza Area, Statistical Quarterly, Israeli Central Bureau of Statistics, Vol. XII, 1982, Jerusalem.
4. Statistical Abstract of Israel 1984 No. 35, Central Bureau of Statistics-Jerusalem.
5. A private interview with an Israeli citrus juice exporting dealer.
6. F.A.O. Commodity Review and Outlook, F.A.O. Economic and Social Development Series, No. 29, Rome, 1983/1984 pp. 88-91.
7. Kidma, Israel Journal of Development No. 121, Vol. 3 - 1977 - p. 17.
8. Lawson, Ruth C. International Regional Organizations, Fredrick Praeger, New York, 1962, p. 112.
9. Thomas Naff /Editor/, The Middle East Challenge 1980-1985 Southern Illinois University Press - 1981 - Development Prospects in Arab Nations - George Abed, p. 92.
10. F.A.O. Trade Year Book, 1981, Rome 1982.
11. Tousley, Reyburn, and others, Principles of Marketing McMillan Company, New York, 1962, p. 671.
12. Kotler, Philip, Marketing Essentials, Prentice Hall, 1984.

SCHEDULE 3 - 1

Estimate of Sales Revenues

PRODUCTS		YEAR 1						YEAR 2						YEAR 3					
DESCRIPTION	UNIT PRICE \$ / TON	Quantities to Be Sold (TON)			Sales Revenues '000 s \$			Quantities to Be Sold (TON)			Sales Revenues '000 \$			Quantities to be Sold (TON)			Sales Revenues '000 \$		
		exp.	local	total	exp.	local	total	exp.	local	total	exp.	local	total	exp.	local	total	exp.	local	total
CONCENTRATED JUICE																			
1. Orange "Shamuti"	1500	100	-	100	150	-	150	125	-	125	187.5	-	187.5	125	-	125	187.5	-	187.5
2. Grapefruit	1350	242	30	272	326.5	40.5	367.5	300	40	340	405	54	459	300	40	340	405	54	459
3. Lemon	1100	100	30	130	110	33	243	122	40	162	134.2	44	178.2	148	40	188	162.8	44	206.8
4. Valencia	1500	620	40	660	930	60	990	755	70	825	1132.5	105	1237.5	755	70	825	1132.5	105	1237.5
SUB TOTAL CONCENTRATED JUICE	-	1062	100	1162	1516.7	133.5	1650.2	1302	150	1452	1859.2	203	2062.2	1328	150	1478	1887.8	203	2090.8
NATURAL JUICE																			
1. Orange "Shamuti"	950	272	-	272	258.4	-	258.4	340	-	340	323	-	323	538	-	538	511.1	-	511.1
2. Grapefruit	900	600	104	704	540	93.6	633.6	730	150	880	657	135	792	730	150	880	657	135	792
3. Valencia	900	1480	396	1876	1332	356.4	1688.4	1885	460	2345	1696.5	414	2110.5	2200	535	2735	1980	481.5	2461.5
SUB TOTAL NATURAL JUICE	-	2352	500	2852	2130.4	450	2580.4	2955	610	3565	2676.5	549	3225.5	3468	685	4151	3148.1	616.5	3764.6
ORANGE NECTAR	450	-	-	-	-	-	-	-	-	-	-	-	-	1400	800	2200	630	360	990
PEELS	15	-	10.000	10.000	-	150	150	-	12.500	12.500	-	187.5	187.5	-	15.000	15.000	-	225	225
<u>GRAND TOTAL</u>					3647.1	733.5	4380.6				4535.7	939.5	5475.2				5665.9	1404.5	7070.4

■ Prices of concentrated juice were based upon 3 year estimate of world trade in concentrated orange juice: Though expectations were towards a decline in price, 1984/1985 prices bloomed to 1800\$/ton. Price of natural juice was based on local average prices. allowing for a slight increase for quality.

Schedule 3 - 2

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ESTIMATE OF PRODUCTION COSTS -
SALES AND DISTRIBUTION

Item	Cost/\$
Sales costs:	
1. Training of Salesmen	4 000
2. T.V. Advertisement	12 000
3. Newspaper advertisement	8 000
4. Market research	6 000
5. Travel expenses	20 000
6. After sales service: replacement of defected products 0.5%	21 000
Distribution costs:	
1. Containers and packaging	166 400
2. Transportation	130 000
3. Warehousing	36 000
4. Commissions (4% and 1%)	211 500
5. Sales administration 1%	42 000
=====	
TOTAL	656 900
=====	

Schedule 3 - 3

PRODUCTION PROGRAM

/in tons/

YEAR	TYPE	SHAMUTI	GRP. FRT.	LEMON	VALENCIA	TOTAL
FIRST	FRT. DELIVERY	1950	4800	1050	12000	19800
	NATURAL	272	704		1876	2852
	CONCENT.	100	272	130	660	1162
	PEELS	984	2536	592	5960	10072
SECOND	FRT. DELIVERY	2441	5999	1306	14985	24731
	NATURAL	340	880	-	2345	3565
	CONCENT.	125	340	162	825	1452
	PEELS	1230	3170	740	7450	12590
THIRD	FRT. DELIVERY	3941	5999	1500	18235	29675
	NATURAL	538	880	-	2735	4153
	CONCENT .	125	340	188	825	1478
	ORANGE					
	NECTAR					2200
	PEELS	1939	3170	850	9066	15025

Chapter 4

MATERIALS AND INPUTS

The main raw products needed for the industrialization of citrus products are the fresh citrus fruits. This will consist of the major portion of the price of the industrialization project. Cost of the products reaches 85 - 90 percent of the entire cost of raw products. Therefore any change in the price of the fruits will affect positively or negatively the financial feasibility of the project especially if we consider that changes in prices are known to be sharp at times. It is important to discuss this subject in great detail in order to know all the things that affect it.

As to other materials which include factory supplies, auxiliary and utilities used with a percentage not exceeding 15 percent from the total cost of raw materials. Changes in these prices are almost negligible since nearly 60 percent of these costs are electricity, fuel, water and oils which prices are determined by the government and are almost stable. Regarding the remaining chemicals and other materials their prices are stable because of their limited sources.

4.1. Classification of Materials and Inputs

4.1.1. Unprocessed Raw Materials.

This consists of fresh citrus fruits. There are four major types in the Gaza Strip: oranges - two kinds: early oranges /Shamouti/, and late oranges /Valencia/, grapefruit and finally lemons. No additional product will be needed as the goal is to squeeze the fresh fruits and get 100 percent juice without any preservatives or chemicals added.

4.1.2. Auxiliary Materials.

This consists mainly of the containers that the concen-

trated or natural juice will be filled in. The type of container must fit in with the type of the production and with the desires of the local and outside consumer. Also there is a need to know how available is the packaging in the local markets and whether there is need to import them from outside with reasonable costs.

4.1.3. Factory Supplies.

This includes maintenance materials for equipment such as oil, grease, cleaning material, in addition to special chemical materials needed to clean the fruits.

4.1.4. Utilities.

This includes electricity, water and fuel. All materials are supplied as public services whose prices are fixed by the government or official bodies.

4.2. Characteristics of Materials and Input.

4.2.1. Suitability of Citrus Fruit Species for Commercial Processing

The major citrus products in Gaza are the sweet oranges which include the early Shamouti type and the late Valencia type. Grapefruit is the common grapefruit and the lemons are Femminello lemons. All these types are considered appropriate generally for squeezing juice out of. Nevertheless we would need to carry out special tests on sample products before we start the industrialization program. These tests would be to examine the necessary measurements needed to know the degree of maturity and to determine the percentage of the balance

between the sugar, tartness and bitterness in it. In general Israeli factories use large quantities of all these products yearly which means that the fruits are fit for this goal. But because prices are different for the same product depending on the degree of maturity or size, a smaller proportion is deemed fit for industrialization from the commercial point of view. The percentage of the various types that are fit for commercial industrialization differ, depending on the quantity of surplus and the averages of the prices. Although there is a larger quantity of imperfect fruits available which include scratched or rotten fruits, we will not depend on this because of its size or because it did not get a good price.

The commercially useful quantity of every type depends on a number of elements that can be explained with each product on its own:

1. VALENCIA ORANGES:

This makes up 60 percent of the total citrus output in Gaza. This is considered the major source for the commercial industrialization scheme. Not only that this type is available in large quantities but it is also unique in that it is available in a season different than the other citrus products.

Its season is long, starting early in February and continuing till late May. Commercial quantities are found in March and April when more than 60 percent of this product is picked. Its somewhat cheaper prices makes its commercial use more attractive. A ton is sold for JD 30 in comparison with 45 Jordanian Dinars for the Shamouti brand. Because of large surplus of this brand, farmers suffer seasonal losses and any industrialization will be gladly welcomed by farmers. Another special trait of Valencia oranges is the fact that one can market the juices directly without the need to store it because the main produce time of this

brand of oranges coincides with the start of the hot season in which the demand for cold juices increases. Naturally this means bigger income because of the direct return of the cost and the quick turnover of capital. In general we can consider the Valencia brand as the corner stone for the factory for the following reasons:

1. Plenty of supply.
2. Low price on the average.
3. Long season of production.
4. Concurrence of the production season with the rise in temperature.

2. SHAMOUTI BRAND:

This is considered a major brand of oranges in the Gaza Strip and is the second in the quantity of production. It is considered the top brand in relation to the average profit for the producer. For this reason it is not considered highly for commercial industrialization production. Although this brand makes up only 27 percent of the general production, it has a much better opportunity for marketing directly to buyers. A major reason for that is its early availability since it ripens with the middle of November and continues until the end of February. It also does not compete with the Valencia brand. In addition to that its small quantity means higher prices. Nevertheless it is possible to obtain 6 - 7 percent of this brand from the smaller sizes and the inferior quantities. But for sure the percentage of profit will be less than the Valencia brand. Its early availability, however, does not give us an advantage because it will increase the daily production load and thus reduce overhead expenses. As a result of its early production it is advisable that the product of this brand not be turned over for direct marketing but instead to be used as concentrate and marketed this way or held up and mixed with

the Valencia product in order to improve the taste of the Valencia juice. At any rate the merits of this brand may be viewed as follows:

1. It provides the opportunity for increasing the daily productive capacity of the factory and reduces the overhead costs.
2. It helps keep the price of the Shamouti brand high by using cheaper price quantities.

3. GRAPEFRUIT:

The production of grapefruit consists of only 6 percent of the total citrus production in the Gaza Strip. There is also fear that this percentage will go down even more as a result of the decrease in the planted areas in the past years. The area has been reduced to one third of what it was ten years ago. This has resulted in a decrease of profits in comparison to other products. The average cost of the ton is only JD 17 in comparison with other citrus products whose prices range from JD 30-45 per ton. Thus the past years have brought a constant loss for producers of this brand. Despite the lack of profitable opportunities for the fresh products, the opportunities for commercial industrial productions are the opposite.

Demand for this brand of juice is on the increase with juices returning higher profits especially considering the fact that the cost of the raw products are very low. The production timing which starts in the middle of December and continues till the middle of March - with the night of 70 percent in January - means an increase in daily production of the factory which means a reduction in the overhead costs.

The basic for the production of this brand can be summarized as:

1. Low cost of the raw product.
2. Large quantities of the lower quality.
3. Is considered seasonally fitting for the factory's production schedule.

4. LEMONS:

This brand consists of 7 percent of the total citrus production in the Gaza strip. Despite this small percentage, it is considered one of the major products which the farmer counts on to bring him a substantial profit. In this respect, it rates second to the Shamouti oranges in its profitability for the farmer. Despite the high price of the fresh product which reaches JD 50 per ton there is no problem in marketing even the inferior qualities. Yet even this brand is necessary for industrialization for the following reasons:

- a. The tart product is the only one available that is in great demand for its juice concentrate.
- b. It also helps reduce the overhead cost since its picking starts early in October and continues till April. Despite this long season which extends to six months it reaches a peak of 70 - 80 percent production during January and February.

It is possible to get the inferior qualities of this product at reasonable prices and it can be produced at a profit because of the high price that can be turned in for its concentrated juice.

4.2.2. Alternatives.

When discussing the supply programme the possibility of turning the West Bank into an alternative in an emergency was mentioned. It would also be possible to extend the energy of the factory by prolonging the yearly use of the factory by squeezing additional products of vegetables and fruits. Especially applicable would be grapes and tomatoes. Turning to these products would be aimed at improving the financial feasibility of the factory by distributing the costs over the longest possible period.

This action would not adversely affect the production of citrus juices but to the contrary it would be a positive development.

4.2.3. Culls Available.

The quantity of citrus products produced every year exceeds 150 thousand tons. The largest quantity the Valencia oranges often reach 100.000 tons. Shamouti 40.000, Grapefruit 10 - 12.000 and Lemons 10.000 tons.

The marketing of these products depends almost exclusively on exports which often reached 95 percent of the registered grades.

The exportation is carried out according to specific guidelines and degrees of product and packaging. The exported products have to go through a complicated set of steps that include separations by degree, washing waxing and finally packing in special packages for exportation. Each degree has its own buyers and prices. Often, the prices, especially for lower grades, does not cover the cost of production. At times and during exportation, farmers stop picking the crop in an attempt to cut extra costs that result from the processing and the packaging of the products as well as from the cost of transportation.

In both cases, unmarketable surpluses are available at low prices. These quantities are not different from the rest except in size. At times it is even similar in size with other products, By the second option which is based on unpicked surplus, the aim of the factory would be to avoid the existence of such cases. This can be done by carrying out account for the quantities needed using the savings from not having to go through the processing needed for marketing the fruits.

But if the production process is losing money which means that many of the fruits will remain unpicked, the factory will try to buy the fruits in order to alleviate some of the purchasing costs of these quantities on condition that this would be financially feasible for production. It is hoped, as we mentioned earlier that the factory will help make sure that these unbearable conditions not to take place.

And as long as we are depending on the inferior qualities in size we need to discuss each degree and its resulting figures keeping in mind that sometimes and for physiological reasons, there is seasonal change in the size of the fruits. This change at times has a negative correlation with the increase in the resulting grades of the fruits.

1. VALENCIA: The yearly crop is nearly 100.000 tons. It is classified according to the nine degrees listed in the charter below:

DEGREE	NO. OF FRUIT BOXES	DIAMETER OF FRUIT IN MILLIMETER	AVERAGE WEIGHT EACH /GRAM/	PERCENTAGE OF CROP	QUANTITY IN TONS
FIRST	56	90	357	10%	10.000
SECOND	60	85-90	333	15%	15.000
THIRD	75	79-85	267	20%	20.000
FOURTH	90	75-79	222	15%	15.000
FIFTH	105	71-75	190	10%	10.000
SIXTH	123	68-71	162	10%	10.000
SEVENTH	144	64-68	139	5%	5.000
EIGHTH	168	61-64	119	5%	5.000
NINETH	198	57-61	101	5%	5.000

Source: GAZA PACKING HOUSE RECORDS.

Generally, the first three degrees face no marketing problem. The three degrees that follow face some problems. The last three degrees face continuous problems in marketing which causes a decrease in prices in a considerable way. We will depend on the fruits of these categories whose yearly production reaches 15.000 tons, an average of 15 percent of the total crop of this brand.

2. SHAMOUTI: The yearly crop reaches 40.000 tons that are marketable. They can be classified under eight categories:

DEGREE	NO. OF FRUIT BOXES	DIAMETER OF FRUIT IN MILLIMETER	AVERAGE WEIGHT EACH /GRAM/	PERCENTAGE OF CROP	QUANTITY IN TONS
FIRST	50	90-94	400	10%	4.000
SECOND	60	84-90	333	20%	8.000
THIRD	75	78-84	267	20%	8.000
FOURTH	88	74-78	227	15%	6.000
FIFTH	105	70-74	191	10%	4.000
SIXTH	123	67-70	163	5%	2.000
SEVENTH	144	64-67	139	5%	2.000
EIGHTH	168	59-63	119	5%	2.000

Source: Ibid

In general most of this crop finds its way to the markets with reasonable prices in comparison to the first brand. Nevertheless, the last degree and a small portion of the seventh degree face at times, difficulty in marketing which results in the drop of its prices. This quantity could be dependent on for industrial use. It reaches in total 2.500 tons among it 2.000 tons from the last degree. This constitutes 7 percent of the crop of this brand which is prepared for marketing.

3. GRAPEFRUIT:

The yearly marketable crop of this brand reaches 10.000 tons. It is categorised under 11 different degrees. There is a big

difference between the degrees which means a large difference between the first and the last degree.

DEGREE	No. OF FRUIT BOXES MILLIMETER	DIAMETER OF FRUIT IN GRAM	AVERAGE WEIGHT EACH	% OF CROP	QUANTITY IN TONS
FIRST	27	128-134	741	10%	1.000
SECOND	30	122-128	667	10%	1.000
THIRD	32	117-122	625	10%	1.000
FOURTH	36	111-117	556	10%	1.000
FIFTH	40	105-111	500	15%	1.500
SIXTH	48	100-105	417	15%	1.500
SEVENTH	56	96-100	357	15%	1.500
EIGHTH	64	90-96	313	5%	0.500
NINTH	75	85-90	267	5%	0.500
TENTH	88	81-85	227	5%	0.500
ELEVENTH	100	77-81	200	5%	0.500

Source: Ibid

Despite the fact that most of the quantities face difficulty in marketing thus causing the prices to drop and the farmers losses to increase. If we consider the fact that the first five degrees problems can be borne the last six degrees result in major losses. Therefore, using these products for industrialization will bring positive results for the producers and growers. The total yearly quantities that can be made available from this brand reaches 6.000 tons, an average of 50-60 percent of the total crop.

4. LEMON:

The yearly crop of lemons reaches 10.000 tons a year. It is classified under 7 degrees:

DEGREE	No. OF FRUIT BOXES	DIAMETER OF FRUIT IN MILLIMETER	AVERAGE WEIGHT EACH GRAM	% OF CROP	QUANTITY IN TONS
FIRST	70	75-80	286	15%	1.500
SECOND	90	70-75	222	20%	1.400
THIRD	113	65-70	177	20%	1.400
FOURTH	125	60-65	160	17%	1.700
FIFTH	150	55-60	133	15%	1.500
SIXTH	175	50-55	114	7%	700
SEVENTH	200	45-50	100	6%	600

Source: Ibid

In general lemons do not face any problem in marketing even in the lowest degrees. Size is not considered a problem. In this brand it is estimated that 1.300 tons can be provided for the factory, since it is necessary for the plant and its concentrated juice to be marketed.

4.2.4. Other Inputs.

In addition to the main raw materials needed which include citrus fruits, there are other materials needed for the completion of the production process. These materials which are necessary for the production can be divided into two kinds:

4.2.4.1. Auxiliary Materials

This includes the materials needed for packaging. Cleaning materials are also included in this section. As far as other chemicals that can be added to the juice in order to preserve it or any additions that would change the colour or taste of the juice, all these things will not be used because we plan to try and produce natural juice and concentrate. The main auxiliary material needed is packages. The factory will need a large number of packages from different

kinds and sizes. The choice of these will depend on the type of product whether it is single strength juice or concentrated, the local and outside market, the taste of the consumers and the availability of the packages in local markets or the possibility of importing them at reasonable prices.

In the local market, metal cans that can be used for one time only are available. Although it is widely available and reasonably priced, it is not recommended because it is tied in the consumers mind with the carbonated soft drinks. At the same time cardboard packs /pure packs/ which are more acceptable to the consumers taste are available. This would be recommended especially the small individual sizes or the family size. The appropriate sizes would be 250 cc, 1 litre for packing fresh single strength juice.

As far as the concentrate is concerned, it will be filled in large containers that will weight 250 kilograms. This will be special for the export market. The large containers will be transferred to another site possibly Jordan where it will be repackaged into regular containers for consumer use. A 5 kilogram can will be used for local markets.

It is necessary here to point out that the containers especially the ones will be made in the West Bank. Similarly other containers will be manufactured locally. If this will not be feasible then containers will be imported from outside bearing in mind that it conforms to the Jordanian guidelines for exports through the bridges.

4.2.4.3. Factory Supplies.

This includes maintenance materials like grease, oils and other cleaning materials to clean the machines.

We estimated that we will need 10.000 liters of this cleaning material a year. In addition we will need other chemicals to clean the fruits.

4.2.4.3. Utilities.

This includes electricity, water, fuel. This will be supplied through networks in the area of the factory. Its prices will be fixed and set by official institutions. The yearly needs in electricity are estimated at 1.15 million kilowatts /KWH/. 50.000 cubic meters of water will be needed. This will include water needed for cooling, heating and cleaning.

4.3. Supply Programme.

The start of operations for the factory will be tied seasonally with the beginning of the yearly citrus crops. It is safe to say that the factory will have an opportunity to be open starting in January till mid May every year. In other words 5.5 months to six months. This would have the factory operating at the height of the various citrus products.

For this reason a careful study of the production and marketing cycle of citrus products in the Gaza Strip was important. This means the dates of fruit maturity, picking period, the height of the picking season and the price relationship that results from the increase of the marketable fruits. An analysis of the packing and grading houses in the Gaza Strip was also necessary. A questionnaire was prepared and filled out in order to determine the scope of this system. Additional information was gathered through interviews with producers and marketing personnel. The results of the analysis shows:

1. The climax of production of the late oranges /Valencia/ is 75 days. This starts in the beginning of March and ends in the middle of May. 90 percent of the total crop is produced during this period.
2. The climax of the Shamouti oranges starts in January and continues two months till the end of February. In this period 80 percent of the crop is picked.
3. The climax period for grapefruits lasts 45 days from the beginning of January till the middle of February. 80 percent of the total crop is picked in this period.
4. The climax period for lemons lasts 75 days from the beginning of January till the middle of April. 80 percent of the total crop is picked in this period.

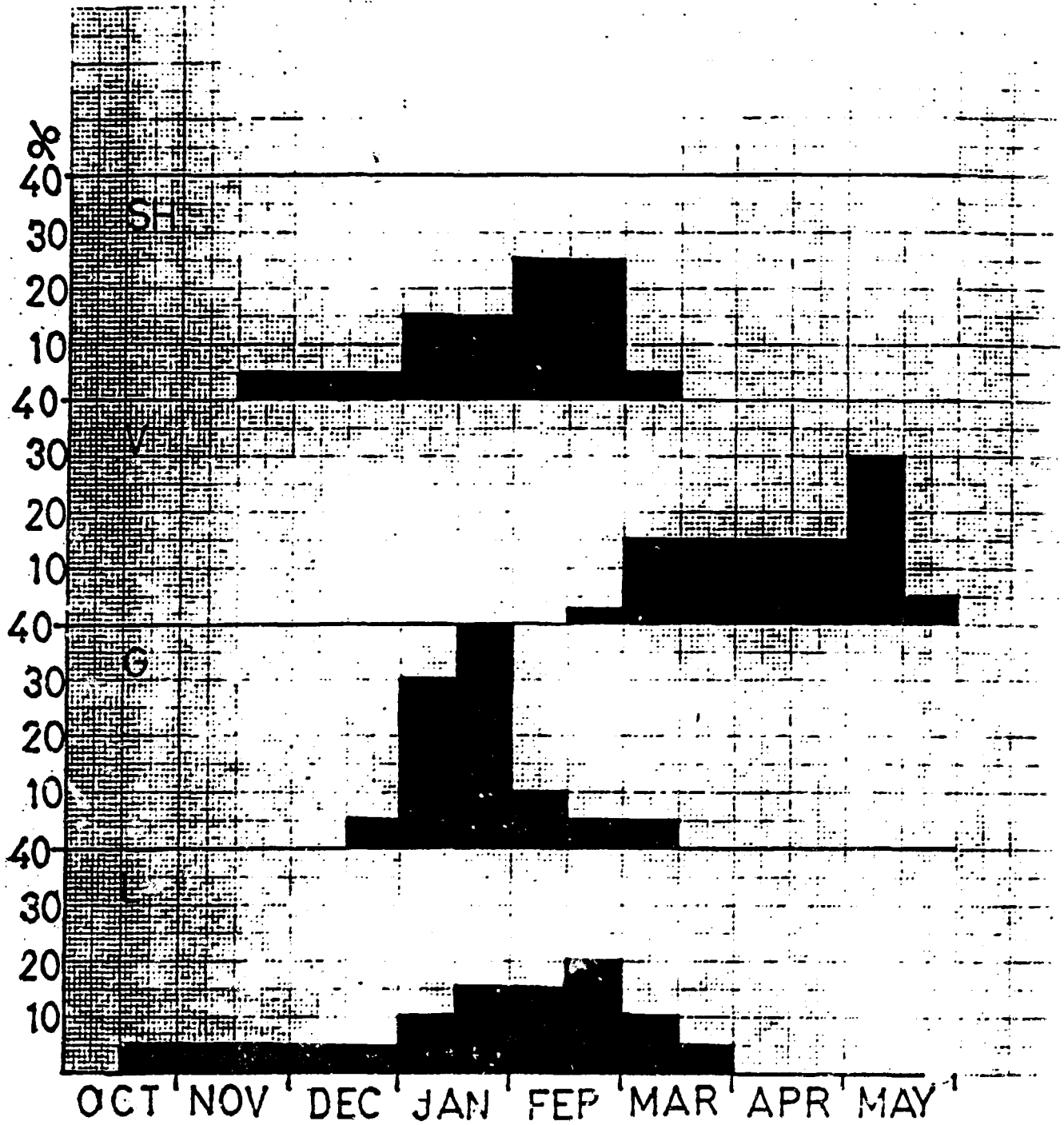


Chart: Peak Production Periods of Citrus Fruits in Gaza Strip

FRUIT SUPPLY PROGRAMME / CITRUS ONLY/
/Quantities are in tons/

MONTH	PERIOD	DELIVERY DAYS	SHAMOUTI		GRAPEFRUIT		LEMON		VALENCIA		TOTAL	
			DAILY	TOTAL	DAILY	TOTAL	DAILY	TOTAL	DAILY	TOTAL	DAILY	TOTAL
JANUARY	1 - 15	13	35	455	173	2249	10	130	-	-	218	2834
	16 - 31	14	32	448	214	1996	28	392	-	-	274	3836
FEBRUARY	1 - 15	13	62	806	58	754	30	390	-	-	150	1950
	16 - 29	12	61	732	-	-	22	264	-	-	83	996
MARCH	1 - 15	13	-	-	-	-	10	130	192	2496	202	2626
	16 - 31	14	-	-	-	-	-	-	178	2492	178	2492
APRIL	1 - 15	13	-	-	-	-	-	-	192	2496	192	2496
	16 - 30	13	-	-	-	-	-	-	192	2496	192	2596
MAY	1 - 15	13	-	-	-	-	-	-	385	5005	385	5005
TOTAL FRUIT		ton	2442		5999		1306		14985		24731	
DELIVERY DAYS		day	52		40		65		66		118	

The graph shows the distribution of the various brands and the period of picking them.

The work of the factory will depend directly on this natural distribution of production. Therefore, the operation of the factory during the first three months in the picking season will depend on the fruits of the Shamouti oranges, grapefruits and lemons. The quantity available for these brands is estimated at ' tons distributed as follows:

Shamouti	- 2.500 tons
Grapefruit	- 6.000 tons
Lemons	- 1.300 tons.

But the following three months /75 - 90 days/ the factory will depend on the Valencia alone. The raw materials available of this brand is estimated at 15.000 tons.

The supply programme has been based on information collected and explained earlier. It is estimated to the nearest ton. Special attention was given to the question of the climax production periods which according to records show a relative decrease in the prices of the fruits.

Accordingly, the quantities that can be made available are estimated at 2.00 tons daily. There is no problem except in two periods:

- a. The second half of January when the quantities available will be more than the factory's work capabilities at one shift. The surplus will be 27 percent.
- b. The first half of May when the quantities available will increase over the work capabilities of one shift by 48 percent.

These gaps could be theoretical to a certain point if we consider the possibilities of postponing part of the grapefruit quantities during the second half of January till the first half of February. Similarly it is possible to postpone some of the Valencia orange quantities during the first half of May to the second half of it. This will depend primarily on a number of variables that can be affected by the price and the amount of fruits supplied during that period.

But if it is impossible to postpone these quantities, then the alternative would be to operate the factory on a second shift during the second half of January in order to process the extra quantities of grapefruits. Similarly the second half of June to process the surplus of Valencia oranges.

It is important to point out that the entire supply programme has depended on the citrus crops of the Gaza Strip and did not include the West Bank's crops. The reason for that has been explained in section /2/ entitled Background and History. Nevertheless, it is possible to use the West Bank crops as a future emergency alternative if the situation needs it and if the Gaza productions have a sudden and unexpected drop. This would also be possible if future opportunities for the factory increase and if the marketing production of the Gaza citrus increases to such an extent that it no longer can provide the needed raw materials for the factory. This is possible if the West Bank production can economically fit with the requirements of the factory. If not, it can always be used in cases of emergency to meet the market needs /or contracts/.

4.4. Cost of Raw Materials.

4.4.1. Unprocessed Raw Materials.

The main factor in raw material is the fresh fruits

needed for the industrialization scheme. The cost of these materials will constitute percent of the total cost of production. In addition the economies of the factory depend directly on this cost. Therefore, it is extremely important to know exactly the cost of the fresh fruit because this is tied directly with the financial feasibility of the project.

Furthermore, the costs of other materials is to a large extent fixed or, to put it differently, changing these costs depends on the general policy and it is not up to the factory administration to alter it except in as much as the suppliers allow. Water and electric prices are stable and are determined by the ruling government. The cost of oils, grease and cleaning chemicals are determined by market prices. Therefore, the majority of discussion will concentrate on the cost of the citrus fruit.

4.4.2. Cost of Citrus Fruit.

Despite the fluctuations in the prices of citrus products in the Gaza Strip, the general trend during the past five years has been a decrease in the rate of 10 - 30 percent depending on the brand. /See Table below /. Nevertheless, the prices of the 84 - 85 season have registered a considerable increase in prices reaching as much as prices five years ago. This increase is considered extraordinary to a large extent. This has been the result of negative influences of the international production market which has decreased the supply and thereby raised the price. However, it is expected that prices will return to their natural dropping rate. Yet despite this fluctuation in the prices, there is a constant element which can be depended upon and that is the cost of production which never drops but increases by more than 2 percent yearly.

The table below shows the average price of citrus fruits

exported to packing factories in Gaza during 80/81-84/85 in Jordanian Dinars per ton /1/.

YEAR	SHAMOUTI	VALENCIA	GRAPEFRUIT	LEMON
80/81	40-60	40-75	-	50-70
81/82	40-55	30-40	-	50-72
82/83	50	30	10-15	40-45
83/84	30-35	43-45	10-12	40-50
84/85	38-40	48-50	28-32	35-40

Source: 1. The special survey sheet.

Also we can see that there is a variance in the prices during the same season. This is for two reasons:

1. Supply period which is connected to the size of the supply, usually means that the price at the beginning and at the end of the season are highest.
2. The quality of the product between one producer and another. This means that prices are determined by the quality of the products, its size and the effects of picking.

Effects on Citrus Prices:

The costs of production is considered the main factor in determining the base price that can be expected. Since the aims of this factory is to produce the citrus in such a way that will bring better prices and profits to the farmers, then the first basic rule is to guarantee a price that will not bring the farmer a loss. Although this goal seems idealistic we have to always keep in mind that the possibility of the price dipping lower than the cost of production is possible.

It is also necessary to keep in mind that the cost of production is the bare minimum price of the raw material. Therefore it is important to know this cost. Many studies have been conducted to determine the cost of production /this paper has reviewed these studies and after analysing them and discussion with citrus producers and agriculture experts we have to come up with the following results/ based on the averages of prices for the different seasons and that the cost of the production of a dunum of land was equalled to the cost of the production of one ton. These prices also do not include the initial costs and the costs of the rent of the land or the administration costs provided by the landowner. Furthermore, the cost of exports do not include the cost of packing and transport. This is because we are trying to find the base production cost which will be the cost of sending the citrus to the juice factory. In this case the money saved from not having to market the production will be like an indirect profit.

Average of Production Cost for the Citrus Brands in Gaza Strip.

/\$/ton based on 1981-1984 prices/

Variety Cost Item	SHAMOUTI	VALENCIA	GRAPEFRUIT	LEMON	AVERAGE
Mechanical Work	7	9	9	8	8.3
Fertilizer*	28	30	13.5	31	25.6
Water**	29	34	35	32	34.5
Labour	28	32.5	27	28	28.9
Picking	15.5	16	15.5	19	16.5
Transport	2.5	2.5	2.5	2.5	2.5
TOTAL:	110	124	102.5	120.5	114.3

* - Decrease in spending on fertilizers for grapefruits is an indication of farmers carelessness to this fruit because of its low returns.

** -Differences in cost of water depends on the difference in the production per dunum.

These figures can be considered reasonable keeping in mind that the Israeli factories pay US\$ 90-100 for each ton of Gaza citrus products. Similarly the research by Bertusi prepared a few years ago gave the price of US\$ 80-90 per ton.

It is unexpected that these costs will change. On the contrary they will rise at a rate estimated at 2 percent a year. It is necessary that we take this into consideration when we calculate the cost of raw products, with the positive impact that the establishment of the factory will have on citrus prices in the future. It is therefore expected that prices will rise until they reach the international level. This might not happen right away but it will start during the first season after the beginning of the factory and will continue so during the first two years. Prices, however, will stay relatively the same as the last year and this will be a good opportunity for the factory to face marketing problems that will face it considering that it will produce a new product for the consumer. This will also mean that the factory will have to set prices that will encourage the consumer while at the same time getting a profit that will cover the deficits that are expected if some of the items do not market well.

Citrus prices are expected to double when the factory opens but economic forecasts should not be based on this rise. A relative adjustment needs to be made but we must take into consideration that the factory will be using products of inferior quality which are usually not as affected by price fluctuations. Therefore, an adjustment of 5 percent after the third year would be necessary. At any rate a number of considerations must be kept in mind:

1. The extent of the grade's influence on the brand: A big effect is seen as to the relationship between the price and the size of the Shamouti oranges and grapefruits. But Valencia oranges are less affected and lemons are practically not affected.
2. The climax supply period: It is clear that the extent of the supply period keeps a stable price. But when the period is short, large amount of fruits will pour into the market thereby lowering the prices. Prices have a negative relation with supply time. Lemons and Valencia oranges are on the market for 75 days which means they are not hit with price fluctuations. But the maximum period for Shamouti oranges is 60 days which is considered an average period resulting in some fluctuations. Grapefruits are available for a short 45 days which means that their prices drop drastically.

Expected Prices.

It is clear that the cost prices range from 102.5 - 124 dollars per ton. Due to fluctuations it is expected that Shamouti oranges and grapefruits will be more affected in the lower grades and less as regards lemons and lesser as far as Valencia.

Similarly grapefruits' prices will be low because of the short supply period thereby not giving it an opportunity to obtain good prices.

What is important when we look comprehensively on the situation is that negative correlations will have a positive result granting higher graded fruits better prices. And since profits are determined by the production of an entire dunum with all its grades, then if the prices of the lower grades were very low this will be offset by the rise in the prices of the higher grades.

Therefore the estimate of prices can be set as follows:

Shamouti US\$ 90 - 100 per ton
 Valencia US\$ 100 per ton
 Grapefruit US\$ 80 - 90 per ton
 Lemon US\$ 110 per ton

These prices are close to the prices in which fruits from Gaza were sold to Israeli factories during the past years, with the exception on the 84/85 season when prices reached US\$ 120 per ton. This should not be taken as the rule but as an exception since it was affected by the international increase on demand of concentrated citrus juices that season. To a large extent the prices paid by the Israeli factories will be a stabilizing role because this can be considered as opportunity cost for citrus producers.

SCHEDULE 4 - 1

Summary Sheet - Production Cost: Materials and Inputs (US\$)

Materials and Inputs
 Project components

Production Cost
 Carried Over

NO.	DESCRIPTION	FOREIGN	LOCAL	TOTAL
1	UNPROCESSED CITRUS FRUITS		2390500	2390500
2	AUXILIARY MATERIALS			
	a. Chemicals and Filters	26000		
	b. Packaging	443040		
	c. Cleaning Material	20000	489040	489040
3	MAINTENANCE		40000	40000
4	UTILITIES		131000	131000
	TOTAL			3050540

SCHEDULE 4 - 2

Estimate of Production Cost: Material and Input

ESTIMATE OF PRODUCTION COST								
Qty.	Unit	Item Description	Local	Foreign	Unit Cost\$	Foreign	Cost Local	Total
Unprocessed raw material:								
Citrus Fruits								
2500	TON	Shamouti Oragnes	x		95		237500	237500
150000	TON	Valencia Oranges	x		100		1500000	1500000
6000	TON	Grapefruit	x		85		510000	510000
1300	TON	Lemon	x		110		143000	143000

SUBTOTAL								2390500

Auxiliary Material								
EST.	EST.	Chmicals		x	-	15000		150000
2000	TONS	Filter Papers		x	4	8000		8000
6	TONS	Filtration Aids		x	500	3000		3000

PACKAGING								
4400	250kg	Barrels		x	5	22000		22000
70400	5 kg	Tins		x	0.30	21120		21120
1430								
million	litre	Cartons		x	0.10	134000		143000
8.564								
million	litre	Cartons		x	0.03	256920		256920
10000	litre	Cleaning Material		x	2	20000		20000
EST.	EST.	Maintenance, Oil, Grease	x				40000	40000

UTILITIES								
1.150								
Thousands	Kwh	Electricity	x				70000	70000
50								
Thousands	M ³	Water	x				6000	6000
900	TON	Fuel	x				5500	55000

T O T A L								305040

Chapter 5

LOCATION AND SITE

5.1. Political and Regulative Measures.

At present the choice of location and site for the proposed plant is majorly affected by regulative and political measures imposed over the occupied territories. The first step towards insuring effective execution of the proposed project is to secure, in written forms, the agreement of authorities concerned on all elements related to project implementation including licensing designs of buildings at a specific site.

It is quite obvious that governmental policies are not in favour of encouraging industrial development, especially when it involves utilization of local raw materials and resources. Hence, governmental involvement in rendering infrastructural services is limited to its very minimum - water and electricity supply, sewage disposal, roads, health and other services. One of the major obstacles would be the administrative services needed for securing licenses and other services. Procedures at this level may require a relatively long time. For these reasons, and of course for others, it is suggested that location and site selection of the proposed plant be limited within municipal boundaries. Regulative measures within such boundaries differ to some extent, from those outside municipal boundaries. Obviously a municipal council, provided it is elected, does possess the powers, plans, budgets, and responsibilities for community facilities and services. Infrastructural requirements necessary for community facilities and services. Infrastructural requirements necessary for industry are more likely to be present within municipal boundaries. Some municipalities do even have master plans for development; or at least have some directives as to classifying and servicing industrial zones. Furthermore labour as well

as housing and other necessary or recreation services are more likely to be available within municipal boundaries. Cost of land, however, is obviously to be much higher than lands outside municipal boundaries.

Transport costs within the occupied territories are not considered to have a major impact on location nor would it involve significant cost element to be considered as a limiting factor for site selection. Though transport costs are by themselves high as related to other countries since fuel costs are higher, length of the occupied territories from Gaza - being the furthest southern location - to Jenin in the north, does not exceed more than 200 kilometers, while width of the occupied territories from Gaza at the western sea shore to the armistice border bridges at the Jordan river in the east does not also exceed 150 kilometers, sea and air transportation is limited to Israeli ports.

Costs of transport to Jordan are determined according to time spent for shipment rather than kilometers covered. Though length of roads from Gaza to Amman is less than 200 kilometers, yet it takes a whole 24 hours for a round trip and sometimes more, due to Israeli security measures.

Three major determinants of locational selection are water and electricity supply and disposal of effluents. The first two determinants are almost totally controlled and supplied by the Israeli authorities. Water allotments need to be agreed upon, in written forms, before any action can be taken in the plant implementation program. Quantities needed should be allotted for a long period of time. Should the Gaza region be selected as the appropriate site for the proposed plant, more emphasis need to be put in connection with the water supply. Water in this region is considered relatively more conserved than the West Bank. In major townships electrical power supply though connected with the Israeli national grid, yet it is administered by respective municipalities. Unit costs, however, do not

differ much from one municipal location to another. But continuous and adequate supply of electricity may differ according to location. Some municipal locations, therefore, have to be omitted. A stand-by generator, on the other hand, may well be considered of a significant value to the plant.

In spite of the absence of sewage water canalization schemes in most locations, water disposal of the proposed plant could be utilized - after treatment - for irrigation. Hence, site selection may be influenced to be somewhat close to an agricultural region; investment in water disposal may then be justified. The organic waste of the proposed plant include citrus peels, pulps, seeds, and rest of filtration materials - and perhaps other fruit residues in future, all of which have a high nutritive value. Demand on such material is more than supply.

Liquid and solid waste disposed then is considered of economical value and constitute a source of income to the project which may justify and perhaps cover the relatively high investment costs involved for treatment of effluents.

Gaseous emissions are considered as safe in terms of their quantitative noxious effects or environmental pollution. The necessary steam boiler is of 4-5 tons steam per hour; and it consumes about 0.2 tons mazot per hour. The light, number /5/ mazot used includes 2.8 percent sulphur. Gas resultants from the chimney - 10 meters high and half a meter diameter - include ten kilograms of SO_2 per hour. The SO_2 level in the air in wind speed of 10 meters per minute - normal weather - will be 0.3 - 0.4 p.p.b. at a distance of 100-250 meters.

In so far as noise level is concerned, the proposed plant is not considered as a source of unfavourable or unbearable noise. Because all noise sources will be located inside

buildings, it is possible to determine the noise level near to the factory fence to be as 30 decibels. Technically this estimate is considered as tolerable. Table /5-4/ classifies noise level of each department of the plant. In this respect, one is inclined then not to include estimates for compensating neighbours.

5.2. Alternative Locations.

Five locations are considered as possible alternatives for selection of the proposed plant site.

- A. Tulkarm - north-west of the West Bank.
- B. Jericho - furthest east location, close to boarder bridges -armistice line with Jordan.
- C. Jerusalem-Bethlehem zone - at the very heart of the occupied territories.
- D. The Gaza Strip - at the center of citrus plantations.
- E. Gaza town.

All of these locations do have the infrastructural facilities needed, and each possesses its merits and pitfalls. Except the Jerusalem-Bethlehem zone, all other locations are close to citrus plantation areas. Tulkarm region includes about 17.000 dunums of citrus groves. Citrus area of Jericho is around 4.000 dunums. The Gaza Strip, as was indicated in Chapter 4, is the major citrus producing location /65.000 dunums/ and is considered as the main problematic area.

In considering West Bank locations, it is clear that they have a special impact in terms of satisfying legal needs for export to the Arab world. /Chapter 3 dealt with the issue and suggested solutions/. Tulkarm may well be disregarded at the very beginning because it is located at the farthest corner of the West Bank. Transport cost of raw materials as well as finished products will certainly be higher than any other location.

Jericho is suitable for export purposes, but weather conditions and the scarcity of labour force leave Jericho as suitable for storing finished products rather than as a site for the proposed plant.

The Jerusalem-Bethlehem zone may be viewed as a possible most suitable location in the West Bank. But it should be considered only after negotiations fail to establish the plant in Gaza. In so far as infrastructural facilities are concerned, this location possesses such facilities with even relatively lower costs. Water and electricity supply, sewage disposal, and the possibility of utilizing sewage water and solid materials disposed, are far more economical than any other location. Second, should the proposed plant be considered as a multi-purpose plant for processing citrus, grapes, and plum juices, Jerusalem-Bethlehem zone is central in terms of raw material localities. It is a hundred kilometers far from Gaza and Tulkarm /where citrus groves are/, in addition it is in the midst of vineyards and plum plantations of the West Bank - 80 percent of the vines and 70 percent of the pums are concentrated in this region. Third, this zone is so close to major local markets /see Chapter 3/, and is presumed to have less legal and political constraints in so far as export markets are concerned.

Though the Jerusalem-Bethlehem zone has more merits than the Gaza Strip itself, yet the complicated and unpredictable situation of the occupied territories may imply considering the Gaza Strip location as more suitable, especially when one to consider the possibility of future separation of the Gaza Strip as it had been the case prior to the 1967 war. It may be even more likely to emphasize the need for two separate plants for each region for processing citrus and other fruit juices.

The final choice of Gaza Strip being the most suitable location for the establishment of the proposed plant can be justified by the following merits:

- /a/ Marketing problems of fresh citrus fruits are more prevalent and more pressing in the Gaza Strip than in the West Bank.
- /b/ Gazan citrus groves are nearly three folds in area as compared to the West Bank.
- /c/ Citrus varieties are not diverse and more concentrated in almost one large location.
- /d/ Gazan citrus producers and dealers do have more interest and more financial ability and readiness to invest in such a project than West Bankers.
- /e/ Marketing and administrative expertise, as well as other skilled and semi-skilled labour force, and more apt to be found in Gaza for this specific industry than the West Bank.
- /f/ A company has already been formed in Gaza for this specific reason.

Within the Gaza Strip, two possible locations may be considered: The first within the Gaza city boundaries, and the second in the middle of the Gaza Strip, north of Khan Yunis town. In the second location, most of the refugee camps are present, from which labour force could be utilized. In addition three citrus packing and grading houses are located in the vicinity. And third, the area is central in terms of citrus fruit production.

In spite of such merits, Gaza town itself seems to be more relevant for the site selection. All facilities and merits cited for the Gaza Strip location can be applied to Gaza city. Second, Gaza city is only few kilometers away from the central part of the Gaza Strip. Third, and perhaps more important, the city of Gaza is the capital of the Strip in both economic

and socio-political sense. And, as was indicated earlier, infrastructural facilities and easier regulative measures are most apt to be present within the city boundaries than in any other location.

5.3. The Choice of Location.

Within the municipal boundaries of the city of Gaza, one of three locations can be chosen as a possible site for the plant. The first is in the eastern end of the city within the present industrial zone. Similar plants already exist in the area for packing and grading citrus products. In addition, a soft drink plant and a citrus packing house for the Arab Citrus Company /which is initiating the juice plant/ exist there. It would be possible to use the same facilities owned by the company or the land next to it. The existing infrastructure that is hooked to the plant like sewage, water, electricity, and roads can be used. Another tempting aspect is the presence - nearby - of a packing and grading citrus plant. This means a substantial transportation cost reduction since the raw material can be transferred directly without transportation or warehouse costs.

By the same token, several possible locations with similar advantages can be chosen next to, or in almost all citrus packing and grading houses. Although the process of selecting a site for the plant, according to the previous possibilities, seems to take less effort and involve a mere evaluation of each site in purely economic terms, yet one is inclined to eliminate such seemingly perfect possibilities and choose a different location to citrus packing houses. The following two main reasons may justify this inclination:

- /1/ It is better to choose a neutral spot without any connection to a specific packing house.
- /2/ Agriculture policy in Gaza and its future.

Since there exists many different people and groups in Gaza who are directly involved and interested in having a juice plant near them, choosing a neutral site will help avoid future problems some of which will mean the end of the detriment of the plant. Such differences can reach the climax of a boycott by other packing plants. And so as part of a socio-economic outlook, the sensitivities of people is important.

The second reason is also important. Although no policy governs the agriculture and economic situation, the Gaza municipal council commissioned an advisory company in 1978 to make a master plan for the city. /1/. The plan which was ready in 1982 provides the general outline for the development of the city in all aspects, particularly the packing of citrus products and general farming industrialization.

The city council which commissioned the plan has been removed for political reasons, but the master plan is expected not to be permanently ignored, although it is presently frozen. This study will be biased in favour of the master plan's recommendation as far as the plant site is concerned.

The master plan calls for cancellation of existing business licenses which are not compatible with the zoning regulations. The plan designates more industrial zones to be located. The master plan allows for three industrial zones in Gaza city:

/a/ A zone south-west of the city. The plan suggests that this zone be used for light industry that will not pollute the environment.

/b/ The present zone in the north-east of the city: This zone already contains mechanical shops and garages. The plan calls for this zone to be used for polluting shops and shops that cause a high cliber of noise.

/c/ The zone in the south-east of the city: The zone contains garages and the plan suggests that it remains for this purpose.

According to this plan, which can be considered a general policy /which is a probability for the future/, the first zone in the south-west of the city should be the site for the plant because it is a light industry as the plan calls for. This should be done regardless if the plan is officially approved or not. The possibility for this is feasible. Land in that zone is available from private owners. And if the plan is officially approved, then municipality owned land would also be available.

5.4. Local Conditions.

The first zone /A/ is one of ten areas within the municipal boundaries of the city of Gaza. The site of the area is 470 hectares, nearly 14 percent of the total area of the city. Of this area 170 hectares will be used for housing, and the rest /300 hectares/ for public services and industrial zone.

Area /A/ is full of sand hills in the west of the city. The area is 15-25 meters above sea level. It is connected with the sea coast with a one kilometer long street. On the east, it is connected by many roads to the main highway, 7 kilometers long, which avoids the center of town.

The sandy land needs a foundation of special specifications. The soil must then be tested before construction.

The main infrastructure is available as part of the services provided by the city. This includes electricity, water streets, an electrical hook-up, and a main water connection. Sewage can be hooked up to the main system which runs westward to the area near the sea.

5.5. Climate Conditions.

Gaza's position on the world map - earth grid - is 34 de-

grees, 28 minutes latitude, and 31 degrees, 30 minutes eastern longitude.

In so far as climate is concerned, nearly all the occupied territories form a part of the Mediterranean zone. But weather conditions differ from one region to another depending on many factors like altitude, exposure to marine influence, and wind directions... etc. It can be fairly stated that the country lies in a typical climate of rainy winter and a completely dry summer. The north part of the Gaza Strip is influenced by the weather of coastal plains, while the south is influenced by the Negev weather conditions.

Temperatures are moderate all over the year in Gaza as a result of its exposure to the sea. Its mean temperature is 20 degrees, with January being the coldest month, and August the hottest. Gaza climate encourages citrus fruit plantations and other sensitive to cold crops, since there is no danger of frost. As a rule, snow or hail is not prevailing in this region.

Winds: In summer strong winds are absent and the air movement is restricted to breezes. But at the advent of winter, the whole country enters the zone of "westerlies" and their typical cyclones which generally move in a west - east direction. Movement of cyclones and anticyclones cause an approximately regular change of wind directions. Wind blows first from the north-east and later from the south-east. After that, winds change direction and come from the sea into the south-west, and then they blow to the west and north-west and finally again to the north-east.

The rainy season in Gaza, like the rest of the country is short. Rainy days per season range from 30 days in the south to 40 days in the north. Seasonal rainfall ranges from 200 mm. - 400 mm., with a mean average of 370 mm. Gaza in general is considered as a drought region, especially in the south-east. Table, shows temperatures and rains in Gaza.

SCHEDULE 5-1

Estimate of Investment Cost : Land

ESTIMATE OF INVESTMENT COST						
L a n d						
No.	Qt.	Unit	Item Description	Local	Unit Cost	Total Cost
1.	10	donums	LAND	x	15.000	150.000
	3	%	TAXES	x	15.000	4.500
	1.5	%	LEGAL EXPENSES	x	1.500	2.250
	2	%	UNFORESEEN	x	1.500	3.000
			T O T A L			159.750

SCHEDULE 5-2

Estimate of Production Cost: Land

ITEM DESCRIPTION	COST US\$
Annual Storage Rents	
Cold Storage - Jericho	3.500
Cold Storage - Jerusalem	5.000
Cold Storage - Amman /optional/	6.000
T O T A L :	14.500

SCHEDULE 5-3

Monthly Mean of Daily Maximum and
Minimum Temperatures - 10 miles Near Gaza
and Average Rains
Several Years Mean
Temperature

Relative Humidity	Month	Max C	Min C	Amount of Rains mm	Number of Rainy days
70	1	16.8	7.7	84	9
68	2	19.9	8.5	57	8
64	3	22.8	11.5	45	9
65	4	21.5	10.4	10	2
59	5	27.3	15.1	4	1
62	6	30.3	18.5	-	-
64	7	29.3	18.7	-	-
67	8	30.0	19.6	-	-
66	9	29.8	19.6	-	-
64	10	27.1	16.8	14	2
70	11	23.6	13.0	66	6
65	12	20.6	9.1	88	8

SCHEDULE 5-4

Noise Level of the Plant

No.	Department	Level Decibel	Frequency/Minutes	Remarks
1.	FRUIT HANDLING	25 - 40	Every 30 min.	In closed building
2.	JUICE EXTRACTION	35 - 55	During working shifts	In closed building
3.	JUICE EARATION/ PASTEURIZATION	35 - 60	During working shifts	In closed building
4.	FILLING	35 - 45	Few	Not Every Day
5.	CONCENTRATION SECTION	40 - 55	Day - Shift	In closed building
6.	ENERGY /COOLING , AIR, WATER, ELECTRICITY	50 - 65	Day - Shift	Low speed compressors may reduce level
7.	STEAM BOILER	60 - 65	Twice a Shift	Only day shift
8.	OTHERS /WORKSHOP/	40 - 50	Not Often	

Chapter 6

PROJECT ENGINEERING

6.1. Project Layouts.

On the basis of both supply and production presented in previous chapters, the following project was formulated with a capacity that meets both input and output. Machinery, equipment and technologies are selected to process juices of citrus fruits, oranges, lemons and grapefruits. It should be noted that since the industry will deal with food for human consumption, and presumably local technical know-how is still in its early stages, then the most modern equipment and facilities have to be selected in order to ensure production of a uniform quality under sound sanitary conditions, and which will be less dependent upon a skilled labour force /though provisions have to be made for selecting and training personnel/.

The layout and description which follows is considered as a preliminary aspect of the project. It is not a detailed design ready for implementation, since several steps for the establishment of the plant have to be taken. Such steps cannot be decided upon at this stage of the study, and have to be considered only at later stages, where all decisions regarding organization, location, staffing, funding and other legal steps are being finalized.

The selection of equipment, in this study, is based upon British /APV/ and Italian manufacture. Other international equipment was not considered for various reasons such as high costs in terms of rate of exchange and/or shipment costs. Supply is subject to lease basis, or highly automatized and computerized, etc. It should be noted, however, that certain items, such as storage bins, piping conveying equipment may be locally

manufactured. This will be a matter for the owners to decide, and accordingly will be the detailed design. The pages to follow will illustrate by drawings the system of machinery incorporated and give explanations of the process and estimations of costs.

6.2. The suggested main products of the plant are /a/ natural citrus juices and /b/ citrus juice concentrates. But the concentrated citrus juice can be either marketed as such, or be used as raw material for citrus drinks, mixes, nectars, carbonated citrus drinks, etc. It must also be remembered that the equipment suggested can produce other fruit juices, especially tomatoes and to some extent grapes with some additions or adjustments. Neither of both products will be discussed in detail in this study, nor will it be considered in cost estimations.

Essential oils that are extracted will be re-used to recover the natural aroma and flavour of the juice. Pulp and peels may produce more juice of low quality, or may be processed as marmalades or candied citrus peels, or be sold for cattle feeding.

Pure natural citrus juices and concentrated citrus juices have been selected as the main products of the proposed plant, according to the following justifications: /1/. The proposed products will presumably face less competition at both local and export markets. /2/. The production does not involve additions of preservatives or additives, hence such production needs less technological know-how. Production of other types may be considered only after the plant has established its footprint on the industry and the market. Natural juices and concentrated juices can be stored for at least six months and two years respectively at room temperature without any signs of deterioration or change of flavour.

6.3. Plant Capacity.

A capacity of 5 tons per hour is considered to be the smallest economic unit possible. According to raw material, however, and market demand analysis an amount of 25 tons per hour is suggested. At early stages of the proposed project, the plant will be operated mostly for one shift per day, six days per week and 24 weeks per seasons. Accordingly, working shifts per season are:

6 days x 24 weeks = 144 shifts;

One working shift: 25 tons x 8 hours = 200 tons/shift;

Efficiency 80% : 200 x 0.8 = 160 tons/shift;

Citrus fruit capacity: 160 x 144 shifts = 23.040 tons/season;

Therefore, an amount of 25.000 tons/season is required.

Essential oils /0.1 - 0.2% oil/:

160 tons/shift = 240 kg oil;

Fine juice 35% and pulp juice 5% :

160 tons/shift = 56.000 litres juice + 8.000 kg pulp;

Fruit peels /60% peels/:

160 tons/shift - 96 tons peels

Concentrated citrus juice = 1.452 tons

Natural juice = 3.565 tons

Peels = 12.590 tons.

From peels juice base can be produced by crushing peels. The base may be used for mixing with concentrated juice to produce drinks.

6.4. Machinery and Equipment.

6.4.1. Since the plant will produce, at least during the first two or three years, only high quality natural juices and concentrated juices, then the selection of juice extraction machine should be of primary concern. Several juice extractors are employed by different international manufacturers; the goal is

to remove as much juice as possible from the fruit without grinding up the pulp or extracting juice from the peel. Some extracting machines cut the fruit into two halves and remove the juice by reaming or by pressing. Other extractors insert a tube through the peel of the fruit and, by squeezing the whole fruit, force the juice out through the tube. A third type of extractor squeezes the whole fruit. This third machine is recommended. One type manufactured in Italy, namely the polycitrus machine type ZX2-M15. The selection of this type may be justified on the grounds that it has the following advantages:

1. It is compact, has comparatively low costs. It is also possible to be purchased on a credit basis.
2. The line is provided with a self-selecting device to expel rotten fruits, while high quality products are extracted. Labour costs, then, will be reduced.
3. It can process fruits of any size simultaneously, thus it is more suitable for the suggested project that is dealing with different sizes of raw material /citrus fruits/. This will lower the cost of labour and save the time required for sorting.
4. It consists of a combination of two units arranged in cascade: one for the extraction of essential oils by rasping the outer surface of the whole fruit; the other for the extraction of juice. This method of extracting essential oils makes it more convenient for the juice extractor to obtain more juice without endangering its quality.

The de-aerator, pasturizer and evaporator should be carefully selected from a well-known, reputable manufacturer, since in these processes the quality of the product is determined.

The evaporator is the main machine in the concentration section. Various types of evaporators are available using different methods of concentration /evaporation/ but the most widely used at present are the plate type and the falling film type. Both are high-temperature short-time distillation types. The plate evaporator, however, is suggested for the proposed project. It is efficient in steam use, and easy to dismantle and clean. It can be purchased from the UK or Italy.

The filling and packaging machines have to be consistent with the capacity of the plant, and need not be highly automated or computerized to allow for a moderate margin of labour force to be employed.

Some of the other necessary equipment may be locally manufactured in Gaza, and some may be obtained from Israel. This is a matter for project sponsors to decide.

6.4.2. Fruit Handling System.

25.000 kg per hour.

1 Reception Bin: 7.000 kg capacity. Below truck offloading ramp. Fabricated mild steel. The factory will have a built-up ramp sloping to the reception bin. Alt: Hydraulic ramp to lift the delivery truck as required.

Note : The reception bin may be below ground level to facilitate offloading the trucks, but if this can be avoided it is advisable as the resultant dump is inevitably difficult to keep clean and dry. The bin will have shallow vertical sides, below which are sloping sides, narrowing to a base opening over a conveyor which feeds the fruit from the bin to the first elevator.

Baffles are required in the bin to prevent overfeeding this conveyor, and a feed control gate should be fitted. The conveyor and elevator should be of a capacity and geared to empty the reception bin quickly to prevent trucks waiting.

- 2 Belt conveyor: 50.000 kg per hour. With feed control device to elevator.
- 3 Elevator : 50.000 kg per hour. Chain of long, shallow buckets feeding bin top conveyor.
- 4 Bin Top Conveyor : 50.000 kg per hur. Distributing to length of storage bin battery.
- 5 Storage Bin : 300.000 kg /300 ton/ total capacity of angle iron with strong wire mesh panels. Fitted with baffles to minimise fruit damage.
- Note : Those silos may be reinforced by concrete construction with heavy panels, or of girden construction with heavy wire mesh panels. A system of baffles is required to prevent damage to fruit during filling. The total capacity of these bins should be at least one and a half days through put.
- 6 Bin Discharge: 25.000 kg per hour. Served by gates from bins and feeding sorting table.
- 7 Fruit Washer : 25.000 kg per hour, with counter revolving brushes and water sprays.
- 8 Belt Conveyor: 25.000 kg per hour for drainage and feed to elevator or oil extractor.
- Note : /a/ From the bases of the silos, controlled by gates, is the feed to the belt conveyor for discharge to fruit processing. A fruit washing machine follows where either the oranges are jostled through a

water tank or are subjected to sprays while being brushed with revolving brushes. The washed /sorted/ fruit is then conveyed by elevator to the extraction section of the factory.

/b/ Most of this equipment may be manufactured locally.

6.4.3. Juice and Oil Extraction Section.

The belt conveyor from fruit preparation section /handling system coming to oil extractor/.

Polycitrus machine type ZX2-M15 integrated unit for the extraction of essential oils and juice from all kinds of citrus fruits.

The unit can process citrus fruits of any size simultaneously without any previous sorting of sizes.

1. Hopper to receive the fruits complete with a dosing device to introduce the fruits into the machine.
2. Paddle transporting chain to push the fruits through the machine.
3. Water circulation system consisting of a suction basket filter, a centrifugal pump, a flowmeter, sprayers and connecting piping.
4. Six rasping cylinders coated with a rasping plate and driven by a speed regulator.
5. Collecting tank to gather the water-oil mixture with a built-in screw conveyor to expel solid waste.
6. Finisher for the water oil mixture consisting of three filtering stages and screw press for the separation of solid waste.
7. Chute to convey the de-oiled fruit to the juice extracting section.
8. Juice extracting section complete with a device to adjust

the squeezing pressure, juice collecting tank, two screw conveyors to expel peels, juice outlet groove and external tank for juice.

9. Staircase and platform to inspect the machine.
10. Electric motors and centralized electric panel /20kw/.

6.4.4. Natural Juice De-aeration and Pasteurisation Section
and Filling Line /5.000 to 10.000 litres per hour/.

1. Float balance tank controlling flow from natural juice reception tanks.
2. Vacuum pump for de-aeration section of pasteuriser.
3. Plate heat exchanger pasteuriser accomplished, de-aeration, high temperature, short time pasteurisation with automatic flow diversion.
4. Filling machine: carton /pure pack/ filling machine of 5.000 litres per hour for 1 litre, 0.25 litre carton containers /fresh juice/ and 5 kg galvanized tins /concentrated juice/.
5. Carton/can seaming machine to match output.
6. Carton/can cooling machine.
7. Carton packing machine.

Note: /a/ The cooling tunnel machine can be combined for the two filling lines.

/b/ The packaging system for finished products into cartons will be done semi-automatically.

6.4.5. Concentration Section.

"The most important technological point in fruit juice manufacturing is how to treat the fruit without losing

the natural flavour, colour and taste of the original fruit" /1/. Selection of the juice evaporator is then the most important item in the whole process of juice manufacturing. It is recommended, therefore, to select only an internationally, highly reputed evaporating device. "... practically all modern citrus processing plants use TASTE evaporator... /it/ eliminates problems of gelation and bacterial buttermilk flavour... /it/ operates on the principle of high temperature, short time exposure of a thermally-accelerated descending fog, followed by a separation of liquied and vapour. This effect may be repeated from three to six times. The heat source is low pressure steam applied in the last preheater and first effect tube bundle. Vapours that are evaporated from the first effect become the heating medium for the second effect and so on..." /2/.

Since the proposed processing plant will be oriented at least for the first two seasons, towards producing only natural high quality juices and juice concentrates as its main output for marketing, the evaporating machine, as described, will help overcome the problem of shortage of trained manpower. This does not mean that the factory needs no experienced technologies and other skilled production personnel. As is indicated in Chapter 8, perhaps it is advisable to hire the expertise of a foreign technologist for one year together with a local counterpart.

The suggested evaporator is of 10.000 litres per hour intake. The sequence of concentration is as follows:

-
- /1/ - How to Start Manufacturing Industries - Concentrated fruit juice making plant. Paper prepared by the Japan Consulting Institute and reproduced by UNIDO: File No. ID/562/12 UNIDO, Vienna
 - /2/ - Orange juice processing, storing and packing in Florida - by C. Reed Sutherland, General Foods Corporation, Proceedings International Society of Citriculture, 1977, Vol. 3.

1. Float balance tank controlling flow from natural juice reception tanks.
2. Plate heat exchanger pasteuriser without de-aeration, accomplished high temperature short time pasteurisation and quick cooling to maintain flavour excellence.
3. buffer tank to regulate flow to evaporator.
4. Reheater /heat exchanger/ to give optimum evaporate inlet temperature.
5. Evaporator, triple effect. Output to be cooled for slush freezing or may be reheated for hot filling.
6. Pre-cooler before slush freezing.
7. Slush freezer from which output can be filled into cans or cartons.

Note:

/a/ From the natural strength juice reception tanks, juice for canning or carton filling at single strength is de-aerated and pasteurised in the purpose plant, ensuring retention of natural flavour and high quality product. Hot filling in the containers is the logical sequence with tunnel cooler.

Provision may be made at the pasteuriser to draw off juice at a suitable temperature for the evaporator, but if natural juice processing and concentration are to proceed simultaneously a separate heat exchanger is required for this duty.

/b/ Of the various systems of juice concentration the plate evaporator must be considered the foremost. It is employed in different kinds of fruits, compact machine and efficient in steam use, easy to dismantle and clean.

Concentration is generally 5 to 6 fold, into the region of 65% to 70% total solids in the case of orange or 45% in the case of lemon.

After high concentration blending back of unconcentrated juice ensures a product high in antrual flavour. In this case a blending tank must be added after the evaporator and the blend subsequently pasteurised before hot fillings.

Alternatively, of frozen concentration is desired, the evaporator is followed by a pre-cooler and slush freezing plant before packing.

To concentrate 10.000 lt/hr of orange juice at 10% TS to 1538 kg/hr of product at 65% TS other duties considered are:

ORANGE JUICE	10 - 65% TS
GRAPEFRUIT JUICE	10 - 65% TS
LEMON JUICE	7 - 45% TS

For economy of steam and quality of concentrate, flush cooling to 20 C automatic brix control and aroma recovery are recommended.

STEAM PRESSURE	10 kg/sq cm
COOLING WATER	27 C
CHILLED WATER	1.5 + 2 C

Process Description. (Appendix 4)

Feed is pumped forward from the balance tank to the preheater where it is successively heated to 79 C with condenser water, first and second effect condensate, first effect product /regeneration/ and hot water.

The feed then enters the second effect evaporator, where the concentration commences using vapour from the first effect as the heating medium Product and vapour pass onto the second effect separator, vapour leaving by the top outlet is ducted to the third effect heater. Concentrate is pumped to an inter-effect heat exchanger where it is heated up to 90 C using hot water. The concentrate then enters the first effect evaporator where evaporation takes place, using steam from the thermocompressor outlet as the heating medium, Product and vapour pass

into the first effect separator where vapour leaves via the top outlet and is ducted to the second effect heater and product leaves and is pumped through the regenerative section of the preheater before entering the third effect evaporator. Here evaporation takes place using 90% of the vapour from the second effect. The condensate and remaining vapour, which is rich in fruit juice aromatics, enter a separator associated with the aroma recovery unit.

The condensate is pumped away and the vapour continues through the aroma recovery unit.

The concentrate and vapour from the third effect pass onto the separator and the vapour passes to the shell and tube condenser, while the concentrate passes to the slush cooler unit where the final concentration takes place in cooling the product down to approximately 20 C.

6.4.6. Auxiliary Equipment.

The plant needs some auxiliary equipment most of which can be purchased locally. Such equipment includes: installation of piping system, electricity supply and a stand-by generator, CIP system /cleaning in place/, laboratory instruments, air compressor, steam boiler, cooling system, water treatment plant, sewage treatment plant, trucks and fork lifts.

6.4.7. Service Equipment.

Such as:

/a/ The administration building which has to be furnished and provided with typing, reproduction, computing and other necessary machines and equipment.

- /b/ Provision for First Aid with all necessary facilities, including a bed.
- /c/ Fire extinguishers and other protective equipment.
- /d/ Canteen equipment and utilities.
- /e/ Cleaning utilities.

6.4.8. Primary Stock of Spare Parts and Tools for Maintenance.

Though spare parts and major maintenance are available in the local market, yet provisions are made to have a supply of spare parts for easily damaged equipment. Some other equipment may be needed before or during starting the plant.

Estimated equipment costs are shown in Schedules 6-2 and 6-3.

6.4.9. Plant Operating Conditions /Concentration Section/.

Feed rate	10.000 kg/h
Product rate	1.538 kg/h
Evaporation rate	8.462 kg/h
Feed concentration	10% TS
Product concentration	65% TS
Feed temperature to preheater	24 C
Feed temperature to evaporator	79 C
Temperature in first effect steam chest	102 C
Boiling temperature in first effect	88 C
Boiling temperature in second effect	77 C
Boiling temperature in third effect	49 C
Product temperature	20 C
Steam pressure at boiler	10 kg/sq cm
Condenser vacuum	88 mm Hg abs
Cooling water in	27 C
Cooling water out	40 C

6.4.10. Services.

STEAM:

Hot Water	550 kg/h
Evaporator	2.250 kg/h
Augmentor	<u>300 kg/h</u>
	3.100 kg/h

WATER:

Condenser	115 cubic meters/h
Vacuum pump	2 cubic meters/h
Primary condenser	3 cubic meters/h

ELECTRICITY:

45 kw /installed/ 380 V

COMPRESSED AIR:

Oil free 5 kg/sq. cm 1.5 cubic meters/min

CHILLED WATER:

10 cubic meters/h at 1.5 C 2 kg/sq. cm

6.5. Cost of Technology.

6.5.1. It has already been suggested that the careful selection of equipment may save costs of technology since necessary technologies are embodied within the equipment itself. Proposed products, on the other hand, are considered as primary products. The need is for well trained personnel under the direct supervision of a highly qualified, experienced technologist.

But this argument is perhaps oversimplifying the whole

problem of technologies needed for future /not so distant future/ perspectives of the plant. The plant is designed and suggested for the development of the industry, satisfying the needs of consumers and adding value to the production of citrus in the Occupied Territories. And also it is aiming at gaining some profits. Surely, profits will not be achieved from primary products as will be the case when technologies are employed for various blending, mixing and adding up to the primary product to produce a new product that suits the needs of some consumers.

6.5.2. High quality natural juices and concentrated citrus juices have been commercially produced for more than four decades. Research is continuing in the field of citrus juices. Some manufacturing corporations, such as Automatic Machinery USA, are supplying and servicing machines on a lease basis. This fact indicates the importance of acquiring the technology.

The scope of citrus manufacturing technology extends beyond the mere objective of extracting "as much juice as possible from the fruit without grinding up the pulp and membrane or extracting juice from the peel" /1/; in fact, machines have already overcome this problem. Juice manufacturing technologies are dealing also with how to treat the fruit without losing the natural flavour, colour and taste of the original fruit; and dealing with when to harvest the fruit, since brix/acid ratio in the juice depends among other factors, on timing of the harvest.

Technology also deals with packages and storage. But one of the important aspects of technology is the ways, percentage and means of mixing and adding acid, syrup, colouring, pulp, etc. to the concentrated citrus juice /which is considered as

raw material/ to produce various kinds of citrus drinks, squash, nectar, etc.

6.5.3. There is some empirical evidence, on local markets, and observational remarks of some Arab countries, that demand on drinks and sweetened concentrated citrus juice is somewhat higher than pure natural strength juice and concentrate. Let this not suggest that the proposed plant has to start with drinks or other varieties. It has already been advocated that the plant will start with natural juices and juice concentrates, since competition, especially in local markets, is much sharper on other varieties than pure natural juice and concentrates.

6.5.4. It is advisable to grasp the opportunity of buying technologies from manufacturing corporations. After all, technology is a commodity that has to be sold. Reliable sources from the manufacturing industry /British and others/ expressed their readiness to help in training a few individuals in their respective processing firms. As much as these remarks are serious, sponsors of the proposed plant must be ready to allocate budgets for both training and buying the technology. Negotiations on acquiring equipment might be conditioned and related with training and future servicing together with acquiring technologies, all as one parcel.

6.6. Civil Engineering.

6.6.1. Total area needed for the proposed plant is estimated to reach 10,000 sq. m /10 dunums/. Planning and preparing blueprints for civil, sanitary, electrical, mechanical and refrigeration engineering is recommended to be trusted to a local engineering firm. Three to six months are needed for accomplishment of this phase. Construction is also suggested to be leased to a reputed construction firm on a contractual basis.

6.6.2. The following remarks are of special importance for the unique situation in the Occupied Territories.

1. To ensure organized, continuous and uninterrupted production, there is a need for storing fresh fruits. Extra storage bins /300 tons - 1.5 shifts/ are recommended.
2. It is expected that, on some occasions and out the control of the administration, production may exceed demand; or that export products may face difficulties. To overcome such difficulties and to ensure more efficiency in delivery, it is suggested that provision for cold storage houses be made in Jericho.
3. Since locations and site of the proposed plant will be in the Gaza vicinity, tile flooring is a must for hygienic and ecological conditions.
4. Material used for buildings is mostly available at local markets, such as concrete and cement blocks. Roofing of production halls will be of asbestos on iron U-shaped beams. Other buildings specified later in this Chapter are not different than any other plant. Fencing, however, should be not less than two and a half meters, for security reasons, preferably to be of concrete walls topped with barbed wire.

6.6.3.

1. The area of the main production hall is 400 sq. m, 7 m high. Basis of walls and floor should be of concrete to hold machinery and equipment.
2. The area of the filling and packaging hall is 400 sq. m, 7 m high. Both halls should have tile floors and ceramic walls.
3. An area of 375 sq. m is needed for the cold storage and another area of 250 sq. m for the warehouse. The energy room

area is 300 sq. m. In this room, provision should be made for concrete flooring to withstand vibration of machinery and double walling to minimize noise.

4. Other buildings such as workshop, administration office, laboratory, cafeteria and guard's room are built with available building materials.

Cost estimates of civil engineering work are shown in Schedules 6-4 and 6-5.

6.7. Emissions.

Since the proposed plant will produce mainly citrus fruit juices and concentrates, the main raw material will be citrus fruit during the season. Hence, waste ejected from the plant would be /1/ organic waste, which includes pulp, peels, seeds and what remains from the filtration materials and /2/ inorganic waste, which includes sand and other materials.

6.7.1. Organic Waste.

The peels and pulp are organic material which have a considerably high nutritive value. Demand for such material for animal feed is strong to the extent that it is even higher than supply. Thus such material /or part of it/ if not processed may be emitted and render some revenue. The pulp is emitted from the plant by means of a conveyor to a silo. The silo is emptied into trucks twice or more each day. The estimated quantities of waste emitted from the plant are as follows:

JANUARY	100 - 140 tons/day
FEBRUARY	50 - 75 tons/day
MARCH	90 - 110 tons/day
APRIL	100 - 105 tons/day
MAY	180 - 200 tons/day

6.7.2. Other Waste.

Solid waste rubbish is expected to result from cleaning the machines, equipment, pipes, tanks, etc. This waste should be disposed of by means of contracting a rubbish disposal agency.

6.7.3. Sewage Wastes.

Drainage piping has to be destined to a sewage treatment plant. A sewage treatment system should be constructed with a capacity of 60 cubic meters per hour. The system includes:

- /a/ A solid separation device /rotor strainer filtration/ to separate solids with the size of more than 0.25 mm from water. These solids will be emitted to a manure heap.
- /b/ Sewage water will be collected in an underground pool in order to settle the rest of the solids and to provide strong changes in the waste water going for municipal canalization system.
- /c/ Correction of pH and neutralization of sewage water by means of adding acids and caustic /pH around 6 - 8/.

Cost estimates of the automated sewage treatment system in Schedule 6-2.

6.7.4. Noise Level.

The noise sources of the plant are not different from any other factory. All noise sources are located inside buildings, hence it is possible to determine noise level next to the plant fence as 30 decibels. This noise is tolerated and there will be no claims for neighbours to be compensated by the plant.

6.7.5 Steam Boiler.

The steam boiler capacity is 4 - 5 tons per hour. Mazot consumption is about 0.2 tons per hour. The light Mazot number 5 will be used, which includes 2.8% sulphur. The result of chimney flow will be 10 kg per hour of sulphur dioxide.

The chimney diameter is 0.5 m, height of 12 m above ground level. The sulphur dioxide concentration level in the air at wind speed of 10 meters per minute /normal weather/ will be 0.3 - 0.4 p.p.b. in a distance of 100 to 250 meters. Thus this level is tolerable.

SCHEDULE 6 - 1

Estimate of Technology Costs /US\$/

TECHNOLOGY	FOREIGN	LOCAL	TOTAL
1. Hired foreign technologist /for one year/	30.000		30.000
2. Training for three foremen locally		6.000	6.000
3. Training of Production Eng. and Technologist for three months in GB	15.000		15.000
T O T A L :	45.000	6.000	51.000

SCHEDULE 6 - 2

Estimate of Investment Cost: Equipment (in US\$)
Project Component No.

No	Qty.	ITEM DESCRIPTION	Description			Cost			Depreciation	
			LC	FC	Unit Cost	Local	Foreign	Total	Years	\$
1		PRODUCTION EQUIPMENT								
	1	Reception Bin	x		6000	6000		6000	10	560
	3	Storage Bins	x		6000	180000		180000	10	2100
	3	1 Bin conveyor, 2 Screw conveyors	x		2800	8400		8400	5	1680
	3	2 Belt conveyor, Bin discharge conveyor	x		2600	7800		7800	5	1550
	2	1 Solids particular conveyor. 1 spent peels conveyor	x		3800	7600		7600	5	1680
	1	Fruit washer		x	3800		3800	3800	5	840
	1	Elevator	x		3500	3500		3500	5	800
	1	Hooper Elevator	x		2900	2900		2900	5	660
	1	Mixer Oil-water Tank		x	2600	2600	2600	2600	5	560
	2	Oil separator, stage 1, stage 2		x	17000	34000	34000	34000	5	7200
	1	Oil receiver		x	3500	3500	3500	3500	5	800
	1	Extraction machine for essential oils		x	24000	24000	24000	24000	5	5400
	1	Water circulation system		x	12000	12000	12000	12000	5	27000
	1	Citrus juice extractor		x	18000	18000	18000	18000	5	3840
	1	Screw conveyor	x		3600	3600		3600	5	820
	2	Juice finisher stage 1, stage 2		x	6500	6500	6500	6500	5	1400
	2	Juice receiving tank		x	11000	22000	22000	22000	10	2600
	1	Spent peels container		x	5000	5000	5000	5000	10	580
	1	Float balance tank		x	3000	3000	3000	3000	5	580
	1	Vacuum pump		x	3800	3800	3800	3800	5	840
	1	Plate heat exchanger		x	24500	24500	24500	24500	5	3300
	1	Turner pasteurizer/ cooler		x	160000	160000	160000	160000	5	35000
	5	Production conveyors		x	5000	25000	25000	25000	5	6000
	1	Carton filler		x	150000	150000	150000	150000	5	35000
	1	Buffer tank		x	9000	9000	9000	9000	5	2400
	1	Reheater		x	18000	18000	18000	18000	5	420
	1	Heater		x	1600	1600	1600	1600	5	3800
		Vacuum Equipment		x	32000	32000	32000	32000	5	7600
	1	Evaporator		x	185000	185000	185000	185000	5	4200
	1	Slush Freezer		x	21000	21000	21000	21000	5	5000
	1	Platform	x		3000	3000		3000	5	800
2		AUXILIARY EQUIPMENT								
	1	Piping (steam, water, air)	x		35000	35000		35000	5	10000
	1	CIP System (cleaning)		x	22000	22000	22000	22000	5	4400
		Laboratory Instruments		x	10000	10000	10000	10000	5	2000
	1	Air compressor		x	18000	18000	18000	18000	5	4600
	1	Steam Boiler		x	60000	60000	60000	60000	5	14400
		Cooling System		x	125000	125000	125000	125000	5	32000
		Water treatment plant		x	45000	45000	45000	45000	5	11000
		Sewage treatment plant (estimate)		x	90000	90000	90000	90000	5	20000
		Electricity (reserve)		x	35000	35000	35000	35000	5	8000
	3	Fork lift		x	30000	90000	90000	90000	5	18000
	2	Trucks		x	50000	100000	100000	100000	5	20000
3		PRIMARY STOCK - SPARE PARTS, WEAR & TEAR WORKING TOOLS, SPARE PARTS (ESTIMATE)		x	50000	50000	50000	50000	5	10000
4		SERVICE EQUIP. (Furniture, Reproduction Software)		x	15000	15000	15000	15000	5	5000
		Computer, Typewriter, Office Equip.		x	40000	40000	40000	40000	5	120000
5		OTHERS NOT FORESEEN (estimate)		x	120000	120000	120000	120000	5	30000
		TOTAL :				110800	1583700	1694500		383810

SCHEDULE 6 - 3

Summary Sheet Investment Cost:

E q u i p m e n t

US\$

Project Component

Investment Cost

Carried over

NO.	DESCRIPTION	LOCAL	FOREIGN	TOTAL
1.	PRODUCTION EQUIPMENT	60.800	778.700	839.500
2.	AUXILIARY EQUIPMENT	35.000	595.000	630.000
3.	SPARE PARTS, WEAR AND TEAR, TOOLS	-	50.000	50.000
4.	SERVICE EQUIPMENT	15.000	40.000	55.000
5.	OTHER UNFORESEEN	-	120.000	120.000
	T O T A L :	110.800	1.583.700	1.694.500

SCHEDULE 6 - 4

Estimate of Investment Cost: Civil Engineering Work

Project Component No.

NO.	QUANTITY UNIT	ITEM DESCRIPTION	LOCAL	FO-REIGN	UNIT COST	C O S T		
						Foreign	Local	Total
1		Site Preparation and Development	x			-	150000	150000
2		Buildings and Special Civil Works:						
	250 sq.m.	Finished Product Warehouse	x		200	-	50000	50000
	370 sq.m.	Cold Storage - 18C	x		370	-	115000	115000
	300 sq.m.	Energy Room (Cooling. Steam)	x		200	-	60000	60000
	200 sq.m.	Cafeteria and Toilets	x		250	-	25000	25000
	80 sq.m.	Spare Parts Warehouse	x		250	-	15000	15000
	100 sq.m.	Workshop	x		200	-	20000	20000
	400 sq.m.	Filling Hall	x		300	-	12000	12000
	400 sq.m.	Production Hall	x		300	-	12000	120000
	125 sq.m.	Office and Laboratory	x		360	-	4500	4500
	15 sq.m.	Guard Room	x		333	-	5000	5000
	60 sq.m.	Silo Foundation	x		83	-	5000	5000
	10 sq.m.	Fruit Reception Hopper	x		500	-	5000	5000
	10000 sq.m.	Land (Infrastructure)	x		12	-	12000	120000
	Estimate	Bases for Machinery and Equipment	x			-	10000	10000
	Estimate	Canalization System	x				30000	30000
3		Outdoor Works:						
	400 m	Face and Gate	x		12.5	-	5000	5000
4		Other and Unforeseen					85000	85000
		<u>T O T A L :</u>					985000	985000

If another cold storage was considered at Jericho the investment costs will increase by \$ 115000. Land cost \$ 18000

SCHEDULE 6 - 5

Investment Cost - Civil Engineering Works

Summary Sheet - Investment Cost

US\$

Civil Engineering Works

Investment Cost

Project Component

Carried Over

NO.	DESCRIPTION	FOREIGN	LOCAL	TOTAL
1.	Site Preparation and Development	-	150.000	150.000
2.	Buildings and Special Civil Works	-	745.000	745.000
3.	Out-door Works	-	5.000	5.000
4.	Other and Unforeseen	-	85.000	85.000
TOTAL :		-	985.000	985.000

SCHEDULE 6 - 6

Estimate of Production Cost : Civil Engineering Works

Project Component No.

NO.	QTY. UNIT	DESCRIPTION	LOCAL	FO-REIGN	UNIT COST	COST		T O T A L
						FOREIGN	LOCAL	
		Maintenance & Repair Works of:						
1.		Site preparation and De/velopment	x		03	-	6000	6000
2.		Buildings and Special Civil Works:						
	250 sq.m.	Finished Product Warehouse	x		80	-	2000	2000
	375 sq.m.	Cooling Store - 18C	x		12	-	4600	4600
	300 sq.m.	Energy room (cooling, steam, electricity)	x		8	-	2400	2400
	60 sq.m.	Spare Parts Warehouse	x		10	-	600	600
	100 sq.m.	Work Shop	x		8	-	800	800
	440 sq.m.	Filling Hall	x		12	-	4800	4800
	400 sq.m.	Production Hall	x		12	-	4800	4800
	125 sq.m.	Offices and Laboratory	x		14.5	-	1800	1800
	15 sq.m.	Guard Room	x		13.5	-	200	200
	60 sq.m.	Silo Foundation	x		3	-	200	200
	10 sq.m.	Fruit Reception Hopper	x		20	-	200	200
	10000sq.m.	Land	x		0.06	-	6400	6400
	Estimate	Bases for Machines and Equipment	x		0.06	-	400	400
	Estimate	Canalization System	x			-	1200	1200
3.		Outdoor Works						
	40 m	Fence and Gate	x		0.5	-	200	200
4.		Other and Unforeseen	x		0.5	-	2000	2000
		<u>T O T A L :</u>					38600	38600

Chapter 7

PLANT ORGANIZATION AND OVERHEAD COSTS.

7.1. Cost Centres.

The overall analysis of the project indicates clearly that the main cost centre is the production process itself. There the biggest proportion of company's assets will be concentrated and the bulk of the manpower will be employed. The plant will operate essentially one main production line processing raw citrus fruits into final products. Principal components of the production process are as follows:

- raw fruit handling /delivery, storage, sorting, washing/,
- juice extraction /and oil, seeds, peels separation/,
- de-aeration and pasteurization /for natural juices/,
- concentration /for concentrated juices/,
- filling, cooling and packing.

This is a technically integrated process and high degree of coordination is required to secure smooth and uninterrupted operation. Therefore, the control over the entire production line will be concentrated within one department which in turn can be divided into smaller sections.

Another important cost centre refers to sales and marketing activities. This is because large proportion of the output is to be sold outside the country and a special effort is needed to carry out export sales, which normally is regarded as more sophisticated and demanding than domestic sales. On the other hand, the company will certainly face tough competition both on foreign and local markets which again will require rather extensive publicity and marketing effort. So it

is justified to establish a separate unit within the company, dealing with sales and marketing problems. In addition, some other types of activities should also be included in this unit, specifically the external transport.

It is also customary to put all financial and administration activities within separate unit, usually in the form of a department.

So the general organizational structure of the company should be based upon three main departments:

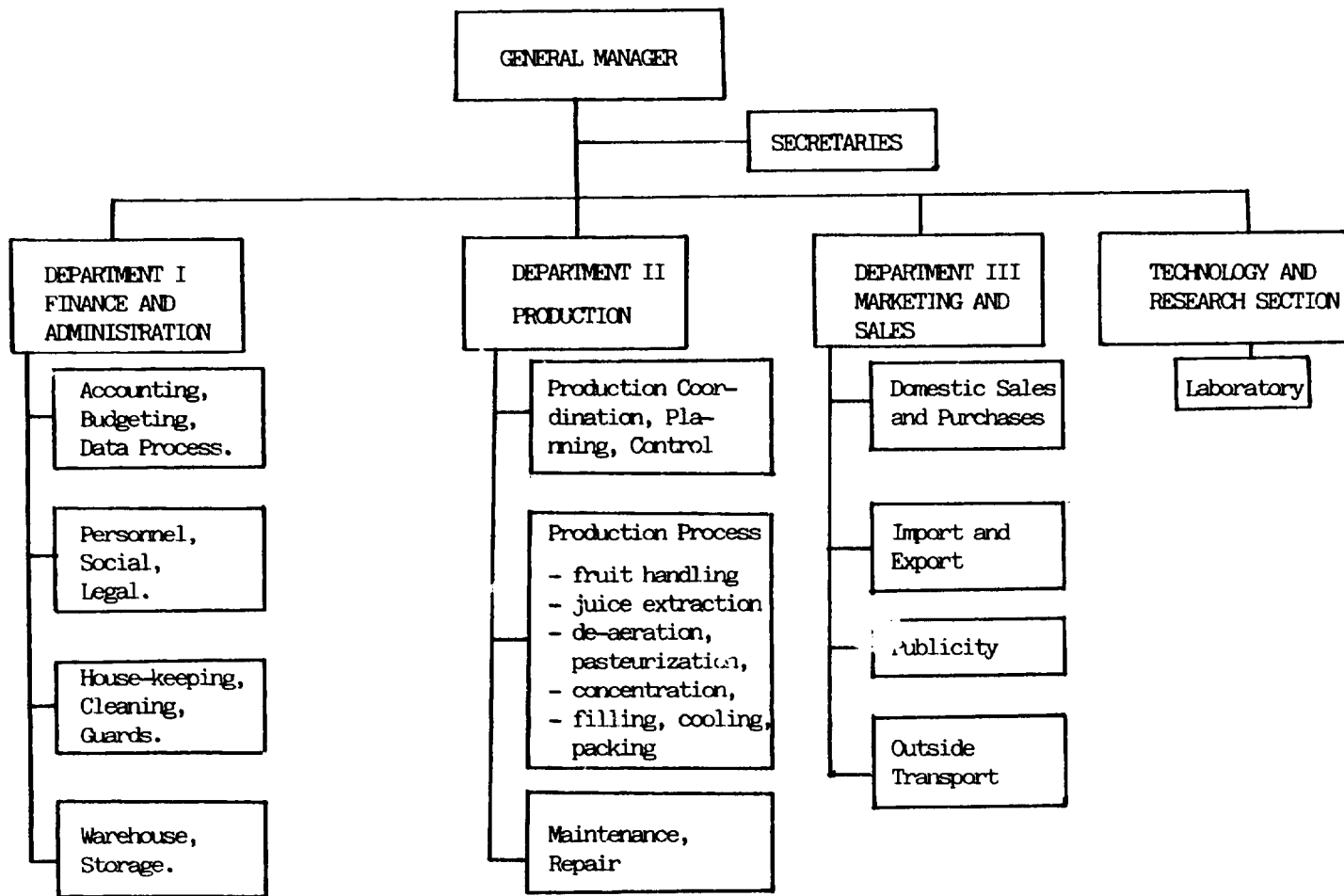
- production department,
- sales and marketing department,
- finance and administration.

Directly reporting to the General Manager will be also a separate unit for technology development, research and quality control. The unit will include laboratory and will be headed by a Chief Technologist.

7.2. Organizational Structure.

The proposed organizational structure of the company is presented in Chart 7 - 1. As it is seen, the company is divided into three departments and one independent section. Among them the production department plays the most prominent role. Because of the large number of workers and employees belonging to this department, it is advisable to divide it into several sections dealing with particular phases of the production process. This will facilitate the proper management, supervision and control.

CHART 7 - 1



The detailed structure of the company together with the numbers of employees in each unit is given below:

1. General Manager Office	3
2. <u>Department I</u> : Finance and Administration.....	14
Head: Finance Manager	
2.1. Accounting, budgeting and data processing.....	3
2.2. Personnel, social and legal affairs.....	1
2.3. House-keeping, cleaning, guards.....	5
2.4. Warehouse, storage	4
3. <u>Department II</u> : Production.....	46
Head: Production Engineer	
3.1. Production Coordination, Planning and Control..	2
3.2. Fruit receiving and handling	6
3.3. Juice extraction	
3.4. De-aeration and pasteurization	
3.5. Juice concentration	31
3.6. Filling, cooling and packaging	
3.7. Maintenance and repair.....	6
4. <u>Department III</u> : Marketing and Sales	6
Head: Sales Manager	
4.1. Domestic Sales and Purchase	1
4.2. Import-Export.....	1
4.3. Publicity.....	1
4.4. Outside Transport.....	2
5. Technology and Research Section	3
Head: Technologist	
 TOTAL EMPLOYMENT :.....	 72

7.3. Overhead Costs.

Overhead costs include salaries and fringe benefits of indirect manpower, i.e., General Manager Office, and staff of Department I and II, as shown in the manning Table /Schedule 8-3/. Next annual rent payments for cold storage facilities in Jericho, Jerusalem and Amman have to be included. Compulsory insurance fee for fixed assets has been assumed at 0.5% of their initial book value. Miscellaneous office supplies, communication costs /telephone, telex/ and effluents disposal payments have been estimated at standard levels. Finally, a small contingency for unforeseen expenditures has been also provisioned.

The total administration and factory overhead costs are presented in Table 7 - 1 /below /:

TABLE 7 - 1 - OVERHEAD COSTS /IN US\$/

NO.	ITEM	COSTS
1.	Indirect Labour /salaries/	97.200
2.	Indirect Labour /other costs/	57.816
3.	Rents for storage /outside/	14.500
4.	Insurance on property /0.5% of fixed assets/	18.500
5.	Office Supplies	30.000
6.	Communications	15.000
7.	Effluent Disposal	20.000
8.	Other	9.284
T O T A L :		262.300

All overhead costs are supposed to be fixed costs.

Chapter 8

MANPOWER

8.1. Demand and Supply of Manpower in the Occupied Territories.

8.1.1. The problem of the availability of competent and adequate personnel for a newly established industrial enterprise is of vital importance, and should be seen as a primary task of the project sponsors in planning for the whole enterprise. Analysing positions and job description for each position needed, selection and recruitment of appropriate personnel, specifying their training requirements, identifying wage policies and setting up organization structure, all of these aspects, among others, have to be carefully planned and identified as early as possible and before starting operation. It seems relevant, and advisable, to hire and ask the assistance of a specialist to help in preparing these requirements.

8.1.2. Statistical data available on labour force in the occupied territories indicate that there is a base of labour force available to be drawn upon for industry in general. The percentage of labour engaged in the industrial sector reaches 17% of those employed both within the occupied territories and in Israel.

Though official figures on manpower /1970 - 1979/ showed an increasing number of Palestinians employed in the Israeli sector, yet there is evidence that such a number is now decreasing rapidly, especially for the last three years. The recent economic crisis in Israel, and of course in the occupied territories has resulted in the discharge of quite a percentage of Palestinian labourers. /Appendix 1/.

It can be fairly stated that the labour market in the occupied territories might be abundant with unskilled and semi-skilled labourers seeking new opportunities of employment.

8.1.3. The engineers Association /1/ of the West Bank has recently /February 1985/ published a survey concerning characteristics of its members. The survey revealed that almost 30% /199/ of total members /627 engineers/ are unemployed. To be more precise, mechanical engineers represent 17% of total membership /107 mechanical engineers/, out of whom thirty engineers /28% are unemployed. The survey has also indicated that 166 members has left the occupied territories between the period 1979-1984 seeking job opportunities in international labour markets. The Engineers Association predicts that the number of graduate students, who will be due back to the West Bank in the coming five years /1985 - 1989/might reach 1450 engineers. There are no data available concerning Gaza engineers, but some experienced engineers in Gaza estimated there are at least /fifty/ unemployed engineers in Gaza.

8.1.4. Unemployed food technologists, however, are hardly to be located in either the West Bank or Gaza. The Agricultural Engineers Association of the West Bank indicated that there were only two unemployed food technologists, though the percentage of unemployment among its members from different fields of specialization reached 26% in 1984 /50 graduates/. It is also expected that unemployment will reach 40% within the next two years. In Gaza, unemployment among graduates of agricultural schools was estimated to reach 45 percent in 1984. The number of agricultural engineers in Gaza reached in the same year a total of 320 graduates, thirty percent of whom are employed on temporary basis with an average daily wage of US\$ 5. It is not a strange phenomenon to locate engineers employed in semi-skilled jobs in Gaza.

8.1.5. The Polytechnic Institute of Hebron, /3/ West Bank, has provided the labour market in 1984 with nearly graduates of applied mechanics. Total number for 1985 is expected to reach of the same specialization 186.

8.1.6. It can be concluded, that as far as academic training is concerned, the availability of labour force in various positions of the proposed project are far more than what the project can absorb; with the exception, perhaps, of the food-technologist. Considering skill and experience is another issue, those who were employed in Israeli industrial firms would have gained some experience at different production lines but presumably in minor semi-skilled jobs. In any case they may be taken into consideration for selection and recruitment. Skills of the majority of university graduates, however, are being under-estimated and not fully utilized to their relevant capacities. The need for training both levels is undoubtedly imperative. Training will be discussed in more detail in a separate section of this Chapter.

8.1.7. Experience in both the West Bank and to some extent in Gaza, has shown that managerial skills are lacking behind, especially in such occupations like marketing and top managerial levels. As an example, one may find persons with high academic qualifications that are best suited for key technical positions, yet their experience in personnel management is inadequate or even nil. Intensive training, therefore, can make up for such professionals.

8.2. Training Needs.

8.2.1. Personnel training is considered as prerequisite for the proposed plant. Training is not a matter of choice: "it is rather an on going process, and carefully planned part of an inte-

grated programme of personnel administration. "/4/ The importance of training if personnel of the project under discussion may be summarized in the following:

- /a/ It is a newly established project where all employed personnel hardly know each other but have to work together.
- /b/ Regardless of their previous education, training, or experience, all employed personnel need to be introduced to the new work situation, and to be trained on how to perform their duties in an adequate manner, and how to coordinate their efforts with each other. They need to understand how and where they fit in the whole organization structure of the proposed plant.

Orientation and induction training, therefore, would be considered as the first step in the training process, where all employees are involved.

8.2.2. One of the most important tasks of the proposed project sponsors would be the careful selection and early recruitment of the plant general manager. He should participate in preparing the overall plan, including job description of each position in the plant, but his main concern should be preparing detailed training program for each position. The plant general manager himself may need training. It is advocated that he should be selected from applicants in the local labour market, and whose education, training, and experience rank high, especially in administration and personnel management. Selection of competent, highly qualified, Palestinian top administrators from the diaspora, though might seem appropriate, yet such a person should acquire the clearance of the military government for entry visa as well as for working permit. Problems of renewing permits may arise in the future. The same expectations would apply to recruiting a non-Palestinian foreign

expert. Keeping the plant away from such anticipated acts that may endanger its activities, a local Palestinian should be selected. Should he lack the experience, a training program can be arranged for him, as early as possible, in a foreign university to join an advanced management program. The training period may extend from 10 weeks to 12 months depending on his previous training and experience.

8.2.3. Along with the top executive, three other key positions will need the same training courses in their relevant technical education. Those are: the production engineer, the technologist, and the sales manager. The four will constitute a team of "experts" for planning and conducting training programmes for subordinates. It might be of relevance in this respect to utilize the available possibility that such training be sponsored and financed, totally or partially, by international agencies who sponsor training programmes for developing countries..

8.2.4. Training of foremen, technicians, and process operators may be undertaken locally or may be arranged by suppliers of the machines and equipment.

8.2.5. There is a good opportunity for recruiting efficient and trained personnel in finance, accounting, book keeping, secretarial work, and others with limited induction training, estimated costs of training are included with other costs of pre-production phase. It is assumed that on the job training needs very limited costs, since it is part of the duties of supervisors at both line and staff levels.

8.3. Labour Law and Bylaws /5/.

8.3.1. Labour Laws applied in the occupied territories are those that had been applicable pre-1967 /Jordanian and Egyptian

for the West Bank and Gaza respectively/.Some changes and additions were effected by Israeli military orders during the years of occupation. Each industrial enterprise has to furnish /on a special form/ the Labour Department with its location and address, names of owners and directors, type of production, electrical energy consumed, number of shifts, number of working hours, and number of workers.

8.3.2. The following articles of the West Bank Bylaws are seen pertinent for the purpose of this study:

1. Working hours are restricted to eight hours a day, and three break hours. No firm should allow for more than five hours work without a break of half an hour; and for more than continuous six hours without a break of one hour.
2. Labourers are prohibited from working in two establishments at the same time.
3. Labourers who accept working overtime are restricted to two hours; and those who accept working on weekends may do so; both are entitled an increment of not less than 25 percent of their daily wages.
4. Labourers are entitled to a full paid annual leave of 21 days, and fifty two days /weekends/ per year. Annual leaves are effective only after 240 days in a year. Should a labourer be terminated after working eight days within four months, he is also entitled for a paid leave proportionate with the number of workign days.
5. Work accidents insurance policy has to be issued for each labourer. Covering the rate of the policy, however, is left, to each firm to decide whetehr to deduct it from wages or to be covered by the firm itself.

6. Sick leaves are fully paid, if accidents were caused by work.
7. Income tax: a portion or the whole amount of income tax is deducted from wages.
8. A pregnant working woman is entitled to have three weeks leave before delivery, and is not allowed to work three weeks after delivery. In either or both leaves the firm should pay her 50 percent of average wage for the preceding three months. This leave is effective only if a woman worked for not less than 180 days prior to expected delivery.

8.4. Wages - Salary Policies

8.4.1. A "fair" wage policy has to be developed in any organization or firm. Such policy is of vital importance to the achievement of "good" performance. In spite of the outcome that one may derive from the previous discussion on labour demand and supply, it should be stated that data concerning wages of labourers working in the same industry, indicated that daily wages of labourers in food, beverages, and tobacco industry exceeded wages in other industries. Table 8/1 indicates that in 1983 average daily wages of labourers in five industries is around 7220 Israeli Shekels (IS), while daily wages of labourers in food, beverage and tobacco industry was 15 percent more than average daily wages. No one can deny that pressures of economy together with expected high supply of labour force in the market may influence sponsors of the proposed project to fix wages to their minimum.

But, such a policy would surely be considered as short-sighted. In industry, experience and skills gained through work on production lines cannot be picked from the labour market at any time. Turnover should be limited to its minimum. On the other hand, job opportunities in Israel to some extent and in the rapidly developing Arab World to a larger extent, may play a major role for experienced and skilled labourers to leave their unsatisfying wage position and seek other opportunities. This fact has to be considered in planning wage policies.

8.4.2. The following wage levels are presumed to have considered the previous precautions. They were based upon comparable levels of wages in the local labour market; neighbouring Arab labour markets, the availability of the technical know-how and experience needed, and professional associations' regulations. Provisions were also made for certain expertise needed.

1. Unskilled positions	US\$ 9.00/Day
2. Semi-skilled positions	US\$12.00/Day
3. Skilled positions	US\$16.00/Day
4. Supervisory positions	US\$24.00/Day
5. Technical and professional skills	US\$34.00/Day
6. Top managerial levels	US\$45.00/Day

Table 8 - 3 suggests another six salary categories for staff personnel ranging from US\$ 270.00 per month to US\$ 1.500 per month.

Note:

Perhaps some provisions should be made for the first and second year of operation to increase the wage rate of the technologist by 50 percent for a foreign technologist until a local counterpart is fully trained.

8.5. Organization Structure.

Some viewpoints seem to be relevant for setting out the organization structure of the proposed project. In this respect, one should stress the idea that since the product is expected to face severe competition, it is important not to overestimate costs of production, and make full and efficient utilization of resources. Some may advocate the necessity of encountering unemployment in the occupied territories. Though such a claim is logical, yet it should not be at the expense of marginal profitability of any project.

Recruitment, therefore, should be limited to its optimum size; but selection of service and auxiliary work personnel should be limited to its minimum size without endangering the flow of production.

Departmentation, though advised to be based on sequential units of operation, yet provisions should be made to move labourers from one unit to another.

The pressure of economy may also dictate certain measures to be taken with regard to auxiliary services. Any auxiliary position, while considered important should be justified only as long as such a position is expected to assist the operation for production of more economic and efficient work; and also as long as such an auxiliary position is expected to pay more than its expense. For example: legal advice, though important, may be hired when needed rather than thinking of it as a permanent position. The same suggestion applies to the public auditor.

Pooling the administrative services in one office to assist all executives, including the general manager, is a second example. Such services as typing, filing, duplicating, mailing, telephone and other administrative services, if pooled will provide services to all departments.

The number of maintenance personnel should be limited to its minimum, and it is suggested that they be placed under the production engineer since most of their performance is expected to be considered with production lines.

There is still another factor to be discussed in relation to decreasing administrative expenses. It is suggested that staff roles be assigned to executives as long as they are competent enough to handle such roles effectively. For example: the sales manager may also work on marketing research, training and sales methods. Executives of different departments may help the director manager in planning, training programmes, sales forecasts, and other duties usually performed by staff specialists. If a problematic issue arises that needs the advice of a specialist, such an advice may be hired rather than a specialist in a certain field be appointed.

8.6. Computation of Surcharges on Wages and Salaries.

Surcharges on wages and salaries are computed on the following basis:

8.6.1. Only citrus juice production programme was considered. Should the management decide - and it is advised to do so - to process grapes and tomatoes or other fruits, calculations will be different. But wages and salaries were calculated on the basis of a whole working year, and the only difference will be on additional labour, if required.

8.6.2. Labour Laws and bylaws were considered concerning annual leaves, accident insurance, working hours, etc.

8.6.3. Professional union laws concerning professional allowances were considered. The law specifies 70 percent allowance for engineers and food technologists, the 40 percent surcharges were not calculated for those categories. Other increments were added to positions of scarcity, i.e. 20 percent increment for finance manager, import-export manager, sales representative, and chief accountant; 35 percent increment for top managerial levels of the director general manager, and sales manager, and 50 percent increment for the two foreign experts. The production engineer and the technologist.

8.6.4. Wages were calculated on daily basis, not hourly. Salaries were calculated on monthly basis. Though annual leaves are effective, in accordance with the law, only after 240 working days per year, and number of shifts are only 144, yet surcharges on annual leaves were considered fully for all personnel. Two factors influenced such a decision:

/1/ The plant is presumed to be working in the near future for almost all the year round.

/2/ Workers will be more attached to the plant work situation, thus turn over would be minimized.

8.6.5. The manning table is recommended to be re-examined at the second period of operation, presumably in the third year; so is the case with organization structure, and scale of salaries that has to be evaluated for each position.

8.6.6. Some wages earners on daily basis are also recommended to be shifted, at the same period, to annual salaries. At that time the plant is expected to be stable and growing, new lines are established. Turn-over at this stage should be at its minimum. The suggestion, though might reflect some what higher costs of production, yet it insures the continuity and productivity of the plant. Appendix 1 shows that more than 63% of Arab labourers working at Israeli firms have been working continuously for more than four years. The same Appendix shows that persons employed in beverage industry earn the highest wages as compared to other industries. These facts indicate the importance of developing favourable work conditions in the proposed plant.

8.6.7. Computation of Surcharges and Fringe-Benefits.

	Days
Number of days per year	365
Fridays	52
Paid days	313

1. Official and religious holidays	10
2. Annual Leave	21
3. Accidents Leave	10
4. Training	10
5. Others	5
Total paid unproductive days	56
Number of effective working days/year	257
Computation of surcharges due to unproductive working days	22%
Insurance and fringe-benefits /as estimated by public auditors/	18%
<u>TOTAL SURCHARGES</u>	40%

Chapter 8

REFERENCES:

1. Qasas Tareef H. Survey of Engineers in the West. Bank. Engineers Association of the West Bank, Jerusalem, February, 1985.
2. Istanbuli, Daoud - Characteristics of Agricultural Engineers in the West Bank - Agricultural Engineers Association, Jerusalem 1983, /unpublished follow-up, 1984/.
3. Direct Interview with Hebron Polytechnic Administration.
4. Pigors, P. and Myers, C. - Personnel Administration McGraw-Hill Inc. New York, 1985, p. 377.
5. Jordanian Law - 1965 , Israeli by-laws.

SCHEDULE 8 - 1

Manning Table - Labour

DEPARTMENT	Wage Categories /No. of Workers/										
	sft.	1	2	3	4	5	6			TOTAL	
1. Fruit Receiving	I	L. 2	L.	L.	L.	L.	L.	F		2	2
2. Fruit Transport	I	1								1	1
3. Truck Drivers	I		2							2	2
4. Fork Lift Drivers	I		3						3	3	3
5. Warehouse and Strong	I		4							4	4
6. Energy Room	I		1	1						5	5
Operators	II		2								
	III		1								
7. Maintenance Techni-	I		2	1						6	6
cians Including	II		2	1						6	6
Electrician	I	3								3	3
8. Cleaning Operators	I									3	3
9. Process Equip.	I			3						3	3
Operators	I			4						4	4
10.Extraction Dept.	I		8	2						10	10
11.Pasteurizing/Filling	I			2	1						
12.Concentration Dept.	II			1	1						
	III			1					6		6
13. Laboration	I				2					2	2
14. Engineer	I				1					1	1
15. Production Eng.	I							1		1	1
16. Technologist	I							1		1	1
17. Administrative Worker	I		2							2	2
18. Guards	I	1									
	II	1									
	III	1								3	3
TOTAL LABOUR		9	27	16	5	-	-	2	57	2	59

Wage Categories: 1 = 9\$/day, 2 = \$ 12/day, 3 = \$16/day, 4 = \$ 24/day, 5 = \$34/day
6 = \$ 45/day

SCHEDULE 8 - 3

Manning Table -- Staff

DEPARTMENT	SALARY CATEGORIES /NO. OF STAFF/							
FUNCTION	1	2	3	4	5	6	SUB TOTAL	
	L.	L.	L.	L.	L.	L.	TOTAL	
1. DIRECTOR GENERAL MANA GER						1	1	1
2. SALES MANAGER						1	1	1
3. FINANCE MANAGER					1		1	1
4. IMPORT EXPORT MANAGER		1					1	1
5. SALES REPRESENTATIVE					1		1	1
6. ACCOUNTING/BOOK KEEPING		2		1	1		4	4
7. SECRETARIES		2					2	2
8. HOUSE KEEPERS	2						2	2
TOTAL STAFF	2	4	1	2	2	2	13	13
<u>SALARY CATEGORIES:</u>								
1. 270\$/Month								
2. 360\$/Month								
3. 480\$/Month								
4. 600\$/Month								
5. 720\$/Month								
6. 1500\$/Month								

SCHEDULE 8 - 4

Estimate of Production Costs - Salaries

DEPARTMENT DESCRIPTION	SALARY CATERGORIES /NO. OF STAFF/						TOTAL
	1	2	3	4	5	6	
	L	L	L	L	L	L	
DIRECTOR GENERAL MANAGER						1	1
SALES MANAGER						1	1
FINANCE MANAGER					1		1
IMPORT EXPORT MANAGER				1			1
SALES REPRESENTATIVE					1		1
ACCOUNTING/BOOK KEEPING		2	1	1			4
SECRETARIES		2					2
HOUSE KEEPERS	2						2
TOTAL NUMBER OF STAFF	2	4	1	2	2	2	13
WORKING MONTHS/YEAR	17	34	8.5	17	17	17	x
MAN-MONTH PER YEAR							x
SALARIES PER MONTH	540	1440	480	1200	1440	3000	x
SURCHARGES %	40	40	40	60	60	75	x
SURCHARGES \$	2592	6912	2304	8640	10368	27000	x
SALARIES PER YEAR	6480	17280	5760	14400	17280	36000	x
TOTAL	9072	24192	8064	23040	27648	63000	155016

DEPARTMENT	VARIABLE COSTS WAGE CATEGORIES NO. OF WORKERS					FIXED COSTS WAGE CATEGORIES NO. OF WORKERS							
	1 L	2 L	3 L	4 L	Total Total	1 L	2 L	3 L	4 L	6 L	Sub Total		Total F
Fruit Receiving	2				2								
Fruit Transport	1				1								
Truck Drivers		2			2								
Fork Lift Drivers		3			3								
Warehouse and Storage		4			4								
Energy Room Operators		4	1		5								
Process Equip. Operators			3		3								
Extraction Department			4		4								
Pasteurizing and Filling		8	2		10								
Concentrat. Department		4	2		6								
Maintenance						4	2		6		6		6
Cleaning						3					3		3
Laboration								2		2			2
Engineer									1		1		1
Production Egnieer										1		1	1
Technologist										1		1	1
Administration							2				2		2
Guards						3					3		3
<u>Total Number of Workers</u>	3	21	14	2	40	6	6	2	3	2	17	2	19
Working Holidays	24	168	112	16		48	48	16	24	16			
Working Days/Year	771	5397	3598	514		1542	1542	514	771	514			
Wages/Day	27	252	224	48		54	72	32	72	90			
Surcharges/	40/	40/	40/	40/		40/	40/	40/	70/	90/			
Surcahrges/	2776	25906	23027	4934		5551	7402	3290	12953	20817			
Wages/Year	6939	64764	57568	12336		13878	18504	8224	18504	23130			
TOTAL	9715	90670	80595	17270		19429	25906	11514	31457	43947			
Grand Total					198250						132253		330503
Working Days per Year Ñ 257 days							161						

Chapter 9

IMPLEMENTATION SCHEDULING

9.1. Because of the many surprises that are expected to face the implementation of the proposed project, the investors are advised to take full responsibility over such issues as:

- /a/ provisions for project finances and sources of finance, including costs of implementation,
- /b/ site selection,
- /c/ registration of the organization and gaining approvals and clearance from different authorities.

The investors have to make sure that steps in planning and execution of the project be carefully evaluated, and that constant control over each step be maintained. Therefore, a "task force", so to speak, has to be appointed, and full authority be delegated to it, to act and negotiate in the name of the investors. Perhaps it is advisable that such a group may include not only expected staff members, but also legal and technical advisors. The "task force" may be headed by the Chairman of the Board, or by the Director General Manager.

The investors, with the help of the technical and legal advisors and the direction of the director general manager, should also decide on the following steps:

- /a/ selection of machinery and equipment and types of technologies involved;
- /b/ selection, recruitment, and training of key personnel;
- /c/ deciding upon new materials and other supplies.

9.2. The main responsibility of the "task force" would be ensuring that implementation of the project be in accordance with specifications and plans; and that all steps in implementation are being carried out on time. Some specific responsibilities may include:

- /a/ Approvals, registrations, clearance, and other related formal activities needed from various authorities, including import licensing, electricity supplies, water quotas - etc.
- /b/ Tendering negotiations, and contracting with relevant agencies, firms , or individuals for detailed planning and design construction of buildings, material supplies - etc.
- /c/ Coordination supervision, control, and rendering services for different bodies involved in the implementation of the project.
- /d/ Preparation for markets and product advertisement; and selection of and contracting with prospective wholesalers and dealers.
- /e/ Facilitating communication, transport and lodging accommodations, etc.

9.3. Perhaps it is worthwhile that agreement with the machinery and equipment suppliers includes provisions for direct control and supervision, from the part of the suppliers, over installing all machinery and equipment till the trial run of the whole plant. It may also include technical training of plant operators and supervisors.

9.4. The diagram, here under, shows in detail the timing of each step needed for the implementation of the project. It is clear that some steps could be done concurrently, while others need to be in sequence. The diagram also reveals that most of the activities, which need the help and service of the "task force", are occurring after the time allocated for plan and design phase. Hence, recruitment of the "task force" would commence at that time. Provisions were made that at the same time trainees would be coming back from their post-graduate management training program.

The diagram shows that implementation period will last for eighteen months. The first half of this period is allocated almost totally for preparatory actions, i.e., company registration, land selection and registration, managerial training, planning and design, tendering, contracting and purchasing. The second period is allocated for physical implementation of the plant and preparatory steps for marketing and actual running of the plant.

9.5. Costs of Implementation.

Perhaps it is advisable to segment the activities needed and their cost estimates into the following categories; needless to mention that those categories are not necessarily sequential.

9.5.1. Management.

The decision taken by the investors upon appointing a managerial team - task force - for project implementation implies that the investors have already undergone a concrete stage of the plant establishment, including approvals of authorities, legal declaration of the firm, identification of shareholders, setting out by-laws, deciding upon the feasibility of the project, resolving the question of project financing, and even selecting the site of the plant. The investors are now in the stage of delegating some or all of their authority to a special team for carrying out efficiently the whole project and bringing it out from papers and blueprints to its physical operational form. This also means that the investors are setting out the primary structure of the plant's organizations.

The selection and recruitment of this team may involve the following members:

The director general manager of the plant, the production engineer, the finance manager, the import export manager, one accountant and secretary, and two guards. In addition, a technical advisor and a legal advisor may also be recruited for this specific task. A civil engineer is also advised to be recruited at this period. The sales manager will join the team at a later stage; three months before commencement of the plant. Provisions should be made that the chairman of the board be leading the team until the return of the director general manager and the production engineer who will be sent for managerial training in the first period of implementation; but would presumably be back before construction starts.

9.5.2. Approvals.

Gaining government approvals as well as other relevant agencies and bodies is considered as the primary task to be performed by the management. The time schedule suggested allocates more than three months to obtain such approval.

/a/ The company - or any other organizational form - registration fees are in proportion with the total amount declared as primary investment capital, usually 0.5 percent of investment costs.

/b/ Land registration fees are 3 percent of cost of land.

/c/ Licensing of buildings is the responsibility of either the municipality or regional planning authority depending on the site selected for the plant, whether it is within municipality boundaries or not. The fees are nominal.

/d/ Operation license of the plant is subject to approvals of several authorities: municipal authorities, health department, department of industry, and even traffic department for licensing of vehicles.

/e/ Connections with main electricity supply: The costs are dependent on many variables including distance from main supply, availability of sufficient power /in this case no transformers are needed/, but in any case a rough estimate seems important.

/f/ One of the main steps that need to be clarified and approved is water supply quota. The plant's water consumption estimates reach up to 50.000 cubic meters per year. Written approval of the responsible authorities for such a quota need to be issued for life time of the project. Costs of connections with main supply are dependent on the distance between the plant and the main supply. Estimates, however, seem necessary.

/g/ Sewage disposal - regardless of plans arranged for a sewage plant /for water treatment/, connection with municipal canalization system is also needed.

9.5.3. Tenders:

Detailed plans and designs phase may be handed by tendering of course over to a local engineering construction firm. Usually such firms charge from 3 - 10 percent of the total costs of the project, depending on the size of the project and responsibilities asked to be fulfilled. If supervision over construction was not a part of the tender, a lump-sum fee may be agreed upon and, consequently, construction of buildings

needs to have special tendering. Tendering is also needed for machinery and equipment ordering and receiving, outdoor tendering, such as construction of walls, land scaping, canalization system, electricity and water main supply... etc. In any case estimates of costs of construction are presented in Schedule 9 as 6 percent of installation of equipment. Costs are presumed to be part of machinery and equipment costs; and provisions in the agreement is made that an expert from the part of the supplier's be present to supervise installations. This condition should be mentioned and agreed upon even if installation works be accomplished by local contractors. Installation costs are presented in Schedule 9.

9.5.4. It seems also important that, at a specific stage of implementation, arrangements for raw materials needed for production be undertaken

9.5.4. Communication with, selection, and recruitment of wholesalers for local markets, as well as contracting with one or more sales agencies for export, is also an important phase of implementation plan of action. Training salesmen, pre-production advertisement, and travel expenses to build up distribution structure for local and export markets are also costs of the implementation phase. Costs of these elements are also included in Schedule 9. Managerial training costs, however, were estimated in Chapter 6. Technical training is presumed to take place at this stage and the provided, as a parcel agreement, by machinery and equipment suppliers.

9.5.6. Provisions should be made for living accommodations of two foreign experts, who are presumed to supervise the installation of equipment and machines. Duration of total stay for each is estimated to reach 60 days.

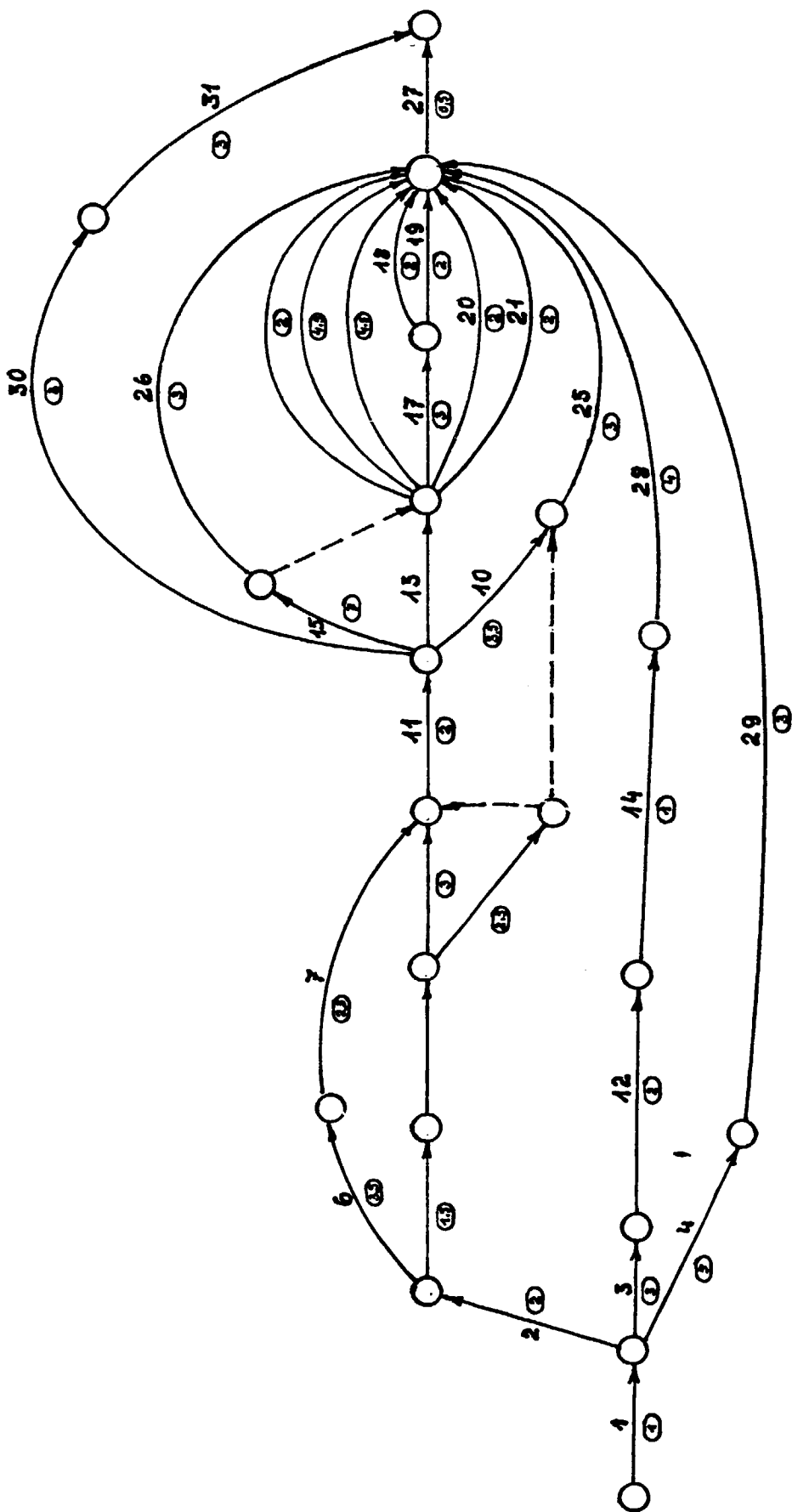
Prefabricated temporary offices, and temporary lodging of guards, should be constructed close to the plant site with an area of 72 square meters. Such a space will be also used for engineering and clerical work. Temporary stores has to be rented as near as possible to the plant's site for keeping machinery, equipment and other supplies.

9.5.7. Communications and transport facilities, including travel expenses of foreign countries, should be estimated and provided for each one involved in the implementation phase. Estimates of such services are included as an aggregate figure in Schedule 9.

9.6. Implementation - Network Plan.

<u>Number of Activity</u>	<u>Length in Months</u>
0. Start	-
1. Alternatives and Negotiations	1.0
2. Selection and Purchase of Land	2.0
3. Licencing, Registration, Official	3.0
4. Managerial Training	5.0
5. Plant Layouts and Design	1.5
6. Civil Engineering Plans	3.5
7. Sanitary Engineering Plans	2.5
8. Electrical Engineering Plans	3.0
9. Mechanical Engineering Plans	4.0
10. Refrigeration Engineering Plans	2.5
11. Building Contractor Agreement	2.0
12. Machinery and Equipment Purchasing	2.0
13. Local Contractors - Negotiations and Agreements	2.0
14. Machinery and Equipment Delivery	1.0
15. Building Construction	7.0
16. Cold Storage Construction	3.5
17. Fruit Handling System	3.0
18. Juice and Oil Extraction	2.0
19. Concentration Section	2.0
20. Filling Section /Concentrates/	2.0
21. Filling Section /Juices/	2.0
22. Electrical Installations	4.5
23. Piping and Valving	4.5
24. Boiler Installation	2.0
25. Refrigeration System Installation	3.0
26. Water Treatment	3.0
27. Trial Runs	0.5
28. Production and Quality Procedures	4.0
29. Technical Training	3.0
30. Sales Preparation /Wholesalers/	3.0
31. Advertisement and Promotion	3.0

NETWORK PLAN



Ⓜ - number of months
 A - number of activity

SCHEDULE 9 - 1

Estimate of Investment Cost - Project
Implementation

NO.	ITEM DESCRIPTION	COST US\$
1.	<u>Salaries and/or wages of mangement</u> a. Wages and/or salaries for 18 months. Finance manager, technical advisor, legal advisor, import/exportu manager, accountant, 2 quards b. Wages and/or salaries for 12 months. Direc-tor general manager, production engineer c. Wages and/or salaries for 7 months. Chair-man of the Board, civil engineer, sales manager	76.680 34.200 26.040
2.	<u>Approvals - Fees</u> a. Company registration and announcement b. Land registration /3% of US\$ 150.000/ c. Other fees d. Electricity connections with main supply e. Water connections with main supply f. Connection of sewage with municpality canal system	8.500 4.500 6.000 17.500 12.000 9.000
3.	<u>Tendering</u> a. Detailed plans and design - construction 6% b. Installation costs of machinery and equipment c. Outdoor works	59.100 248.800 25.000
4.	<u>Preparation of Marketing</u> a. Training of salesmen b. Advertisement and publicity c. Travel Expenses	100.000 160.000 120.000
5.	Communications, lodging, travel expenses for 2 foreign experts /60 days/	9.000

No.	ITEM DESCRIPTION	COST US\$
6.	Communications, transport, travel expenses for managerial staff	250.000
7.	Prefabricated offices - 72 square meters	5.400
8.	Furniture, utilities and administrative facilities	22.000
9.	Store rent costs for 12 months	4.800
	T O T A L :	631.520

Implementation Time Schedule

SUBJECT / ACTION	1988	1986					1987											
		AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1. Registration, Site Selection																		
1.1. Alternatives, Negotiations		=====																
1.2. Selection, Purchase of Land			=====															
1.3. Licensing, Registration, Official Approvals				=====	=====	=====												
2. Managerial Training			=====	=====	=====	=====	=====											
3. Planning and Design																		
3.1. Plant Programs					=====	=====												
3.2. Civil Engineering						=====	=====	=====										
3.3. Sanitary Engineering						=====	=====	=====										
3.4. Electrical Engineering						=====	=====	=====										
3.5. Mechanical Engineering						=====	=====	=====										
3.6. Refrigeration Engineering						=====	=====	=====										
4. Purchase and Contracts																		
4.1. Building Contractor Agreement									=====	=====								
4.2. Machinery and Equip. Purchasing									=====	=====								
4.3. Local Contractors/Negotiations											=====	=====						
4.4. Machines and Equip. Delivery																		
4.5. Buildings Construction												=====	=====	=====	=====	=====	=====	=====
4.6. Cold Storage Construction																		
5. Installations																		
5.1. Fruit Handling System																		
5.2. Juice and Oil Extraction																		
5.3. Concentration Section																		
5.4. Filling Concentrates																		
5.5. Juice Preparation and Filling																		
5.6. Electrical Installation																		
5.7. Piping (Process)																		
5.8. Boiled Installation																		
5.9. Refrigeration System Installation																		
5.10. Water Treatment																		
6. Production and Operation																		
6.1. Trial Runs /- Running in the Systems																		
6.2. Production Procedures																		
6.3. Quality Control Procedures																		
6.4. Technical Training																		
6.5. Manpower Organization, Wholesalers, Dealers																		
6.6. Production	→																	
7. Advertisement																		

Chapter 10

FINANCIAL ANALYSIS.

Financial analysis of the citrus processing plant is carried out in several stages. First, investment cost and production cost will be summarized using data provided by technical analysis presented in Chapters 6, 7 and 8. These costs will be confronted with estimated sales revenues. Next the necessary financial means will be estimated and a financial plan of the project will be designed in order to secure the desired liquidity at every stage of the project life. This will provide a basis for the preparation of three main financial statements, i.e. net income statement, balance-sheet and cash-flow table. Within this part a capital structure of the company will be examined using ratio analysis. Finally, commercial profitability evaluation is carried out and some familiar measures of financial viability will be computed. At the end of the Chapter, the sensitivity analysis will allow to examine the overall risk involved with the project implementation and operation.

All calculations have been done on COMFAR Program /Computer Model for Feasibility Analysis and Reporting/ a specially designed software to compute financial schedules of industrial projects. All relevant printouts of financial schedules are attached to this report in Appendices 2 and 3.

10.1. Cost analysis.

10.1.1. Investment Cost.

The value of total initial investment for the project is US\$ 3.893.920 which includes the value of initial fixed

assets, pre-production expenditures and the initial spares and tools requirements for 5 years. This amount includes also physical contingency of ca. 5%. The investment cost includes a provision of US\$ 29 000 during construction to cover interest charges.

The structure of the initial investment outlays is given in Table 10 - 1, below:

Initial Fixed Investment Cost in '000 US\$

NO.	ITEM	LOCAL	FOREIGN	TOTAL
1.	LAND	<u>159.75</u>	-	<u>159.75</u>
2.	BUILDINGS, STRUCTURES AND CIVIL ENGINEERING WORKS	<u>985.0</u>	-	<u>985.0</u>
	2.1. Site preparation and development	150.0	-	150.0
	2.2. Buildings and Civil Works	745.0	-	745.0
	2.3. Outdoor Works	5.0	-	5.0
	2.4. Other and unforeseen	85.0	-	85.0
3.	MACHINERY AND EQUIPMENT	<u>110.8</u>	<u>1898.3</u>	<u>2009.1</u>
	3.1. Production Equipment	60.8	946.1	1006.9
	3.2. Auxiliary Equipment	35.0	722.9	757.9
	3.3. Spare Parts, Tools	-	60.7	60.7
	3.4. Service Equipment	15.0	48.6	63.6
	3.5. Other and unforeseen	-	120.0	120.0
4.	INCORPORATED FIXED ASSETS	<u>6.0</u>	<u>45.0</u>	<u>51.0</u>
	4.1. Technology Cost	6.0	45.0	51.0
5.	PRE-PRODUCTION EXPENSES	<u>660.0</u>	-	<u>660.0</u>
	5.1. Implementation Costs	627.02	-	627.02
	5.2. Others and unforeseen	32.98	-	32.98
6.	INTEREST DURING CONSTRUCTION	-	<u>28.98</u>	<u>28.98</u>
7.	TOTAL FIXED INVESTMENT	1921.55	1972.28	3893.83

a. Land

As mentioned in Chapter 5, among five alternative locations envisaged for the proposed plant, the Gaza town is a recommended one. This choice has been made both on the economic and commercial grounds, as well as based on the political situation. Within Gaza administrative boundaries, the selection of "A" zone in the south-west part of the city is equipped with main infrastructure and utilities are provided by the city. The price of land within this site comes around US\$ 15.000 per donum /1.000 sq. meters/. The total area of ca. 10 donums is required for the project purpose thus making the cost of purchase to be US\$ 150.000. Adding up 3% purchase tax, legal expenses and unforeseen, the total cost figure of US\$ 159.750 is finally obtained.

b. Buildings, Structures and Civil Engineering Works

The main cost items here are production hall /400 sq. m/, cold-storage /375 sq. m/, finished products warehouse /250 sq. m/, energy room /300 sq. m/ and office facilities /125 sq. m/. Since the plant is to be located within city limits, some additional requirements have to be met by buildings for security and hygienic reasons. Total cost for buildings, structures and civil works is estimated at US\$ 985.000 including provision for uncertainty.

c. Machinery and Equipment

A detailed list of necessary equipment is given in Chapter 6 /see also Table 6 - 2/. The cost of the equipment is estimated on the basis of information obtained from European manufacturers /United Kingdom, Italy/. Respective prices are import cif prices, including cost of transportation to the

project's site and all taxes bearing upon imports. Therefore, cif prices as quoted by suppliers have been increased by 21.5% as follows:

- Value Added Tax	15.0%
- Import Clearing Tax	2.5%
- Galil Tax	2.0%
- Bank Commission	2.0%

- T O T A L	21.5%

The equipment will be delivered to Israeli port at the Mediterranean coast and transported by road to Gaza. The cost of internal transport will not exceed US\$ 50.000 /transportation rate is ca. US\$ 10 per ton/ and is included within the item "Others and Unforeseen".

d. Incorporated Fixed Assets and Pre-production Capital Expenditures

They include the cost of hiring a foreign technologist, training several local technicians and all other costs of implementation as shown in Table 9 - 1 /except for land registration fee/. In particular, this cost item includes cost of layout and installation of machinery and equipment, which is supposed to be done by a local contracting company.

e. Investment During Production

In the present analysis an operation period of ten years has been assumed. It is foreseen that the initially procured equipment will function throughout this period and no major replacement will be necessary. The only exception refers to

spare parts and tools, their initial stock being supposed to be used up within five years, and therefore, there is a need to provide for another set of spares in the fifth year of operation. The estimated cost is US\$ 5.000

10.1.2. Working Capital Requirements

Except for the initial stock of spares and tools, which are purchased together with the main production equipment, the remaining working capital will be provided at the beginning of the operation phase. The required amounts of particular working capital components have been computed by COMFAR on the basis of the specified minimum coverage periods. Assuming 15 to 30 days periods for most of the assets, but 3 days only for raw materials /citrus/ and 3 days for accounts payable /most of the supplies will be paid against delivery/, the initial net working capital required is US\$ ca. 590.000 with accounts receivables constituting more than 50% of that amount. A detailed breakdown of the working capital requirements for a normal full-capacity year of operation follows /Table 10-2/.

TABLE 10 - 2

Working Capital Requirements

ITEM	Minimum Coverage Period in days	Amount in US\$ '000
1. Current assets - total		<u>867.65</u>
1.1. Accounts receivable	30	461.84
1.2. Raw Materials	3	155.66
1.3. Work-In Progress	3	34.87
1.4. Finished Products	15	180.82
1.5. Cash-in-Hand	30	55.95
2. Current Liabilities - total		<u>34.87</u>
2.1. Accounts payable	3	34.87
3. Net Working Capital /1 - 2/		<u>854.28</u>

10.1.3. Total Production Costs

The total production costs can be broken down into five major categories:

FACTORY COSTS - including cost of raw materials, utilities, energy, cost of direct manpower, repair, maintenance and factory overheads.

ADMINISTRATION OVERHEADS,
MARKETING AND DISTRIBUTION COST ,
FINANCIAL COST,
DEPRECIATION.

Cost estimates for some of the above mentioned items have been made in previous chapters. In what follows a summarized description of particular cost items is presented.

a. Raw Materials

Main raw material are citrus fruits of four kinds: Shamouti oranges, Valencia oranges, grapefruits and lemons. They account for ca. US\$ 2.4 million which is more than 70% of total factory cost. In addition, small quantities of some auxiliary materials are being used for the production /chemicals, filter paper, filtration aids/, their value reaching US\$ 26.000 a year. Raw material costs are presented in Table 10 - 3.

b. Consumables and Packaging Material

Consumables constitute minor cost item, their annual value not exceeding US\$ 60.000. They include cleaning materials, oil and greases. By contrast, packaging is of a more considerable importance. The so-called primary packaging material consists of barrels /250 kg/, tins /5 kg/, 1 litre cartons and regular 0.25 litre cartons. Their annual value varies around US\$ 440.000 /Table 10-4/.

TABLE 10 - 3 - Raw material cost/full capacity/

C O S T	I T E M	Unit	Quantity	Unit Price\$	C O S T I N ' 0 0 0 U S \$		
					Local	Foreign	Total
1.	RAW MATERIALS	tons					
1.1.	Shanouti	t	2500	95	237.5	-	237.5
1.2.	Valencia	t	15000	100	1500.0	-	1500.0
1.3.	Grapefruit	t	6000	85	510.0	-	510.0
1.4.	Lemon	t	1300	110	143.0	-	143.0
2.	AUXILIARY MATERIALS						
2.1.	Chemicals	estimate			-	15.0	15.0
2.2.	Filter paper - 2000 units			4	-	8.0	8.0
2.3.	Filtration Aids	t	6	500	-	3.0	3.0
3.	<u>TOTAL MATERIALS</u>				2390.5	26.0	2416.5

TABLE 10 - 4 - Cost of packaging and consumables/full capacity/

C O S T	I T E M	Unit	Quantity /in ' 0 0 0 /	Unit Price\$	C O S T I N ' 0 0 0 U S \$		
					Local	Foreign	Total
1.	PACKAGING						
1.1.	Barrels	250kg	4.4	5	-	22.0	22.0
1.2.	Tins	5kg	70.4	0.3	-	21.12	21.12
1.3.	Cartons	1L	1430.0	0.1	-	143.0	143.0
1.4.	Cartons	0.25L	8564.0	0.03	-	256.92	256.92
2.	CONSUMABLES						
2.1.	Cleaning Material	1000L	10.0	2000	-	20.0	20.0
2.2.	Oil, Grease, etc.	estimate		-	40.0	-	40.0
3.	<u>TOTAL</u>				40.0	463.04	503.05

c. Utilities

The plant will use electrical energy, water and fuel oil. The estimated consumption and annual costs are given in Table 10-5 below.

TABLE 10 - 5

Cost of Utilities

ITEM	UNIT	QUANTITY	PRICE	COST IN '000 US\$ /local/
1. Electricity	kWh	1150000	0.06	70.0
2. Water	m ³	50000	0.12	6.0
3. Fuel	t	900	61	55.0
4. TOTAL UTILITIES				131.0

d. Direct Manpower

The plant will employ altogether 72 people, of which 59 will be directly involved in the production process. The detailed manning table and expected cost of labour is given in Chapter 8 - see Tables 8 - 1, 8 - 2, 8 - 3 and 8 - 4. Consolidated figures are presented below /Table 10 - 6/:

Table 10 - 6 -- Cost of Direct Manpower in US\$

ITEM	VARIABLE	FIXED	TOTAL
1. WAGES	141.607	82.240	223.847
2. SURCHARGES	56.643	50.013	106.656
3. TOTAL	198.250	132.253	330.503

The cost of direct manpower has been computed under the assumption of 8 hours working day and 257 working days in a year. Indirect manpower will be included in overhead costs.

e. Repair and Maintenance

The annual cost of repair and maintenance for buildings and structures is estimated at US\$ 38600 and for machinery and equipment at US\$ 40.000 /both locally provisioned/.

f. Factory and Administration Overheads

They include salaries and fringe benefits of indirect manpower, rents for cold-storage facilities in Jericho, Jerusalem and Amman as well as standard overhead costs. They have been summarized in Chapter 7 and their annual amount is US\$ 2.623.000.

g. Marketing and Distribution Cost

As it was stated in Chapter 3, sales and distribution costs are estimated at 15% of total sales revenues. This will amount to US\$ 657.000 in the first year of operation, to US\$ 821.000 in the second year and to US\$ 1.061.000 from the third year onwards. Detailed breakdown of these costs can be found in Chapter 3.

h. Financial Cost

Loan financing covers 25% of initial investment expenditures and 6% interest rate /in real terms/ is assumed for this loan. Both figures are comparatively low and consequently, the financial charges are of lesser importance. During construction period, capitalized interest does not exceed US\$ 29.000, which

is merely 0.7% of total investment cost. The loan is assumed to be repaid over 5 years with one year grace period for the first year of production. Cost of finance gradually decreases from ca. US\$ 58.000 at the beginning of operation to US\$ 12.000 in the sixth year. Even if one takes the higher figure it still constitutes less than 1.3% of total production costs.

i. Depreciation

The following depreciation rates have been assumed for the fixed assets:

- Land	0
- All Machinery and Equipment	20%
except for:	
juice receiving tank	
spent peels container	10%
reception bin	
storage bins	
- Incorporated Fixed Assets	20%
- Pre-production Expenses	20%

Depreciation and amortization charges have been calculated by COMFAR. The annual amount of depreciation gradually decreases over the life period of the project from US\$ 559.000 in 1989 to ca. US\$ 33.000 in 1998.

10.1.4. Sales Revenues.

Consolidated figures for net sales revenues have been derived from Tables 3 - 1 and 3 - 2, and are presented on the next page /Table 10 - 8/.

TABLE 10 - 8

Sales Revenues /in US\$ '000/

ITEM	YEAR 1	YEAR 2	YEARS 3 - 10
1. <u>Concentrated juice</u>			
- exports	1516.7	1859.2	1887.8
- domestic market	133.5	203.0	203.0
2. <u>Natural Strenght Juice</u>			
- exports	2130.4	2676.5	3148.1
- domestic market	450.0	549.0	616.5
3. <u>Peels</u>			
- domestic market	150.0	187.5	225.0
4. <u>Nectars</u>			
- exports	-	-	630.0
- domestic market	-	-	360.0
5. <u>Promotion Cost /1%/</u>	/43.8/	/54.75/	/68.5/
6. <u>Incentives to Wholesa- lers /1%/</u>	/43.8/	/54.75/	/68.5/
7. TOTAL NET SALES REVENUES	4293.0	5365.7	6933.4

The above figures have been computed under the assumption that not more than 17 - 18% of natural strength juice and not more than 8 - 9% of concentrated juice will be marketed locally and the major part of the output will be exported, mainly to Jordan and other Arab countries. However, more than 1/3 of orange nectars production will be sold at the domestic market but since nectars constitute only a small fraction of total

output /not exceeding 15% of sales/, this will not alter the generally outward orientation of the project.

It has been assumed in the "basic version" of the COMFAR evaluation that promotion costs will vary about 1% of the sales revenues. The promotional budget will cover television advertisement, newspaper advertisements, other forms of publicity as well as necessary market reseach in new areas and in service training of salesmen.

A 1% discount for wholesalers is conceived as a promotional incentive and will continue for the whole life period of the project.

10.2. Financial Plan.

10.2.1. Sources of Funds.

The complex political and socio-economic situation of the occupied territories requires a special pattern of financing. Vital interests of both private and public sectors have to be accomodated and at the same time the capital structure of the future company must provide a sound financial basis for the project. It seems therefore reasonable to seek for a combination of equity and bank financing on one hand, and for a combination of private and public contribution on the other hand. It is conceivable that the Gazan business community can raise a considerable proportion of funds necessary to initiate the project. If the company takes legal form of limited company, the equity contribution of the private sector would be assumed around 50%.

To secure the interests of public sector and to avoid ex-

cessive influence and control over the project from private businessmen, the remaining part of funds should be provided by the public sector.

This would certainly help in maintaining fair wage policy and working conditions, high quality standards and reasonable prices for citrus producers. It seems also that if a sort of balance is established between public and private participation in the project, it will certainly not discourage private investment from further expansion.

Public contribution can take the form of equity and loan financing. Investment credits are available for industrial purposes at 6% real rate. For the present analysis it has been assumed that 25% of initial investment will be covered by equity funds from public sources and 25% by loan from public financial institution. However, it must be stressed that this is only a tentative proposal and no specific measures and commitments have been made so far to secure the proposed financial structure of the project.

The total cost of initial investment reaches almost US\$ 3.9 million. In Table 10 - 9 below the sources of initial funds are presented.

TABLE 10 - 9

Sources of Initial Funds

ITEM	AMOUNT IN US\$ '000
Equity - private sector	1933
Equity - public sector	966
Loan - public sector	966
T O T A L	3865

In addition to this, funds must be secured to cover interest during pre-production, which amounts to ca. US\$ 29.000. Much more important, however, is a need to finance the initial working capital requirement of ca. US\$ 600.000 at the very beginning of operation phase. This amount, which is not included in the initial investment costs will have to be covered either by additional equity or by short term loan financing, e.g. in form of bank overdraft.

10.2.2. Alternative Financing Pattern

Initial investment outlays could be reduced substantially if instead of buying the equipment, a lease agreement could be reached with one of the European manufacturers. Under lease financing, a company pays a certain rental every year which is tax deductible. The present value of lease financing is:

$$P_L = \sum_n \frac{a_n / (1 - t)}{1 + r/n}$$

where a_t stands for annual rental, t is the tax rate, r is the interest rate and n is the period of leasing. The value of P_L can be compared with the initial payment for the equipment, say P_B . It may well happen that $P_L < P_B$ and lease financing would be preferred. This could reduce the initial capital requirements by as much as 50% of total investment.

10.2.3. Payment Scheme

If the equipment is to be purchased from a foreign supplier, the cash-against-documents form of payment should be negotiated first. However, this may be difficult to negotiate.

with the supplier because the importing company has no established financial reputation as yet and also because the delivery is to be done to a politically unstable area. Therefore more likely is a letter-of-credit form of payment. Taking into account possible terms of delivery and the amount of required cash deposit with Israeli bank, the following payment scheme can be suggested:

- 30% deposit while placing the order, i.e. six months after the investment starts.
- 60% against the documents /Bill of Lading/ sent to the bank.
- 10% after the clearance of the delivery.

Since no decision has been taken yet as to the form of payment, in further calculations it has been assumed that the payment for the equipment is split evenly between the second and third half-year period of the construction phase.

10.2.4. Repayment of Loan

It has been assumed that the loan will be repaid over five years in equal annual installments with gradually decreasing interest paid annually at the end of the calendar year on outstanding balance. One year grace period has been assumed for the first year of operation, when production capacity is used only at 61 - 62%. The actual repayments start in the second year of operation and continue for five years. However, the interest is paid from the first year of operation. Detailed presentation of loan repayment is shown in COMFAR Schedules /Appendix 2/.

10.3. Financial Evaluation

Financial evaluation of a project requires the preparation of three main financial statements: projected balance-

sheet, projected net-income statement and cash-flow table. These documents have been computed by COMFAR programme. On the basis of the information provided by these statements several important measures of financial /commercial/ viability are also calculated, i.e. a number of ratios for financial analysis. Furthermore, internal rates of return on investment and on equity, together with the net present value of the project will complete overall picture of the profitability of the project.

10.3.1. Balance-Sheet

The capital structure of the project reveals a dominant position of equity funds - the long-term debt/equity ratio is 25/75 at the beginning of the operation. In more distant periods equity preserves its position.

On the liabilities side, reserves in the form of retained profits are being gradually accumulated, reaching almost 80% of total liabilities at the end of the project's life. They are matched on the assets side by increasing net cash surplus which in turn, constitutes over 90% of all assets at the end of the project's life period.

Fixed assets amount to almost US\$ 3.3 million at the start, decreasing gradually to 1 million at the end. Current assets /inventories, receivables/, reaching 15 - 17% of all assets during the first two years of production, do not exceed 6 - 8% at the end.

In the debt structure, long-term loan dominates during the first half of the project's life, and after it has been repaid, a small amount of accounts payable remains the only outside liability.

10.3.2. Net Income Statement

The Net income statement reveals that gross taxable profit yielded by the project is positive throughout the whole life period, except for the first year (1989), when a loss occurs of ca. US\$ 90.000. This however, is to be seen as the normal effect of a slow start-up. Sales in the first year are only 62% of full capacity output, and the proportion of fixed costs is quite substantial. However, in the second year (1990), when capacity is used at 78% the project exhibits already a gross profit of US\$ 212.000 i.e. ca. 4% of sales. In the next years when the production capacity is fully reached, annual gross profit rises from US\$ 922.000 (1991) to 1.5 million (1994 and after), i.e. from 13% to 21% of sales revenues.

The Israeli corporate tax rate of 25% of taxable profit is applied to this project with no allowance for an initial tax holiday or other tax allowances. On this basis, the net profit would be positive from 1990 and rises thereafter until 1995, when it levels off. At full capacity (1991) net profit is 9.8% of sales revenue and in 1995 it is 15.8% of sales revenue which is still a comfortable figure.

10.3.3 Cash-Flow Table

The cash-flow table compares financial inflows and financial outflows connected with the project in particular years. The table produced by COMFAR programme (Appendices 2 and 3) exhibits both the financial surplus (or deficit) and the net cash-flow from operation. It can be seen that except for the first year of production, outflows are matched by inflows in every year. The deficit of funds in the first year is produced by a low level capacity utilization and by a build-up of inventories, necessary to secure a smooth operation process. However, the deficit of ca. US\$ 60.000 during the first year of production is very modest (not exceeding 1.5% of sales) and may be covered by a bank overdraft.

In all other years the project produces a financial surplus, and therefore, the financial liquidity is secured. Net cash flow is also positive in all but the first year, and even then the deficit is negligible, not exceeding US\$ 2000. During the full capacity period, the annual net cash-flow varies around US\$ 1.2 million which is about 30% of initial investment cost. When cumulated net cash-flow is examined it can be seen that it turns positive at the beginning of the fifth year of operation, indicating a pay-back period for the project of about four and a half years. These results would be even more favourable if this project is granted a tax holiday in the initial years.

The cash-flow table also reveals, that the project is export-oriented and will give substantial revenues in terms of foreign exchange. Net annual foreign exchange income reaches almost 5 million US\$ at full capacity which is more than enough to cover initial foreign exchange expenses.

10.3.4. Ratio Analysis

The overall financial picture of the project can be assessed as very healthy on the basis of the three financial statements discussed above.

However, it is always a good practice to examine financial ratios for the projects as they may give additional confirmation of the conclusions derived. Some of the ratios have been discussed earlier /e.g. profitability ratios or capital

structure ratios - see paragraph 10.3.1. and 10.3.2. . What remains therefore, are liquidity ratios and debt-service ratios.

Liquidity ratios reveal no financial squeeze whatsoever. The current ratio never drops below 20, and the "quick" ratio ranges between 1.6 and 2.0.

Debt service ratio is defined as relation of debt service payments /principal plus interest/ to cash generation /net profit plus depreciation/. This ratio - under given assumptions as to the loan repayment pattern - is very low, decreasing from ca. 35% in the second year of production to ca. 18% in the sixth year of production. This means that no difficulty should be met while servicing the debt. All computed ratio values comply to most demanding banking requirements.

10.3.5. Profitability Measures

It is normally sufficient for the proper evaluation of a project to compute two familiar measures of profitability - internal rate of return /IRR/ and net present value /NPV/ - both based on discounted cash-flow technique. These measures have been computed by COMFAR programme and are as follows:

a. Return on Equity:

NPV at 10% is US\$ 2.325.630

IRR /E/ is 22%

b. Return on Total Investment:

NPV at 10% is US\$ 2.236,900

IRR is 20%

Higher value of the IRRE than the IRR demonstrates leverage effect of the particular loan-equity proportions in the initial financing. As it is seen, both NPV and IRR give comparatively high figures, clearly indicating high profitability of the whole venture under given assumptions.

10.4. Uncertainty Analysis

Although the foregoing analysis revealed very favourable commercial viability of the project, it is advisable to carry-out some elements of risk analysis in order to check the project's sensitivity to changes in the most critical parameters. Two familiar tools will be applied with this purpose in mind - break-even analysis and sensitivity analysis.

10.4.1. Break-Even Analysis

Break-even analysis will be done for a typical, full-capacity year of operation, say year 1992, for three parameters - price, unit variable cost and output level. The following formula is to be used:

$$px = f + cx$$

where p stands for selling price, x - for output level, f for fixed costs, and c for unit variable cost. Fixed cost is calculated as follows/see paragraph 10.1.3./: All figures in US\$ `000:

wages	132.3	/fixed component only/
overheads	107.3	
salaries	155.0	

depreciation 559.000

TOTAL f = 953.6

a. Break-Even Price
+++++

From the formula above we obtain:

$$\frac{x^*}{p} = \frac{f + cx}{x} = \frac{953.6 + /6135.9 - 953.6/}{7070.4} = p^* 0.8678 = 86.8\%$$

Since The selling price has been assumed 1 because of multi-product output structure, the result obtained indicates the minimum level of price, at which the project breaks even in 1992. The margin is surprisingly small showing the high dependence of the project's performance on the selling price level.

The price can drop by only 13.2% without producing a loss.

b. Break-Even Unit Variable Cost
+++++

The formula is changed slightly.

$$c^* = \frac{px - f}{x} = \frac{7070.4 - 953.6}{7079.4} = 0.865 \sim 86.5\%$$

The result is similar which is no surprise. The break-even unit variable cost is 86.5% of the selling price - above this level the project would yield a loss.

c. Break-Even Output Level
+++++

The relevant formula is as follows:

$$x^* = \frac{f}{p - c} = \frac{953.6}{7070.4 - 5182.3} = 0.505 \sim 50.5\%$$

The break-even output level is 50.5% of the full capacity level.

d. Break-Even Analysis for Another Year
+++++

The obtained figures indicate the relatively high sensitivity of the project to the changes of price level. However, this dependency diminishes if one takes other operation years into account. Below break-even selling prices are given for particular years.

YEAR	1990	1991	1993	1994	1995 - 1997	1998
PRICE [*] %	96.1	86.9	84.1	79.1	78.9	78.8

In spite of the gradual decrease as observed during the life period of the project, the values of break-even price are still to be considered as high, indicating a substantial vulnerability of the project to the selling price level variations.

10.4.2. Sensitivity Analysis

The sensitivity analysis has been run to examine the project's dependence on selling price changes and raw material cost changes. All computations have been done with COMFAR and are presented in Appendix 3.

a. Selling Price Changes

One simulation has been run to check the impact of the selling price decrease by 10%. In this case the IRR on total investment becomes 7.2%, a fall of 64 % compared with the basic version. This gives another confirmation of high sensitivity of the project to changes of the selling price level. Practically, it can be stated that if the selling price goes down by 15% the project will not be worthwhile.

b. Raw Material Cost Changes

The increase of the raw material cost /citrus fruits/ by 10% has no substantial impact on the project's financial position, IRR/E/ drops to 14.5%, IRR on investment drops to 13.5%, which still is safe enough. The profits however, would be wiped out if the raw material cost increase were of 30% or more. This however, is quite unlikely.

10.5.3. Conclusions

The financial evaluation proves that the project has a healthy financial structure and assures an adequate level of commercial profitability. However, as pointed out earlier the project is highly vulnerable to the selling price level.

This suggests that there is a need to examine the reliability of the price assumed in the study. On the other hand, the project should take measures to reduce operating costs as much as possible. Secondly, the promoters may try to obtain some tax incentives similar to those enjoyed by Israeli enterprises. If a tax holiday is granted the IRR will show a higher percentage and the net cash flow will also be higher than that in the basic version.

In conclusion, it is suggested that the following options be examined, which might also enhance the financial soundness of the project.

- extension of the operation period from 10 to 15 years;
- introducing long-term agreements for raw citrus supplies from farmers at a pre-determined, guaranteed price;
- lease of the main production equipment /instead of purchase/;
- no matter what specific tax rate will be applied a tax holiday of 3 - 5 years should be sought for;
- extension of the variety of fruits being processed in the plant by e.g. plums, grapes, peaches, tomatoes;
- establishment of a twin plant in the West Bank region under integrated management and pursuing coordinated sales policy.

APPENDIX 1 - TABLES AND FLOW-SHEET

TABLE NO. 3/1

Selected Statistics on Beverage Consumption

Total expenditure on Some Food Stuffs in West Bank

/Thousand Shekels - Base Year 1979 - 100/ /

YEAR		1979	1980	1981	October 1982
	Qt.	403.2	1004.5	2830.7	8745
Beverages	/	100 /	249 /	702 /	2169 /
	Qt.	330.8	815.4	1915.3	4809
Alcoholics	/	100 /	246.5 /	579 /	1454 /
	Qt.	637.9	1270.4	2163.6	5834.9
Hot Drinks					
Cigarettes	/	100 /	199 /	339 /	915 /
Milk and Milk Pro- ducts	Qt.	376.2	1127.4	2122	5301.2
	/	100 /	564 /		1409 /
	Qt.	338.6	896.5	2186.6	5145.3
Eggs	/	100 /	265 /	646 /	1520 /
	Qt.	370.2	887.7	1897.1	5297
Pastries	/	100 /	240 /	512 /	1431 /

Source: Combined Statistical Official Data
Different Years

TABLE 3 - 2

Consumption Rates of Citrus Drinks by Variety of Location in West Bank

Area/ District	Size of Package	Annual Market Size 1000 Unit	Unit Price \$	Conc.	Quantity 1000 L Nect.	Drink Conc.	Total Price 1000\$ Nect.	Drink
HEERON	4 litre co.	5.5	2.25	22.0			12.375	
	3 litre con.	2.5	3.00	7.5			7.500	
	2 litre	3.0	1.25			6.0		3.600
	1 litre	70	0.75			70.0		52.800
	75 cent.litre	38	0.31			28.50		11.780
	65 cent.litre	25	0.29			16.25		7.250
	33 cent.litre	250	0.14			82.50		35.000
	15 cent.litre	750	0.03			112.50		22.500
SUB TOTAL				29.5	-	315.75	19.875	132.630
BETHLEHEM	4 litre	20	4.00	80			80.00	
	3 litre con.	5	3.00	15			15	
	3 litre nect.	4	2.40		12			9.60
	75 cent.litre	38	0.35			28.5		13.300
	33 cent.litre	650	0.13			214.5		84.500
SUB TOTAL				95	12	243.0	95.00	97.800
JERUSALEM	4 litre con.	35	3.25	140			113.00	
	3 litre con.	45	3.00	135			135.00	
	3 litre nect.	30	2.30		90			69.00
	2 litre	32	1.00			64		32.000
	1 litre	76	0.65			76		49.400
	65 cent.litre	130	0.57			84.5		74.100
	33 cent.litre	1080	0.16			365.4		172.800
	25 cent.litre	400	0.15			100.00		60.000
SUB TOTAL				275	90	680.90	248.00	69.00 388.300
RAMALLAH	4 litre.con.	12	3.40	48			40.800	
	3 litre.con	5	3.00	15			15.000	
	3 litre Nect.	4	2.30		12			9.200
	1 litre	33	0.62			33		20.460
	65 cent.litre	125	0.55			81.25		68.750
	33 cent.litre	650	0.15			214.50		97.500
	25 cent.litre	850	0.13			212.50		110.500
SUB TOTAL				63	12	541.25	55.800	9.200 297.210
JERICHO	4 litre con.	1.3	2.9	5.2			377	
	3 litre	38	1.75			144		66.5
	2 litre	25	1.0			50		25.00
	1 litre	160	0.58			160		92.80
	75 cent.litre	86	0.25			64.5		21.50
	65 cent.litre	74	0.22			48.5		16.28
	50 cent.litre	12	0.21			6.0		2.25
	33 cent.litre	805	0.13			265.65		104.65
SUB TOTAL				5.5		708.65	3.77	329.25

TABLE 3 - 2 /continued/

Consumption Rates of Citrus Drinks by Variety of Location in West Bank

Area/ District	Size of Package	Annual Market Size 100 Unit	Unit Price \$	Conc.	Quantity 1000 L Nect.	Drink	Conc.	Total Price 1000\$ Nect.	Drink
NABLUS	4 litre.conc.	6.0	3.4	24.00			20.4		
	3 litre.Nect.	10.0	2.3		30.00			23.0	
	2 litre	35	1.2			70			42
	1 litre	20	0.65			20			13
	75 cent.litre	40	0.23			30			9.20
	33 cent.litre	198	0.16			65.34			31.68
	25 cent.litre	250	0.15			62.5			37.50
SUB TOTAL				24.00	30.00	247.84	20.4	23.0	133.38
TULKARM									
	2 litre	4.5	1.25			9			5.625
	1 litre	38	0.62			38			23.560
	75 cent.litre	27	0.25			20.25			6.750
	50 cent.litre	80	0.17			40.00			13.600
	33 cent.litre	452	0.15			149.16			67.800
SUB TOTAL						256.41			117.335
JENIN									
	50 cent.litre	105	0.23			52.5			24.15
	33 cent.litre	400	0.17			132.0			68.00
	25 cent.litre	210	0.15			52.5			31.50
SUB TOTAL						237.0			123.65
GAZA									
	1 litre	120	0.57			120			68.40
	65 cent.litre	550	0.38			357.5			209.00
	33 cent.litre	1320	0.13			432.6		171.60	
TOTAL GAZA						913.1			449.00
<u>TOTAL WEST BANK</u>				491.7	144	3230.8	442.845	110.8	1619.555
<u>GRAND TOTAL O.T.</u>				491.7	144	4143.9	442.845	110.8	2068.555

TABLE 3 - 3 Consumption Per Capita Rates

	TOTAL POP. 1000	TOTAL CONSUM. DRINKS 1000L	PER CAPITA LITRE	CONCENT LIT.1000	PER CAPITA
HEBRON	148	315.75	2.1	29.5	0.2
BETHLEHEM	82	355	3.1	95.0	1.6
JERUSALEM	119.3	770.9	6.5	275	2.3
RAMALLAH	124	552.5	4.5	63	0.5
JERICHO	11.8	708.65	60	5.2	0.4
NABLUS	135	277.84	2	24	0.17
TULKARM	126.6	256.41	2	-	-
JENIN	115	237	2	-	-
GAZA	455.8	913.1	2	-	-

TABLE 3 - 4 Percentage Consumed According to Size of Filling

	1 LITRE AND MORE/100 L		LESS THAN 1 L / 1000 LITRE		TOTAL /	CONCENTRATED	
HEBRON	76	24	239.75	76	315.75	100	29.5
BETHLEHEM	12	5	243.00	95	255.00	100	95.0
JERUSALEM	230	30	540.90	70	770.90	100	275.00
RAMALLAH	45	8	508.25	92	553.50	100	63.0
JERICHO	324	46	384.65	54	708.65	100	5.2
NABLUS	120	43	157.84	57	277.84	100	24
TULKARM	47	18	209.41	82	256.41	100	-
JENIN	-	-	237.9	100	237.00	100	-
GAZA	120	13	793.1	87	913.1	100	-

Value of Agricultural Trade Beverages

	YEARS	EGYPT	ISRAEL	JORDAN	KUWAIT	QATAR	SAUD. AR.	U.A.E.
IMPORTS 1000US\$	1975	721	3342	1424	2691	1780	3798	12483
	1976	5168	4403	2266	5333	2588	6346	17238
	1977	2579	5218	3108	10261	3353	53985	23258
	1978	1194	5517	5116	16667	3461	112366	34880
	1979	1418	5618	5687	20688	3807	169824	41692
	1980	1504	3692	6288	17003	7153	143695	50379
EXPORTS 1000US\$	1975	24778	3656	749	143		19	
	1976	15231	3741	1188	321		33	122
	1977	27073	4604	1035	1540		1211	198
	1978	21320	5762	1402	2574		1588	5164
	1979	9811	6753	2982	2790		3184	4550
	1980	4507	7221	1669	1249		4016	6309

Source: FAO TRADE YEARBOOK, 1981; Rome, 1982

Population Distribution in Proposed Export Arab Markets

COUNTRY	NO. POP. 1980	ANNUAL GROWTH RATE	EXPECTED POP 1986
SAUDI ARABIA	8.1	2.4%	9.2
JORDAN	2.3	2.4%	2.7
KUWAIT	1.3	3.7%	1.6
U.A.E.	0.8	3.0%	0.9

Source: AL-Qasem, Subhi, The Problem of Food in the Arab World, A. Shumman Institute, Amman, 1982.

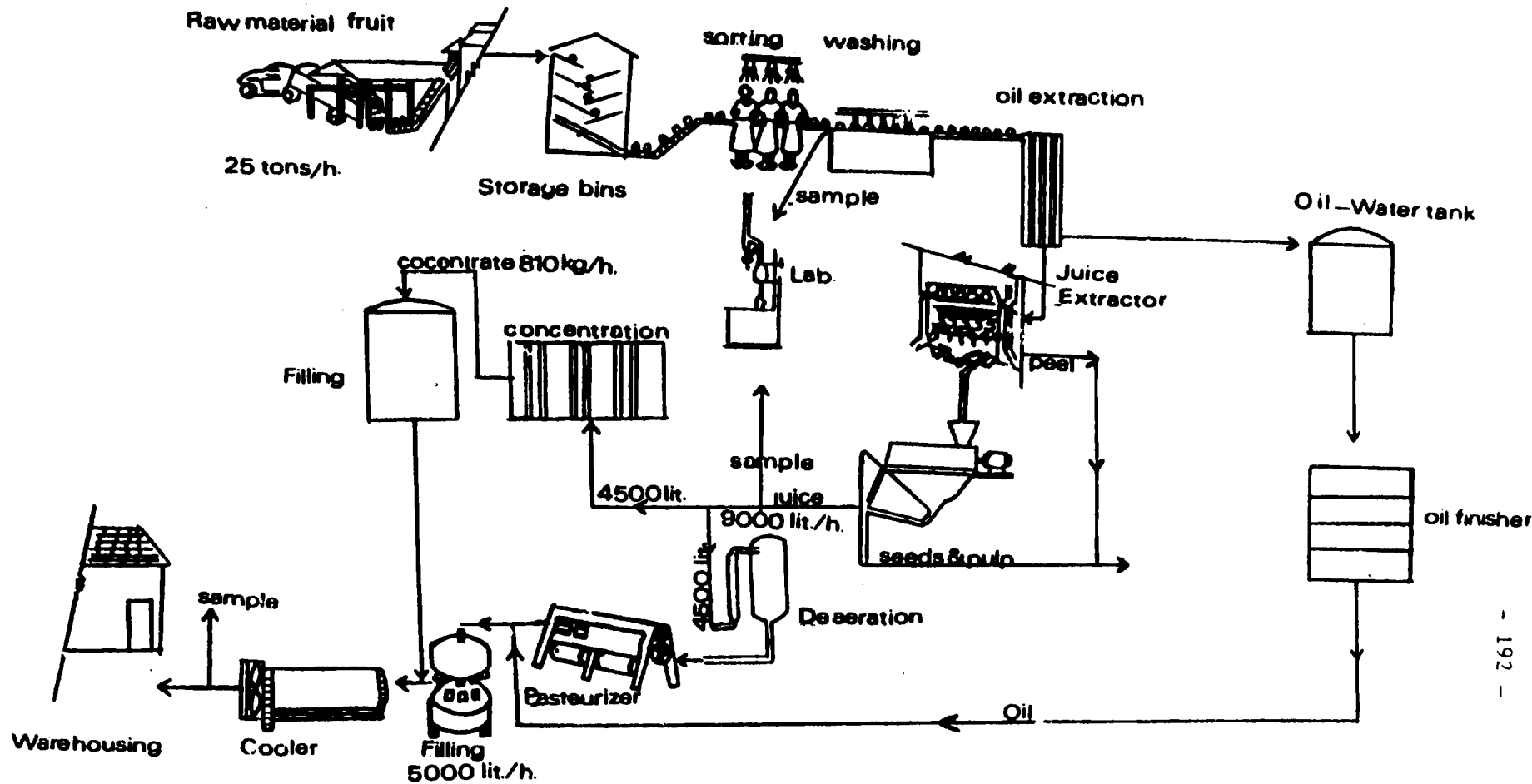
Population Distribution According to Districts - 1967 - 1990

DISTRICT	1967	1980	1984	EST. 1990
JENIN	78.3	108.4	115	123
TOLKARM	72.2	121.0	126.6	135.3
NABLUS	152.4	128.8	135	144.3
RAMALLAH	95.8	117.0	124	132.5
JERICHO	9.1	11.3	11.8	12.6
BETHLEHEM	49.5	78.1	82	87.6
HEBRON	118.4	141.4	148	158.1
JERUSALEM	88.9	114.2	119.3	127.5
W.B. TOTAL	664.6	820.2	861.7	920.9

Source: Statistical Bulletin for the West Bank and Gaza Strip 1981 Vol.2 Rural Research Centre, AN-Najah University, Nablus, West Bank

Employed Persons and Average Daily Wages

		1970	1975	1980	1981	1982	1983		
Total—all economic branches	W.B.	114.6	1325	134.8	133.4	140.9	147.2		
Employed /1000/	Gaza	58.7	72.6	80.9	82.5	82.0	85.3		
Employed in Industry	W.B.	16.5	22.0	22.8	21.9	23.2	24.7		
in the occupied territories /1000/	Gaza	6.9	10.3	15.8	14.3	13.0	14.5		
Average daily wages in the occupied territories /Israeli Shekels/	W.B.	0.7	3.5	32.9	89.2	201.0	487.4		
	Gaza	0.5	3.7	35.5	85.0	217.0	547.9		
Working in Israel/1000/	Year	1970	1975	1977	1979	1980	1981	1982	1983
In Industry	Total	2.3	11.9	13.1	16.7	15.6	13.7	13.8	16.00
	W.B.	/1.9/	7.3	8.0	9.3	8.4	7.2	7.5	8.5
	Gaza	/0.5/	4.6	5.3	7.2	7.2	6.6	6.3	7.5
Average Daily Wages /Israeli Shekels/	Total	/1.1/	4.2	6.9	20.2	38.7	99.7	236.0	577.9
	W.B.	/1.1/	4.2	7.0	19.1	37.6	101.0	226.0	548.4
	Gaza	/1.2/	4.1	6.9	21.8	39.4	97.8	249.0	610.8
W.B. Employees Daily Wages In Food, Beverages, and Tobacco - Base, Monthly, Average, June, 1977 - = 100% /Israeli Shekels/		1977	1978	1980	1981	1982	1983		
		5.9	180	600	1467	3078	8336		
Wood Industry							6071		
Leather							7934		
Textile and Clothes							7319		
Plastic and Chemicals							6437		



Flow-Sheet showing steps in the production of natural orange juice and concentrate.

APPENDIX 2
BASIC VERSION COMFAR SCHEDULES



COMFAR 2.1 - UNIDO, TO/FEAS, Vienna

Citrus Processing Plant, Palestine
1986-07-29, by D. Rosati

2 year(s) of construction, 15 years of production

currency conversion rates:

foreign currency 1 unit = 1.0000 units accounting currency
local currency 1 unit = 1.0000 units accounting currency
accounting currency: 1000 US \$

Total initial investment during construction phase

fixed assets:	3833.18	49.871 % foreign
current assets:	60.75	100.000 % foreign
total assets:	3893.93	50.653 % foreign

Source of funds during construction phase

equity & grants:	2898.94	0.000 % foreign
foreign loans :	966.00	
local loans :	0.00	
total funds :	3864.94	24.994 % foreign

Cashflow from operations

Year:	1	5	10
operating costs:	3765.57	5400.53	5400.53
depreciation :	559.01	381.85	32.80
interest :	57.96	23.18	0.00
production costs	4382.54	5805.66	5433.43
thereof foreign	18.77 %	14.68 %	10.95 %
total sales :	4380.60	7070.40	7070.40
gross income :	-89.54	1123.24	1495.47
net income :	-89.54	342.43	1121.61
cash balance :	-59.80	970.00	1154.41
net cashflow :	-1.84	1132.71	1154.41

Net Present Value at: 10.00 % = 2236.90
Internal Rate of Return: 19.95 %
Return on equity(1): 16.77 %
Return on equity(2): 12.81 %

Index of Schedules produced by COMFAR

Total initial investment	Cashflow Tables
Total investment during production	Projected Balance
Total production costs	Net income statement
Working Capital requirements	Source of finance



COMFAR 2.1 - UNCTAD, CONFESS, Vienna

Total Initial Investment in '000 US \$

Year	1987.1	1987.2	1988.1	1988.2
Fixed investment costs				
Land, site preparation, development	0.00	369.75	0.00	0.00
Buildings and civil works	0.00	330.00	330.00	175.00
Auxiliary and service facilities . .	0.00	0.00	388.80	432.73
Incorporated fixed assets	0.00	0.00	95.00	86.00
Plant machinery and equipment . . .	0.00	0.00	488.43	518.49
Total fixed investment costs	0.00	639.75	1292.23	1212.21
Pre-production capital expenditures.	0.00	220.00	227.24	241.74
Net working capital	0.00	0.00	0.00	60.75
Total initial investment costs . . .	0.00	859.75	1519.47	1514.70
Of it foreign, in %	0.00	0.00	63.80	66.21

Citrus Processing Plant, Palestine --- 1986-07-29, by O.Rosati



COMFAR
1986-1989

COMFAR 2.1 - UNIDO, IS/FE4S, Vienna

Total Current Investment in 1000 US \$

Year	1989	1990	1991	1992	1993	1994-95
Fixed investment costs						
Land, site preparation, development	0.00	0.00	0.00	0.00	0.00	0.00
Buildings and civil works	0.00	0.00	0.00	0.00	0.00	0.00
Auxiliary and service facilities . .	0.00	0.00	0.00	0.00	0.00	0.00
Incorporated fixed assets	0.00	0.00	0.00	0.00	0.00	0.00
Plant, machinery and equipment . .	0.00	0.00	0.00	0.00	0.00	0.00
Total fixed investment costs	0.00	0.00	0.00	0.00	0.00	0.00
Preproduction capitals expenditures.	0.00	0.00	0.00	0.00	0.00	0.00
Working capital	529.27	97.00	106.51	0.00	60.75	0.00
Total current investment costs . . .	529.27	97.00	106.51	0.00	60.75	0.00
Of it foreign, %	10.60	14.38	13.80	0.00	0.00	0.00

Citrus Processing Plant, Palestine --- 1986-07-29, by D.Rosati

COMFAR 2.1 - UNIDO, IS/FE4S, Vienna

Total Current Investment in 1000 US \$

Year	1999
Fixed investment costs	
Land, site preparation, development	0.00
Buildings and civil works	0.00
Auxiliary and service facilities . .	0.00
Incorporated fixed assets	0.00
Plant, machinery and equipment . .	0.00
Total fixed investment costs	0.00
Preproduction capitals expenditures.	0.00
Working capital	-752.78
Total current investment costs . . .	-752.78
Of it foreign, %	0.00

Citrus Processing Plant, Palestine --- 1986-07-29, by D.Rosati



COMPARE 2000 - JANUARY TO 1998, Palestine

Total Production Costs in 1000 US \$

Year	1989	1990	1991	1992	1993	1994
% of nom. capacity (single product):	0.00	0.00	0.00	0.00	0.00	0.00
Raw material I	1978.75	2193.97	2872.81	2870.91	2870.91	2870.91
Other raw materials	423.50	529.04	577.50	577.50	577.50	577.50
Utilities	157.90	157.90	157.90	157.90	157.90	157.90
Energy	0.00	0.00	0.00	0.00	0.00	0.00
Labour, direct	770.50	770.50	770.50	770.50	770.50	770.50
Repair, maintenance	78.60	78.60	78.60	78.60	78.60	78.60
Stores	0.00	0.00	0.00	0.00	0.00	0.00
Factory overheads	107.30	107.30	107.30	107.30	107.30	107.30
Factory costs	2957.55	3560.41	4184.61	4184.61	4184.61	4184.61
Administrative overheads	155.02	155.02	155.02	155.02	155.02	155.02
Indir. costs, sales and distribution	657.00	821.00	1061.00	1061.00	1061.00	1061.00
Direct costs, sales and distribution	87.60	109.50	141.50	141.50	141.50	141.50
Depreciation	559.01	559.01	559.01	559.01	381.85	38.45
Financial costs	57.96	57.96	46.77	74.78	33.18	11.59
Total production costs	4470.14	5362.90	6147.61	6135.91	5947.16	5592.20
Costs per unit (single product)	0.00	0.00	0.00	0.00	0.00	0.00
Of it foreign %	20.04	19.21	19.06	19.10	19.85	22.50
Of it variable %	1.96	2.08	2.70	2.71	2.78	2.57
Total labour	495.52	485.52	495.52	485.52	495.52	485.52

Citrus Processing Plant, Palestine --- 1986-07-29, by D.Rosati



COMFAR 2.1 - UN100, COMFEAS, Vienna

Total Production Costs in 000 US \$

Year	1995-97	1998	1999
% of nom. capacity (single product)	0.00	0.00	0.00
Raw material I	2972.81	2972.81	0.00
Other raw materials	637.59	637.59	0.00
Utilities	157.90	157.90	0.00
Energy	0.00	0.00	0.00
Labour, direct	330.50	330.50	0.00
Repair, maintenance	78.50	78.50	0.00
Spares	0.00	0.00	0.00
Factory overheads	107.30	107.30	0.00
Factory costs	4194.61	4194.61	0.00
Administrative overheads	155.02	155.02	0.00
Indir. costs, sales and distribution	1061.00	1061.00	0.00
Direct costs, sales and distribution	141.50	141.50	0.00
Depreciation	38.49	32.80	0.30
Financial costs	-0.00	0.00	0.00
Total production costs	5580.61	5574.93	0.30
Costs per unit (single product)	0.00	0.00	0.00
Of it foreign, %	12.65	12.60	0.00
Of it variable, %	2.54	2.54	0.00
Total labour	485.52	485.52	0.00

Citrus Processing Plant, Palestine --- 1986-07-29, by D.Rosati



COMFAR 2.1 - UNIDO, IO/FEAS, Vienna

Net Working Capital in '000 US \$

Year	1989	1990	1991	1992	1993
Coverage	adc	coto			
Current assets &					
Accounts receivable	30 12.0	321.10	387.16	461.84	461.84
Inventory and materials	3 107.4	93.45	89.10	94.91	155.66
Energy	0 ---	0.00	0.00	0.00	0.00
Spares	0 ---	0.00	0.00	0.00	0.00
Work in progress	3 120.0	24.61	29.67	34.97	34.97
Finished products	15 24.0	129.52	154.81	180.82	180.82
Cash in hand	30 12.0	55.95	55.95	55.95	55.95
Total current assets		614.63	716.69	828.40	889.15
Current liabilities and					
Accounts payable	3 120.0	24.61	29.67	34.97	34.87
Net working capital		590.02	687.02	793.53	854.28
Increase in working capital		529.27	97.00	106.51	60.75
Net working capital, local		473.17	556.22	648.03	648.03
Net working capital, foreign		116.85	130.80	145.50	206.25

Note: adc = minimum days of coverage ; coto = coefficient of turnover .

Citrus Processing Plant, Palestine --- 1986-07-29, by D.Fosati.

COMFAR 2.1 - UNIDO, IO/FEAS, Vienna

Net Working Capital in '000 US \$

Year	1994-98	1999	
Coverage	adc	coto	
Current assets &			
Accounts receivable	30 12.0	461.84	0.00
Inventory and materials	3 107.4	155.66	121.50
Energy	0 ---	0.00	0.00
Spares	0 ---	0.00	0.00
Work in progress	3 120.0	34.97	0.00
Finished products	15 24.0	180.82	0.00
Cash in hand	30 12.0	55.95	0.00
Total current assets		889.15	121.50
Current liabilities and			
Accounts payable	3 120.0	34.97	0.00
Net working capital		354.28	121.50
Increase in working capital		0.00	-732.78
Net working capital, local		648.03	0.00
Net working capital, foreign		206.25	121.50

Note: adc = minimum days of coverage ; coto = coefficient of turnover .



COMFAR 2.1 - UNIDO, IC/FEAS, Vienna -----

Source of Finance, construction in '000 US \$

Year	1987.1	1987.2	1988.1	1988.2
Equity, ordinary ..	0.00	859.75	546.23	526.97
Equity, preference.	0.00	0.00	483.00	483.00
Subsidies, grants .	0.00	0.00	0.00	0.00
Loan A, foreign .	0.00	0.00	483.00	483.00
Loan B, foreign..	0.00	0.00	0.00	0.00
Loan C, foreign .	0.00	0.00	0.00	0.00
Loan A, local....	0.00	0.00	0.00	0.00
Loan B, local....	0.00	0.00	0.00	0.00
Loan C, local....	0.00	0.00	0.00	0.00
Total loan	0.00	0.00	483.00	483.00
Current liabilities	0.00	0.00	0.00	0.00
Bank overdraft	0.00	0.00	7.25	21.73
Total funds	0.00	859.75	1519.48	1514.70

Citrus Processing Plant, Palestine --- 1986-07-29, by D. Rosati

COMFAR 2.1 - UNIDO, IC/FEAS, Vienna -----

Source of Finance, production in '000 US \$

Year	1989	1990	1991	1992-94	1995-98	1999
Equity, ordinary ..	0.00	0.00	0.00	0.00	0.00	0.00
Equity, preference.	0.00	0.00	0.00	0.00	0.00	0.00
Subsidies, grants .	0.00	0.00	0.00	0.00	0.00	0.00
Loan A, foreign .	0.00	-193.20	-193.20	-193.20	0.00	0.00
Loan B, foreign..	0.00	0.00	0.00	0.00	0.00	0.00
Loan C, foreign .	0.00	0.00	0.00	0.00	0.00	0.00
Loan A, local....	0.00	0.00	0.00	0.00	0.00	0.00
Loan B, local....	0.00	0.00	0.00	0.00	0.00	0.00
Loan C, local....	0.00	0.00	0.00	0.00	0.00	0.00
Total loan	0.00	-193.20	-193.20	-193.20	0.00	0.00
Current liabilities	24.61	5.06	5.20	0.00	0.00	-34.87
Bank overdraft	59.90	-98.78	0.00	0.00	0.00	0.00
Total funds	84.41	-276.92	-188.00	-193.20	0.00	-34.87

Citrus Processing Plant, Palestine --- 1986-07-29, by D. Rosati



COMFAR 2.1 - UNIDO, 10/FEAS, Vienna

Cashflow Tables, construction in '000 US \$

Year	1987.1	1987.2	1988.1	1988.2
Total cash inflow . .	0.00	859.75	1512.23	1492.97
Financial resources .	0.00	859.75	1512.23	1492.97
Sales, net of tax . .	0.00	0.00	0.00	0.00
Total cash outflow . .	0.00	859.75	1519.47	1514.70
Total assets	0.00	859.75	1512.23	1492.97
Operating costs . . .	0.00	0.00	0.00	0.00
Cost of finance . . .	0.00	0.00	7.24	21.74
Repayment	0.00	0.00	0.00	0.00
Corporate tax	0.00	0.00	0.00	0.00
Dividends paid	0.00	0.00	0.00	0.00
Surplus (deficit) . .	0.00	0.00	-7.24	-21.75
Cumulated cash balance	0.00	0.00	-7.24	-28.98
Inflow, local	0.00	859.75	1029.23	1019.96
Outflow, local	0.00	859.75	550.00	511.60
Surplus (deficit) . .	0.00	0.00	479.23	498.15
Inflow, foreign	0.00	0.00	483.00	483.01
Outflow, foreign . . .	0.00	0.00	959.47	1002.99
Surplus (deficit) . .	0.00	0.00	-485.47	-519.90
Net cashflow	0.00	-859.75	-1512.23	-1492.97
Cumulated net cashflow	0.00	-859.75	-2371.98	-3864.95

Citrus Processing Plant, Palestine --- 1986-07-19, by B.Rosati



Cashflow tables, production in 1000 US \$

Year	1989	1990	1991	1992	1993	1994
Total cash inflow . .	4405.21	5498.26	7075.60	7070.40	7070.40	7070.40
Financial resources .	24.61	5.06	5.20	0.00	0.00	0.00
Sales, net of tax . .	4380.60	5475.20	7070.40	7070.40	7070.40	7070.40
Total cash outflow . .	4465.01	5052.22	6124.13	6003.72	6100.07	6116.47
Total assets	553.88	102.06	111.71	0.00	60.75	0.00
Operating costs . . .	3883.17	4645.93	5542.13	5542.13	5542.13	5542.13
Cost of finance . . .	57.96	57.96	46.37	34.78	23.18	11.59
Repayment	0.00	193.20	193.20	193.20	193.20	193.20
Corporate tax	0.00	53.08	230.72	233.62	280.81	369.53
Dividends paid	0.00	0.00	0.00	0.00	0.00	0.00
Surplus (deficit) . .	-59.80	428.04	951.48	1066.68	970.33	953.93
Cumulated cash balance	-88.78	339.26	1290.73	2357.41	3327.74	4281.67
Inflow, local	754.85	943.74	1408.27	1404.50	1404.50	1404.50
Outflow, local	3883.29	4206.56	5166.32	5077.05	5120.24	5208.98
Surplus (deficit) . .	-3128.44	-3262.82	-3757.45	-3669.55	-3715.74	-3804.48
Inflow, foreign	3650.36	4536.51	5666.74	5665.90	5665.90	5665.90
Outflow, foreign	581.72	645.66	957.31	930.65	979.83	907.47
Surplus (deficit) . .	3068.64	3890.85	4708.93	4735.22	4686.07	4758.41
Net cashflow	-1.84	679.20	1191.04	1294.65	1186.71	1158.72
Cumulated net cashflow	-3866.78	-3187.59	-1996.54	-701.89	484.82	1643.55

Citrus Processing Plant, Palestine --- 1986-07-29, by D.Rosat



COMFAR 2.1 - UNIDO, IO/FEAS, Vienna

Cashflow tables, production in '000 US \$

Year	1995	1996	1997	1998	1999
Total cash inflow . .	7070.40	7070.40	7070.40	7070.40	0.00
Financial resources .	0.00	0.00	0.00	0.00	0.00
Sales, net of tax . .	7070.40	7070.40	7070.40	7070.40	0.00
Total cash outflow . .	5914.57	5914.57	5914.58	5916.00	-732.78
Total assets	0.00	0.00	0.00	0.00	-757.65
Operating costs . . .	5542.13	5542.13	5542.13	5542.13	0.00
Cost of finance . . .	-0.00	0.00	0.00	0.00	0.00
Repayment	0.00	0.00	0.00	0.00	34.87
Corporate tax	372.45	372.45	372.45	373.87	0.00
Dividends paid	0.00	0.00	0.00	0.00	0.00
Surplus (deficit) . .	1155.83	1155.83	1155.82	1154.41	732.78
Cumulated cash balance	5437.50	6593.32	7749.15	8903.55	9636.33
Inflow, local	1404.50	1404.50	1404.50	1404.50	0.00
Outflow, local	5211.37	5211.87	5211.88	5213.29	-648.03
Surplus (deficit) . .	-3807.37	-3807.37	-3807.38	-3808.79	648.03
Inflow, foreign . . .	5665.90	5665.90	5665.90	5665.90	0.00
Outflow, foreign . . .	702.70	702.70	702.70	702.70	-84.75
Surplus (deficit) . .	4963.20	4963.20	4963.20	4963.20	84.75
Net cashflow	1155.83	1155.83	1155.82	1154.41	732.78
Cumulated net cashflow	2799.37	3955.20	5111.02	6265.43	6998.21

Citrus Processing Plant, Palestine --- 1986-07-29, by D.Rosat:

COMFAR 2.1 - UNIDO, IO/FEAS, Vienna

Cashflow Discounting:

a) Equity paid versus Net income flow:		
Net present value	1186.12 at	10.00 %
Internal Rate of Return (IRRE1) ..	16.77 %	
b) Net Worth versus Net cash return:		
Net present value	2325.63 at	10.00 %
Internal Rate of Return (IRRE2) ..	22.01 %	
c) Internal Rate of Return on total investment:		
Net present value	2236.90 at	10.00 %
Internal Rate of Return (IRR) ..	19.96 %	
Net Worth = Equity paid plus reserves		

Citrus Processing Plant, Palestine --- 1986-07-29, by D.Rosat:



COMFAR 2.1 - UNIDO, CO/FEAS, Vienna

Net Income Statement in '000 US \$

Year	1989	1990	1991	1992	1993
Total sales, incl. sales tax	4380.60	5475.29	7070.40	7070.40	7070.40
Less: variable costs, incl. sales tax	97.60	109.50	141.50	141.50	141.50
Variable margin	4293.00	5365.79	6928.90	6928.90	6928.90
As % of total sales	98.00	98.00	98.00	98.00	98.00
Non-variable costs, incl. depreciation	4324.58	5095.44	5959.63	5959.63	5780.47
Operational margin	-31.58	270.26	969.27	969.27	1146.43
As % of total sales	-0.72	4.94	13.71	13.71	16.21
Cost of finance	57.96	57.96	46.37	34.78	23.18
Gross profit	-39.54	212.30	922.90	934.49	1123.24
Allowances	0.00	0.00	0.00	0.00	0.00
Taxable profit	-39.54	212.30	922.90	934.49	1123.24
Tax	0.00	53.08	250.72	233.62	280.91
Net profit	-39.54	159.22	672.17	700.87	842.33
Dividends paid	0.00	0.00	0.00	0.00	0.00
Undistributed profit	-39.54	159.22	672.17	700.87	842.33
Accumulated undistributed profit	-39.54	69.69	761.87	1462.73	2705.17
Gross profit, % of total sales	-2.04	3.88	13.05	13.22	15.89
Net profit, % of total sales	-2.04	2.91	9.79	9.91	11.91
RCE, Net profit, % of equity	-3.09	5.49	20.28	24.18	29.06
RCE, Net profit-interest, % of invest.	-0.72	4.24	16.06	16.00	18.52

Citrus Processing Plant, Palestine --- 1986-07-29, by D.Rosati



COMFAR 2.1 - UNISG, IGFEAS, Vienna

Net Income Statement in 1000 US \$

Year	1994	1995	1996	1997	1998
Total sales, incl. sales tax	7070.40	7070.40	7070.40	7070.40	7070.40
Less: variable costs, incl. sales tax	141.50	141.50	141.50	141.50	141.50
Variable margin	6928.90	6928.90	6928.90	6928.90	6928.90
As % of total sales	98.00	98.00	98.00	98.00	98.00
Non-variable costs, incl. depreciation	5439.11	5439.11	5439.11	5439.10	5439.40
Operational margin	1489.79	1489.79	1489.79	1489.80	1495.47
As % of total sales	21.07	21.07	21.07	21.07	21.15
Cost of finance	11.57	-0.00	0.00	0.00	0.00
Gross profit	1478.20	1489.79	1489.79	1489.80	1495.47
Allowances	0.00	0.00	0.00	0.00	0.00
Taxable profit	1478.20	1489.79	1489.79	1489.80	1495.47
Tax	369.55	372.45	372.45	372.45	373.87
Net profit	1108.65	1117.34	1117.34	1117.35	1121.61
Dividends paid	0.00	0.00	0.00	0.00	0.00
Undistributed profit	1108.65	1117.34	1117.34	1117.35	1121.61
Accumulated undistributed profit	3417.52	4531.16	5648.50	6765.85	7887.46
Gross profit, % of total sales	20.91	21.07	21.07	21.07	21.15
Net profit, % of total sales	15.68	15.80	15.80	15.80	15.86
ROE, Net profit, % of equity	38.24	38.54	38.54	38.54	38.59
ROI, Net profit+interest, % of invest.	24.05	23.99	23.99	23.99	24.06

Citrus Processing Plant, Palestine --- 1986-07-29, by G.Rosati



Net Income Statement in '000 US \$

Year	1999
Total sales, incl. sales tax	0.00
Less: variable costs, incl. sales tax.	0.00
Variable margin	0.00
As % of total sales	0.00
Non-variable costs, incl. depreciation	0.30
Operational margin	-0.30
As % of total sales	0.00
Cost of finance	0.00
Gross profit	-0.30
Allowances	0.00
Taxable profit	-0.30
Tax	0.00
Net profit	-0.30
Dividends paid	0.00
Undistributed profit	-0.30
Accumulated undistributed profit	7887.16
Gross profit, % of total sales	0.00
Net profit, % of total sales	0.00
ROE, Net profit, % of equity	-0.01
ROI, Net profit+interest, % of invest.	-0.01



COMFAR 2.1 - UNIDO, IC/FEAS, Vienna

Projected Balance Sheets, construction in 000 US \$

Year	1987.1	1987.2	1988.1	1988.2
Total assets	0.00	859.75	2379.23	3892.93
Fixed assets, net of depreciation	0.00	0.00	859.75	2379.23
Construction in progress	0.00	859.75	1519.47	1453.95
Current assets	0.00	0.00	0.00	50.75
Cash, bank	0.00	0.00	0.00	0.00
Cash surplus, finance available	0.00	0.00	0.00	0.00
Loss carried forward	0.00	0.00	0.00	0.00
Loss	0.00	0.00	0.00	0.00
Total liabilities	0.00	859.75	2379.23	3893.93
Equity capital	0.00	859.75	1868.98	2898.95
Reserves, retained profit	0.00	0.00	0.00	0.00
Profit	0.00	0.00	0.00	0.00
Long and medium term debt	0.00	0.00	483.00	966.00
Current liabilities	0.00	0.00	0.00	0.00
Bank overdraft, finance required	0.00	0.00	7.25	28.98
Total debt	0.00	0.00	490.25	994.98
Equity, % of liabilities	0.00	100.00	79.39	74.45

Citrus Processing Plant, Palestine --- 1986-07-29, by D. Rocaat


COMFAR
 2011 UN1000

COMFAR 2.1 - UN100, 10/FEAS, Vienna

Projected Balance Sheets, Production in 1000 US \$

Year	1989	1990	1991	1992	1993	1994
Total assets	3978.33	3969.64	4275.28	4782.95	5432.18	6347.63
Fixed assets, net of depreciation	3274.17	2715.16	2156.15	1597.14	1215.29	1176.81
Construction in progress	0.00	0.00	0.00	0.00	0.00	0.00
Current assets	558.68	660.74	772.45	772.45	833.20	833.20
Cash, bank	55.95	55.95	55.95	55.95	55.95	55.95
Cash surplus, finance available	0.00	339.26	1290.74	2357.41	3327.74	4261.67
Loss carried forward	0.00	89.54	0.00	0.00	0.00	0.00
Loss	89.54	0.00	0.00	0.00	0.00	0.00
Total liabilities	3978.33	3861.64	4275.28	4782.95	5432.18	6347.63
Equity capital	2898.94	2898.94	2898.94	2898.94	2898.94	2898.94
Reserves, retained profit	0.00	0.00	59.69	761.87	1462.73	2305.17
Profit	0.00	155.25	552.17	700.87	842.43	1108.65
Long and medium term debt	966.00	772.80	579.50	386.40	193.20	-0.00
Current liabilities	24.61	29.67	34.87	34.87	34.87	34.87
Bank overdraft, finance required	38.78	0.00	0.00	0.00	0.00	0.00
Total debt	1079.39	802.47	614.47	421.27	228.07	34.87
Equity, % of liabilities	72.87	75.09	67.81	60.51	53.37	45.67

Citrus Processing Plant, Palestine --- 1986-07-29, by D.Rosat

COMFAR 2.1 - UN100, 10/FEAS, Vienna

Projected Balance Sheets, Production in 1000 US \$

Year	1995	1996	1997	1998	1999
Total assets	7464.98	8582.32	9699.67	10821.27	10786.40
Fixed assets, net of depreciation	1138.73	1099.85	1081.77	1028.57	1028.07
Construction in progress	0.00	0.00	0.00	0.00	0.00
Current assets	833.20	833.20	833.20	833.20	121.50
Cash, bank	55.95	55.95	55.95	55.95	0.00
Cash surplus, finance available	5477.50	6597.32	7749.15	8903.55	9676.33
Loss carried forward	0.00	0.00	0.00	0.00	0.00
Loss	0.00	0.00	0.00	0.00	0.00
Total liabilities	7464.98	8582.32	9699.67	10821.27	10786.40
Equity capital	2898.94	2898.94	2898.94	2898.94	2898.94
Reserves, retained profit	3413.82	4531.12	5643.50	6765.85	7887.46
Profit	1117.34	1117.34	1117.35	1121.61	0.00
Long and medium term debt	-0.00	-0.00	-0.00	-0.00	-0.00
Current liabilities	34.87	34.87	34.87	34.87	0.00
Bank overdraft, finance required	0.00	0.00	0.00	0.00	0.00
Total debt	34.87	34.87	34.87	34.87	-0.00
Equity, % of liabilities	38.83	33.78	29.89	26.79	26.88

APPENDIX 3

SENSITIVITY ANALYSIS - SIMULATION I
Selling prices reduced by 10 percentCOMFAR
1986-1990

COMFAR 2.1 - UNICEF, UN/FEAS, Vienna; also UN/FEAS, UN/FEAS

Citrus Processing Plant, Palestine
1986-07-29, by D.Rosati

2 years of construction, 15 years of production

currency conversion rates:

foreign currency 1 unit = 1.0000 units accounting currency

local currency 1 unit = 1.0000 units accounting currency

accounting currency: 1000 US \$

Total initial investment during construction phase

fixed assets:	7977.13	49.971 % foreign
current assets:	50.75	100.000 % foreign
total assets:	7926.38	50.553 % foreign

Source of funds during construction phase

equity & grants:	2998.94	0.000 % foreign
foreign loans:	955.00	
local loans:	0.00	
total funds:	3954.94	24.994 % foreign

Cashflow from operations

Year:	1	5	10
operating costs:	3765.57	5400.53	5400.53
depreciation :	559.01	381.85	32.80
interest :	57.96	22.18	0.00
production costs	4382.54	5905.66	5432.43
thereof foreign	18.77 %	14.98 %	10.95 %
total sales :	3942.54	5767.76	5767.76
gross income :	-527.50	415.20	755.40
net income :	-527.50	312.15	591.33
cash balance :	-477.35	440.35	524.12
net cashflow :	-477.90	556.47	524.12

Net Present Value	at: 10.00 % =	-522.09
Internal Rate of Return:		7.19 %
Return on equity:		-0.72 %
Return on equity:		7.09 %

Index of Schedules produced by COMFAR

Total initial investment	Cashflow Tables
Total investment during production	Projected Balance
Total production costs	Net income statement
Working Capital requirements	Source of finance



COMFAR C.1 - UNIDO, IG/FEAS, Vienna: dec. CAPE 1990E

Cashflow Tables, construction in 1000 US \$

Year	1987.1	1987.2	1988.1	1988.2
Total cash inflow . .	0.00	859.75	1512.23	1492.97
Financial resources .	0.00	859.75	1512.23	1492.97
Sales, net of tax . .	0.00	0.00	0.00	0.00
Total cash outflow . .	0.00	859.75	1519.47	1514.70
Total assets	0.00	859.75	1512.23	1492.97
Operating costs . . .	0.00	0.00	0.00	0.00
Cost of finance . . .	0.00	0.00	7.24	21.74
Repayment	0.00	0.00	0.00	0.00
Corporate tax	0.00	0.00	0.00	0.00
Dividends paid	0.00	0.00	0.00	0.00
Surplus (deficit) . .	0.00	0.00	-7.24	-21.73
Accumulated cash balance	0.00	0.00	-7.24	-29.96
Inflow, local	0.00	859.75	1029.27	1009.96
Outflow, local	0.00	859.75	550.00	511.33
Surplus (deficit) . .	0.00	0.00	479.27	498.63
Inflow, foreign . . .	0.00	0.00	483.00	483.01
Outflow, foreign . . .	0.00	0.00	969.47	1002.90
Surplus (deficit) . .	0.00	0.00	-486.47	-519.89
Net cashflow	0.00	-859.75	-1512.23	-1492.97
Accumulated net cashflow	0.00	-859.75	-2371.98	-3864.95

Citrus Processing Plant, Palestine --- 1986-07-29, by D.Rosati



COMFAR S.A. - UNIDO, COFFEE, Vienna; and CAPE VERDE

Cashflow tables, production in 000 US \$

Year	1989	1990	1991	1992	1993	1994
Total cash inflow	3967.15	4932.74	6768.56	6767.36	6367.36	6767.36
Financial resources	24.51	5.06	5.20	0.00	0.00	0.00
Sales, net of tax	3942.64	4927.68	6763.36	6767.36	6367.36	6767.36
Total cash outflow	4465.01	4995.14	5947.37	5826.96	5927.31	5939.71
Total assets	553.88	102.06	111.71	0.00	60.75	0.00
Operating costs	3852.17	4645.93	5542.13	5542.13	5542.13	5542.13
Cost of finance	57.96	57.96	48.37	34.78	27.18	11.59
Repayment	0.00	193.20	193.20	193.20	193.20	193.20
Corporate tax	0.00	0.00	53.96	56.86	104.05	192.79
Dividends paid	0.00	0.00	0.00	0.00	0.00	0.00
Surplus (deficit)	-497.86	-66.41	421.20	536.40	440.05	423.65
Cumulated cash balance	-526.94	-593.24	-172.05	364.35	804.40	1228.05
Inflow, local	691.50	949.79	1269.42	1264.05	1264.05	1264.05
Outflow, local	3883.29	4157.48	4989.56	4899.29	4947.48	5072.22
Surplus (deficit)	-3201.79	-3303.69	-3721.14	-3671.24	-3679.47	-3769.17
Inflow, foreign	3285.65	4082.94	5100.15	5099.31	5099.31	5099.31
Outflow, foreign	591.72	845.66	957.91	979.69	979.83	997.49
Surplus (deficit)	2703.93	3237.28	4142.24	4119.62	4119.48	4101.82
Net cashflow	-439.90	184.75	650.76	764.37	655.42	629.44
Cumulated net cashflow	-439.90	-255.15	405.61	1169.98	1825.40	2454.84

Citrus Processing Plant, Palestine --- 1986-07-29, cv B.Rosati



COMFAR 2.1 - UNICEF, 10/FEAS, Vienna; doco DAPE VERBE

Cashflow tables, production in 1000 US \$

Year	1995	1996	1997	1998	1999	2000-3
Total cash inflow	6363.36	6363.36	6363.36	6363.36	0.00	0.00
Financial resources	0.00	0.00	0.00	0.00	0.00	0.00
Sales, net of tax	6363.36	6363.36	6363.36	6363.36	0.00	0.00
Total cash outflow	5737.81	5737.81	5737.81	5739.23	-732.78	0.00
Total assets	0.00	0.00	0.00	0.00	-767.65	0.00
Operating costs	5542.13	5542.13	5542.13	5542.13	0.00	0.00
Cost of finance	-3.00	0.00	0.00	0.00	0.00	0.00
Repayment	0.00	0.00	0.00	0.00	34.87	0.00
Corporate tax	195.69	195.69	195.69	197.11	0.00	0.00
Dividends paid	0.00	0.00	0.00	0.00	0.00	0.00
Surplus (deficit)	625.55	625.55	625.54	624.13	732.78	0.00
Cumulated cash balance	1953.59	2479.14	3104.68	3728.81	4461.59	4461.59
Inflow, local	1264.05	1264.05	1264.05	1264.05	0.00	0.00
Outflow, local	5035.11	5035.11	5035.11	5076.53	-648.03	0.00
Surplus (deficit)	-3771.06	-3771.06	-3771.06	-3772.48	648.03	0.00
Inflow, foreign	5099.31	5099.31	5099.31	5099.31	0.00	0.00
Outflow, foreign	702.70	702.70	702.70	702.70	-84.75	0.00
Surplus (deficit)	4396.61	4396.61	4396.61	4396.61	94.75	0.00
Net cashflow	625.55	625.55	625.54	624.13	732.78	0.00
Cumulated net cashflow	-794.53	-159.99	465.56	1090.68	1923.46	1827.46

Citrus Processing Plant, Palestine --- 1986-07-29, by D.Rosati

COMFAR 2.1 - UNICEF, 10/FEAS, Vienna; doco DAPE VERBE

Cashflow Discounting:

a) Equity paid versus Net income flow:			
Net present value	-1672.97	at	10.00 %
Internal Rate of Return (IRREI)	-0.72 %		
b) Net Worth versus Net cash returns:			
Net present value	-533.37	at	10.00 %
Internal Rate of Return (IRREI)	7.29 %		
c) Internal Rate of Return on total investments:			
Net present value	-622.09	at	10.00 %
Internal Rate of Return (IRR)	7.19 %		
Net Worth = Equity paid plus reserves			

Citrus Processing Plant, Palestine --- 1986-07-29, by D.Rosati

APPENDIX 3

SIMULATION II

Raw material cost increased by 10 percent



----- COMFAR 0.1 - UNITED STATES OF AMERICA: Fiscal Year 1985 -----

Citrus Processing Plant, Palestine
1986-07-29, by G. Rosati

2 years of construction, 15 years of production

currency conversion rates:

foreign currency 1 unit = 1.0000 units accounting currency

local currency 1 unit = 1.0000 units accounting currency

accounting currency: 1000 US \$

Total initial investment during construction phase

fixed assets:	3877.18	49.971 % foreign
current assets:	60.75	100.000 % foreign
total assets:	3893.93	50.453 % foreign

Source of funds during construction phase

equity & grants:	3998.94	0.000 % foreign
foreign loans:	966.00	
local loans:	0.00	
total funds:	3864.94	14.794 % foreign

Cashflow from operations

Years:	1	5	10
operating costs:	3999.79	5751.66	5751.66
depreciation :	559.01	781.85	32.80
interest :	57.96	27.18	0.00
production costs	4615.76	6156.69	5784.46
thereof foreign	18.67 %	14.23 %	11.01 %
total sales :	4389.60	7079.41	7079.41
gross income :	-322.76	772.01	1114.44
net income :	-322.76	579.16	959.33
cash balance :	-324.00	707.06	591.13
net cashflow :	-266.04	923.44	591.13

Net Present Value at: 10.00 % = 797.95
Internal Rate of Return: 13.51 %
Return on equity: 8.56 %
Return on assets: 14.47 %

Index of Schedules produced by COMFAR

Total initial investment	Cashflow Tables
Total investment during production	Projected Balance
Total production costs	Net income statement
Working Capital requirements	Source of finance



COMFAR Ltd. - UNIDO, IO/FEAS, Vienna; demo CAPE VERDE

Cashflow Tables, construction in 1000 US \$

Year	1987.1	1987.2	1988.1	1988.2
Total cash inflow . .	0.00	859.75	1512.23	1492.97
Financial resources .	0.00	859.75	1512.23	1492.97
Sales, net of tax . . .	0.00	0.00	0.00	0.00
Total cash outflow . .	0.00	859.75	1519.47	1514.70
Total assets	0.00	859.75	1512.23	1492.97
Operating costs	0.00	0.00	0.00	0.00
Cost of finance	0.00	0.00	7.24	21.74
Repayment	0.00	0.00	0.00	0.00
Corporate tax	0.00	0.00	0.00	0.00
Dividends paid	0.00	0.00	0.00	0.00
Surplus (deficit) . . .	0.00	0.00	-7.24	-21.74
Accumulated cash balance	0.00	0.00	-7.24	-28.98
Inflow, local	0.00	859.75	1009.23	1009.98
Outflow, local	0.00	859.75	550.00	511.90
Surplus (deficit) . . .	0.00	0.00	459.23	498.08
Inflow, foreign	0.00	0.00	457.01	483.01
Outflow, foreign	0.00	0.00	99.47	1002.90
Surplus (deficit) . . .	0.00	0.00	-466.47	-519.89
Net cashflow	0.00	-859.75	-1810.23	-1492.97
Accumulated net cashflow	0.00	-859.75	-2670.18	-3854.95

Citrus Processing Plant, Palestine --- 1986-07-29, by J. Rosen



COMFAR 0.1 - UNIDO, CO/FEAS, Vienna; dem CAPRE VERDE -----

Cashflow tables, production in 1000 US \$

Year	1989	1990	1991	1992	1993	1994
Total cash inflow . .	4407.16	5450.74	7175.10	7070.40	7070.40	7070.40
Financial resources . .	26.56	6.54	6.70	0.00	0.00	0.00
Sales, net of tax . . .	4380.60	5444.20	7070.40	7070.40	7070.40	7070.40
Total cash outflow . .	4731.16	5099.66	6395.93	6267.00	6363.34	6379.74
Total assets	586.81	110.26	120.14	0.00	50.75	0.00
Operating costs	4086.39	4937.24	5893.16	5893.16	5893.16	5893.16
Cost of finance	57.96	57.96	46.37	24.75	23.19	11.59
Repayment	0.00	193.20	193.20	193.20	193.20	193.20
Corporate tax	0.00	0.00	142.97	145.86	193.05	291.79
Dividends paid	0.00	0.00	0.00	0.00	0.00	0.00
Surplus (deficit) . . .	-324.00	182.08	580.27	802.40	707.06	590.66
Cumulated cash balance	-352.98	-170.90	589.37	1312.77	2019.83	2710.49
Inflow, local	756.47	944.15	1409.28	1404.50	1404.50	1404.50
Outflow, local	4104.96	4402.77	5377.73	5277.29	5324.58	5413.32
Surplus (deficit) . . .	-3348.49	-3458.62	-3968.45	-3872.79	-3920.08	-4108.82
Inflow, foreign	3650.69	4536.59	5665.82	5665.90	5665.90	5665.90
Outflow, foreign	626.20	895.39	1015.10	989.01	1038.76	965.42
Surplus (deficit) . . .	3024.49	3640.71	4648.72	4676.89	4627.14	4699.48
Net cashflow	-266.04	457.25	919.84	1001.08	923.44	595.45
Cumulated net cashflow	-4130.99	-3697.74	-2777.91	-1746.53	-823.09	72.36

Citrus Processing Plant, Palestine --- 1989-07-29, by B.Rosati



COMFAR 2.1 - UNIDO, IO/FEAS, Vienna; dem CAPE VERDE -----

Cashflow tables, production in '000 US \$

Year	1995	1996	1997	1998	1999	2000- 3
Total cash inflow . .	7070.40	7070.40	7070.40	7070.40	0.00	0.00
Financial resources .	0.00	0.00	0.00	0.00	0.00	0.00
Sales, net of tax . .	7070.40	7070.40	7070.40	7070.40	0.00	0.00
Total cash outflow . .	6177.85	6177.85	6177.85	6179.27	-779.41	0.00
Total assets	0.00	0.00	0.00	0.00	-817.21	0.00
Operating costs . . .	5893.16	5893.16	5893.16	5893.16	0.00	0.00
Cost of finance . . .	-0.00	0.00	0.00	0.00	0.00	0.00
Repayment	0.00	0.00	0.00	0.00	37.80	0.00
Corporate tax	284.69	284.69	284.69	286.11	0.00	0.00
Dividends paid	0.00	0.00	0.00	0.00	0.00	0.00
Surplus (deficit) .	892.55	892.55	892.55	891.13	779.41	0.00
Cumulated cash balance	3603.04	4495.59	5388.15	6279.28	7058.69	7058.69
Inflow, local	1404.50	1404.50	1404.50	1404.50	0.00	0.00
Outflow, local	5416.22	5416.22	5416.22	5417.64	-687.14	0.00
Surplus (deficit) .	-4011.72	-4011.72	-4011.72	-4013.14	687.14	0.00
Inflow, foreign . . .	5665.90	5665.90	5665.90	5665.90	0.00	0.00
Outflow, foreign . . .	761.63	761.63	761.63	761.63	-92.28	0.00
Surplus (deficit) .	4904.27	4904.27	4904.27	4904.27	92.28	0.00
Net cashflow	892.55	892.55	892.55	891.13	779.41	0.00
Cumulated net cashflow	964.92	1857.47	2750.02	3641.16	4420.57	4420.57

Citrus Processing Plant, Palestine --- 1986-07-29, by D.Rosati

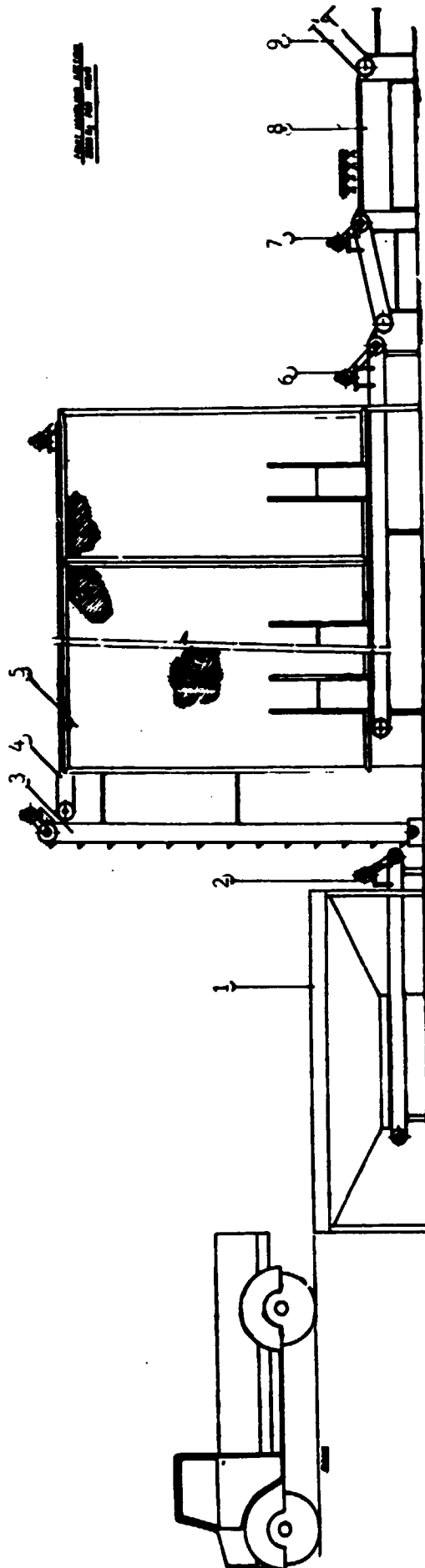
COMFAR 2.1 - UNIDO, IO/FEAS, Vienna; dem CAPE VERDE -----

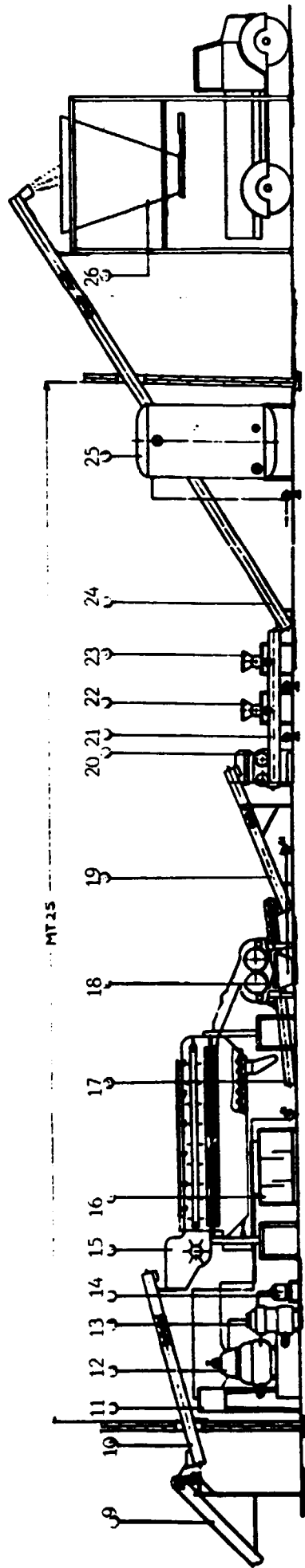
Cashflow Discounting:

a) Equity paid versus Net income flow:			
Net present value	-240.86	at	10.00 %
Internal Rate of Return (IRRE1) ..	8.56	%	
b) Net Worth versus Net cash return:			
Net present value	876.68	at	10.00 %
Internal Rate of Return (IRRE2) ..	14.47	%	
c) Internal Rate of Return on total investment:			
Net present value	727.95	at	10.00 %
Internal Rate of Return (IRR) ..	13.51	%	
Net Worth = Equity paid plus reserves			

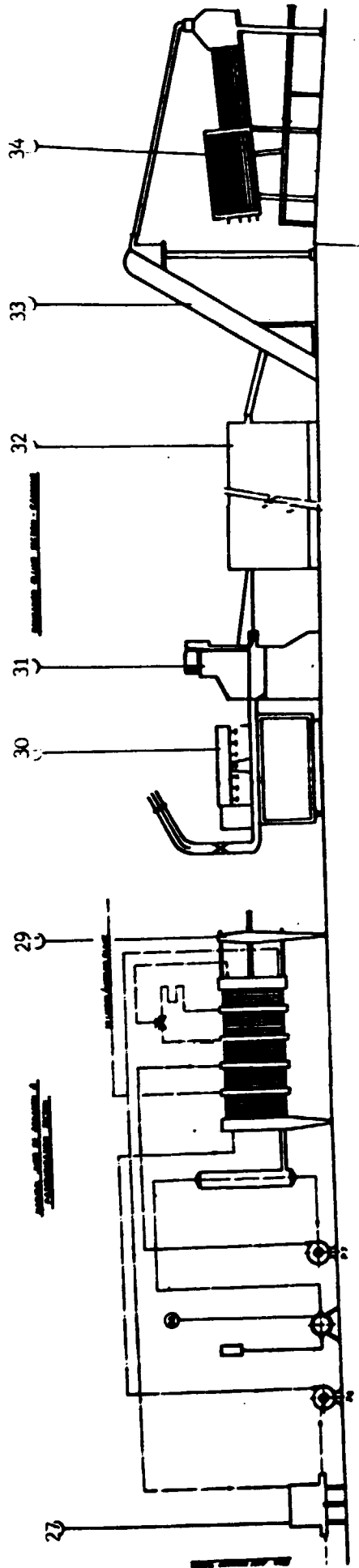
Citrus Processing Plant, Palestine --- 1986-07-29, by D.Rosati

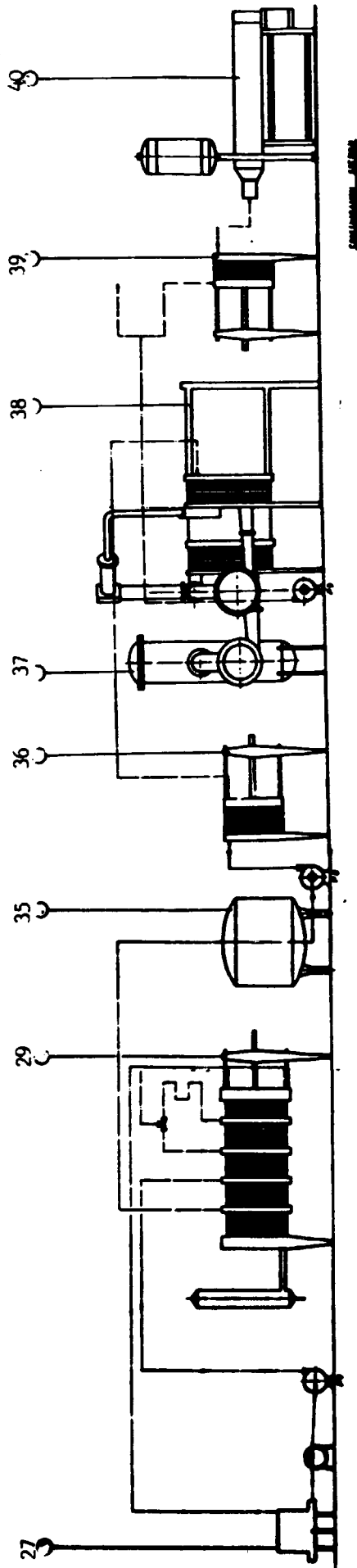
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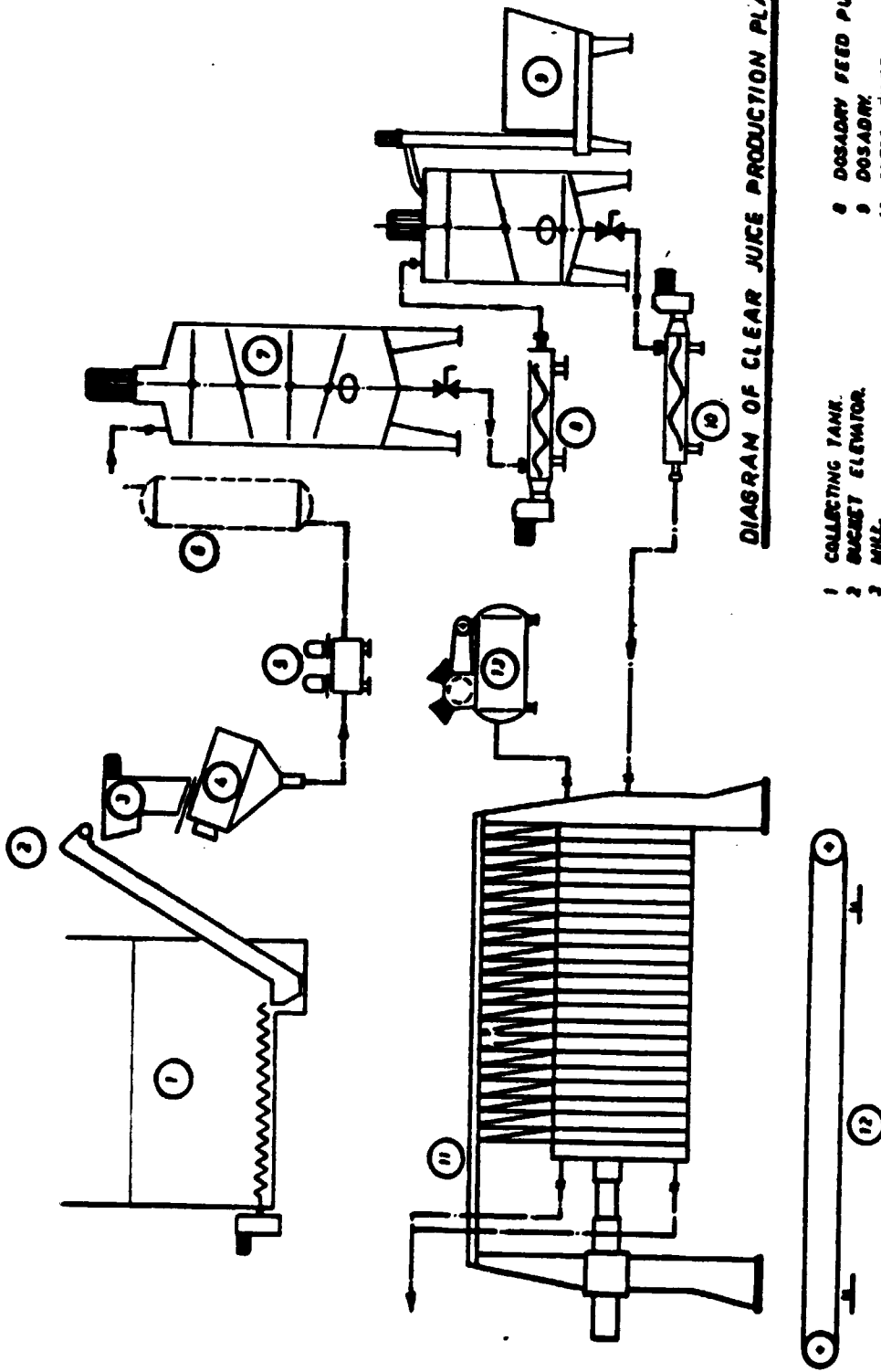


DIAGRAM OF CLEAR JUICE PRODUCTION PLANT

- 1 COLLECTING TANK.
- 2 BUCKET ELEVATOR.
- 3 MILL.
- 4 REFINER - CORER.
- 5 PULP CONVEYANCE PUMP.
- 6 HEATER.
- 7 STORAGE AND MIXING TANK.
- 8 DOSADRY.
- 9 DOSADRY FEED PUMP.
- 10 PRESS FILTER FEED PUMP.
- 11 APPLE PRESS FILTER.
- 12 CAKE CONVEYOR.
- 13 PNEUMATIC STATION.

