

M A R M A R A
FROZEN FRUIT AND VEGETABLE
EXPORT MODEL PROJECT

A PREFEASIBILITY STUDY

Prepared by

AGROTEK LTD., as Contractor

and

TENNECO, INC., as sub - Contractor

for

**THE STATE PLANNING ORGANIZATION
OF THE PRIME MINISTRY
OF THE REPUBLIC OF TURKEY**

and

**THE AGENCY FOR INTERNATIONAL DEVELOPMENT
OF THE UNITED STATES OF AMERICA
(Sub-contract-III, USAID Project No. 298 - 0050)**

February, 1986

AGRÖTEK

TARIM SANAYİ VE TİCARET LİMİTED ŞİRKETİ

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MARMARA FROZEN FRUIT AND VEGETABLE EXPORT

MODEL PROJECT

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MARMARA FROZEN FRUIT AND VEGETABLE
EXPORT MODEL PROJECT

PREAMBLE

The Government of Turkey (GOT), acting through the Minister of State and Deputy Prime Minister and the United States of America, acting through the Agency for International Development (AID) have signed a Grant Project Agreement on September 28, 1984. The Grant Project Agreement was published in the Official Gazette of the Republic of Turkey, its issue number 18689, dated March 9, 1985.

The project title for this Grant Project Agreement was "Agri-Industry Prefeasibility Studies", and the project number is AID Project No. 298-0050.

One of the prefeasibility studies mentioned in that Grant Project Agreement is the "Model Project to Export Frozen Fruit and Vegetables from the Marmara Region". The objective is to use the output of the prefeasibility study, if viable, to interest potential U.S. joint-venture partners and investors from the Gulf Countries.

The GOT authorized the Foreign Investment Department (FID) of the State Planning Organization (SPO), which in turn contracted AGROTEK LTD. (AGROTEK Tarım Sanayi ve Ticaret Limited Şirketi, Ankara-Turkey) as Prime Contractor with an agreement signed by SPO and AGROTEK LTD., on March 29, 1985.

AGROTEK LTD. and TENNECO, INC. (TENNECO, INC., Houston-Texas-U.S.A.)

signed a Sub-contract on April 22, 1985 (SUB-CONTRACT-III) and have agreed to cooperate in conducting this prefeasibility study on " MARMARA FROZEN FRUIT AND VEGETABLE EXPORT MODEL PROJECT ".

The purpose of this prefeasibility study was to test the viability of an integrated investment by a theoretical company, formed as a joint-venture with foreign capital, in the Marmara Region of Turkey. The model project was designed to transfer technology in fruit and vegetable production, their processing, freezing and marketing by the same company, and exporting of 10,000 m tons of packaged products mainly into the European market.

In October 1985, the Aegean and the Marmara Regions were visited with two TENNECO experts and an AGROTEK specialist, and meetings were held with the existing frozen fruit and vegetable producing companies (including the two in Izmir and two in Bursa) during October 1985. Discussions were conducted also with the farmers and cold storage owners, to produce a study as comprehensive and up to-date as possible by using the latest statistical data and financial indicators available. Four U.S. experts for TENNECO and AGROTEK's staff have contributed their efforts to complete this study during the last quarter of 1985 and in January 1986.

The prefeasibility study carried out has shown that such a project is quite viable with an internal rate of return of 28.05%, capital equity pay-back period of less than 2.5 years and a cash break-even point of 4,016 m tons out of the projected 10,000 m tons of annual exports.

A prefeasibility study is of course only the second step in a five-part process for identifying, formulating and implementing a joint-venture project. These are : Opportunity Identification, Prefeasibility Study, Feasibility Study, Joint-venture Company Formation, Project Design and Implementation. Thus, this study will serve as the starting point of a dialogue among interested investors.

AGROTEK LTD. and TENNECO, INC. believe that the objective of this study is fulfilled and hope that it will generate sufficient interest of potential U.S. companies and investors from the Gulf Countries to form a joint-venture company in Turkey and use the findings of this study as a guideline in their negotiations with their Turkish co-partners to complete the next 3 steps, namely the feasibility study, the joint-venture company formation and the project design and implementation.

INTRODUCTION

Turkey annually produces over 20 million m. tons of fresh vegetables and 8 million m. tons of fresh fruits. There is a great potential to increase this production.

The exports of fresh, processed or frozen fruits and vegetables however, are not at a comparative level. Frozen fruit exports of about 2,500 m. tons and frozen vegetables of about 840 m. tons in 1984 are not at all of any importance when compared to over 900,000 m. tons of frozen fruit and vegetable market that exists in Europe alone (See Tables 1, 2 and 6).

The import of frozen fruits into just 5 countries (F.R. Germany, France, Netherlands, Denmark and Italy) for example are about 207,000 m. tons and the import of frozen vegetables into these countries except Denmark are about 458,000 m. tons, to give a total of 665,000 tons, annually (See Table 3). The demand in Europe alone is increasing steadily while domestic production to supply this demand remains limited.

The development in the frozen food handling chain in the Middle East and the Gulf countries increases further Turkey's importance to supply frozen fruits and vegetables for both markets.

Presently in Turkey, there are no more than 2 or 3 plants, that have satisfactory capacity to produce frozen fruits and vegetables. Furthermore, the support equipment capacities of these plants, to remove the kernels and stems of fruits, or grade and cut vegetables for the frozen process, are not suitable to expand their production to any great extent.

Except tomatoes for paste production,vegetables are grown by small farmers and in very small plots (in general not more than 2 hectares). The lack of proper machinery and equipment, the unstable market, and no price guarantee, are the main reasons for holding back the development of large scale field production of vegetables.

The cost of production and losses that occur due to small individual whole-sale market shop owners, are the main reasons to reduce the export potential and competition capabilities of vegetable exporters.

The lack of seeds suitable for the export market and production programs in sufficient quantities to supply the export market on a year-around operation with stable price, quality, satisfactory and yet competitive packing material, under the same brand name, are the main bottle-necks of the vegetable industry in Turkey.

In summary, the lack of centrally located, single large scale purchasing, processing and marketing companies that also organize the production programmes for farmers, is the main reason why Turkey has not been able to increase its frozen fruit and vegetable exports to any great extent, even though it is so centrally located for the near-by importing markets. It is, therefore, our belief, that a model project designed to overcome the above-mentioned bottle-necks, will be very successful and will find multiple implementation sites in Turkey.

Such a project will be implemented in the Marmara region between the cities of Bursa and Balıkesir, where ecological conditions allow a large selection of vegetable varieties to be grown and which is in close proximity to the strawberry and sour-cherry growing areas. This site is also closer to the European market. The implementing organ will be a "Frozen Fruit and Vegetable Export Company" to be established.

Vegetables and annual crops such as strawberries will be produced through the application of contract-farm operations. Cherries and other fruit production will be contracted for at least one crop year and cultivation, irrigation, fertilization, pest and disease control and harvesting will be practiced under the control and technology transfer of the company's farm management team, preferably to farmers who would like to contract their orchards for longer years. The company will also lease land where it will directly produce the crops necessary for its operations.

The produce obtained from the contract farmers or company leased fields will be individually quick frozen, packaged and stored, in the processing (washing, cutting, grading), freezing and deep frozen storage facilities of the company.

These integrated facilities will contain 2 main sections: Processing and Storage Sections.

The produce arriving from the field will be washed, cleaned, sorted, graded, cut into desired sizes; if present, stems and kernels will be eliminated and individually or in blocks, quick frozen at -40°C and packaged according to the export market demand in Processing Sections.

Quick frozen and packaged produce will be stored in frozen storage, in the Storage Section. This section will contain stack-row storage facilities which allows palleted storage, for ease of shipment and stock control.

Commodities produced and processed by the company will be exported under the same brand name, in standard and constant quality control measures and in appealing and attractive packages. The main export market will be the European countries. The Middle-east countries will be explored in accordance to the development of the cold chain in these countries. Transport in exports will be realized by contract basis utilizing refrigerated trucks and/or vessels.

In summary, this model will insure increased yields, low production costs, higher quality produce and an integrated marketing system with proper organization, to at least triple the present frozen fruit and vegetable export volume of Turkey.

TABLE 1

FROZEN VEGETABLES EXPORT FROM TURKEY

Countries	1982			1983			1984			1985 (Jan-Sept.)		
	Q(T)	V(\$)	U.P. (\$/t)	Q(T)	V(\$)	U.P. (\$/T)	Q(T)	V(\$)	U.P. (\$/T)	Q	V	U.P.
F.R.Germany	363	97,847	270	171.6	38,663	225	466.4	135,168	290	1691.0	460,373	272
Austria	--	--	--	--	--	--	19.1	4,657	244	2.1	431	205
Belgium-Lux.	--	--	--	--	--	--	20.0	4,974	249	346.6	90,664	262
Denmark	--	--	--	20.0	5,278	264	15.0	3,882	259	160.0	43,266	270
France	--	--	--	80.3	40,059	499	185.1	84,453	456	184.2	45,482	247
Netherlands	120.0	37,331	311	18.0	4,644	258	71.9	18,895	252	116.2	32,481	280
Iraq	--	--	--	--	--	--	1.5	1,254	836	3.7	5,670	1532
U.K.	--	--	--	--	--	--	5.2	9,412	1810	--	--	--
Sweden	--	--	--	18.0	4,719	264	20.0	3,937	197	0.6	347	578
Switzerland	--	--	--	27.7	9,809	354	14.5	32,157	2217	--	--	--
Greece	--	--	--	--	--	--	16.2	11,840	731	--	--	--
Cyprus	--	--	--	--	--	--	--	--	--	27.1	18,780	693
Kuwait	--	--	--	--	--	--	--	--	--	0.1	18	180
S.Arabia	--	--	--	--	--	--	--	--	--	6.0	2,947	491
Jordan	--	--	--	--	--	--	--	--	--	100.0	20,000	200
TOTAL	483.0	135,178		335.6	103,202		837.9	310,629		2637.4	720,459	

Q =Quantity in metric tons

V =Value in U.S. Dollars (FOB)

U.P.=Unit price in U.S.Dollars/metric tons.

Source: Undersecretariate of Treasury and Foreign

Trade of the Prime Ministry of the Republic of Turkey.1985.

FROZEN FRUITS EXPORT FROM TURKEY

Countries	1982			1983				1984			1985 (Jan-Sept.)		
	Q(T)	V(\$)	U.P. (\$/T)	Q	V	U.P.	Q	V	U.P.	Q	V	U.P.	
F.R.Germany	1843.4	1,080,185	586	2728.2	1,602,149	590	1268.5	696,700	549	1287.6	736,473	572	
Austria	110.7	50,831	459	--	--	--	--	--	--	44.0	26,750	608	
Belgium-lux.	136.3	77,843	571	224.3	106,215	474	22.7	15,211	671	56.4	35,323	626	
Denmark	--	--	--	--	--	--	17.0	5,429	319	40.0	25,533	640	
France	417.5	285,249	683	569.3	312,182	548	516.1	372,564	722	352.4	294,173	796	
Netherlands	555.7	439,356	791	1021.0	663,315	650	179.1	100,910	563	218.5	125,286	573	
Iraq	--	--	--	--	--	--	1.5	3,462	2308	2.0	3,097	1549	
U.K.	159.3	137,970	866	633.3	473,080	742	245.3	165,371	673	409.2	286,821	701	
Sweden	60.0	51,338	866	1.2	643	536	17.2	1,413	257	75.3	54,070	718	
Switzerland	--	--	--	1005.9	556,722	554	26.0	62,265	649	63.8	43,311	637	
Italy	--	--	--	100.0	21,101	911	--	--	--	20.0	5,036	252	
Lebanon	15.4	5,804	377	20.6	10,000	485	--	--	--	--	--	--	
Norway	--	--	--	40.0	30,124	755	--	--	--	--	--	--	
S.Arabia	109.2	103,250	946	101.3	119,970	1184	141.6	99,109	700	115.6	71,503	619	
Greece	--	--	--	44.8	14,861	332	--	--	--	--	--	--	
Kuwait	--	--	--	--	--	--	--	--	--	160.0	96,332	602	
TOTAL	3407.5	2,232,435		6490.4	3,984,431		2505.5	1,525,434		2,861.8	1,804,368		

Q =Quantity in metric tons

V =Value in U.S. Dollars (FOB)

U.P.=Unit price in U.S.Dollars/metric tons.

Source: Undersecretariate of Treasury and Foreign

Trade of the Prime Ministry of the Republic of Turkey, 1985.

TABLE : 3

IMPORTS OF FROZEN FRUITS AND VEGETABLES INTO SOME EUROPEAN COUNTRIES

	FRUITS (m Ton)			VEGETABLES (m Ton)		
	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
F.R.Germany	90,560	97,200	105,850	142,810	145,910	205,390
France	33,640	36,680	40,300	98,190	116,460	135,870
Netherlands	29,530	28,450	39,300	44,090	36,860	65,510
Denmark	9,940	10,890	15,700	12,510	13,940	15,980
Italy	<u>3,150</u>	<u>6,280</u>	<u>5,610</u>	<u>32,460</u>	<u>20,380</u>	<u>35,690</u>
TOTAL	166,820	179,500	206,760	330,060	333,550	458,440

Source : Foodnews, 1984, 1985.

1. SITE SELECTION

The southern coast of the Marmara Sea is selected as a region; where such an investment should be made.

The selected region is well developed, with good infrastructure, irrigation water availability and the farmers' adaptability to contract farming and experience in horticultural crop production.

1.1. GEOGRAPHICAL INFORMATION

The 3 provinces in the region, Bursa, Balıkesir and Çanakkale are rather heavily populated and the people are hard working and industrious.

Geographical data of the region selected, may be found in Annex(1).1.

A map of Turkey and a map of the region is also given at the end of Annex (1) .1.

1.2. METEOROLOGICAL INFORMATION

The climate of the region is on the warm side of the temperate zone (Transition Zone). Precipitation has an average of 660 mm per annum. The mean temperature is 14.4°C , with extreme high of 43.7°C and extreme low of -25.7°C . Mean soil temperature is 16.6°C and the mean insolation period is 7 hours and 10 minutes. The region has a mean humidity of 69.3 percent. The mean vapor pressure is 11.9 milibars with a mean evaporation of 1,248 mm. The mean wind velocity is 3.5 m/second, annually.

Severe weather phenomena are rare in this area. Freeze and frost conditions do not contribute to important economic losses. Occasional hail damage causes minimal economic loss. A detailed meteorological data for the region is compiled in Annex (1).2.

1.3. INFRASTRUCTURE OF THE REGION

The good to excellent highways in the region interconnect the Aegean region and the central western parts of Anatolia to the Marmara Sea and the Metropolitan area of Istanbul. Thus, there is intensive traffic. Çanakkale, with two ferry boat lines, connects Asia to Europe over the Dardanelles. Balıkesir is a transit center, and Bursa, a cultural and industrial center links western Anatolia to Istanbul, again with ferry lines from the port of Yalova and hydrofoil boats from the port of Mudanya.

Bandırma, Turkey's newest port, and Çanakkale port are also main connecting points with Metropolitan İstanbul via Turkish and international maritime and cargo lines. Bandırma is 110 kms from Bursa, 100 kms from Balıkesir and 185 kms from Çanakkale. Eceabat, Biga and Gemlik are small ports serving the marine lines.

There is a small airport in Bursa, from which a private airline company flies twice daily to İstanbul. İstanbul and İzmir International Airports are also in close proximity to the region.

Surface and underground water is quite abundant. Small dams and irrigation canals in the plains are quite satisfactory. The drinking water quality and quantity is satisfactory in all of the cities in the region.

Electrical energy is supplied by the interconnected system linking all of the power plants throughout Turkey. The industrial energy is purchased from the State owned agency called TEK (Turkish Electricity Association).

A good telecommunication system exists with automatic dialing telephone and telex. Mail services and telegrams are all serviced by the State owned PTT (Mail-Telephone and Telegram).

1.4. AGRICULTURAL PRODUCTION IN THE REGION

All of the species of the temperate climatic zone are and can be successfully grown in the region. The sugar industry (State owned) and tomato paste industry (private sector companies) have been very active in this region with contract farming. The farmers are willing to grow commodities on contract farming, if they know that there is a serious buyer and that they will be benefiting if they grow good quality produce.

Recently, large scale operations in dairy and meat cattle production and integrated poultry operations are developing in the project region. Horticultural produce is also a very important component of the income of the rural areas.

TABLE : 4

PRODUCTION OF PROJECT RELATED VEGETABLES AND FRUITS IN THE REGION (mTon)

<u>TOTAL OF PROJECT REGION</u>			
<u>FRUITS</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>
Apricot	1,497	1,649	1,554
Cherry	9,707	10,576	9,672
Peach	123,140	114,730	104,754
Sourcherry	3,517	3,529	3,560
Mulberry	2,586	2,918	3,562
Fig	5,596	5,480	6,156
Strawberry	<u>18,063</u>	<u>17,194</u>	<u>15,702</u>
SUB-TOTAL	164,106	156,076	144,960
 <u>VEGETABLES</u>			
Spinach	14,594	15,218	21,197
Leek	40,276	2,284	42,974
Celery	1,855	56,196	2,180
Leguminous Veg.	53,228	28,338	59,055
Okra	3,763	3,555	3,899
Bell pepper	58,060	46,441	54,172
Carrot	4,331	4,011	2,622
Cauliflower	<u>6,659</u>	<u>7,886</u>	<u>7,634</u>
SUB-TOTAL	182,766	163,929	193,733

Source : SIS (State Institute of Statistics)

Annex(1).3 contains more detailed information about the agricultural products of this region.

1.5. EXISTING FACILITIES IN THE REGION

There is only one plant in the project region that has facilities to freeze fruits and vegetables; this is the BIDAŞ company in Bursa. BIDAŞ is all hand labor handling for the processing, and is only capable of freezing the commodities in bulk in the shock tunnel of -40°C , within 10-25 kg cases. Frigopak plant is still under construction and will become operational in frozen products in the next season.

The locations and capacities of all the plants capable of freezing fruits and vegetables are listed in Table : 5

TABLE : 5

FROZEN FRUIT AND VEGETABLE PROCESSING PLANTS IN TURKEY

<u>Firm</u>	<u>Location</u>	<u>Capacity</u>
Meybuz	Kayseri	Block Freezing Unit : 80tons/24hours
		(IQF)Flow Freezing Unit : 60tons/24hours
		Carto Freezing Unit : 120tons/24hours
		Frozen Storage(-30°C): 20,000 tons
Frigosan	İstanbul	Freezing Tunnel : 21tons/day
		Block Freezing Unit : 10 tons/day
		Frozen Storage(-18°C): 1,500 tons
Çukurova Gıda San.	İzmir	Freezing Tunnel : 50 tons/day

Devşan Gıda San.	Adana	Block Freezing Unit : 30tons/day Frozen Storage(-18°C): 2,000 tons
Frostar	İzmir	(IQF)Flow Freezing Unit : 24tons/24hours Frozen Storage(-18°C): 500 tons
Bidaş	Bursa	Block Freezing Unit : 20tons/24hours Frozen Storage(-18°C): 500 tons
Frigopak (Under construction)	Bursa	Block Freezing Unit : 10tons/24hours (IQF)Flow Freezing Unit : 60tons/24hours Frozen Storage(-18°C): 2,000 tons

1.6. OTHER FACTORS OF SELECTION

All the regions growing fruits and vegetables are the possible establishment areas for a frozen fruit and vegetable production plant. These regions are firstly the Marmara Region and then the Mediterranean and Central Anatolia Regions. Other factors affecting the selection of the Marmara Region are the following;

1-Huge fruit and vegetable growing potential of the region which needs to be tapped with improved technology transfer.

2-Close destination to Afyon and Kütahya provinces, the greatest source of cherry growing region of Turkey.

3-Longer vegetative growing period, typical to the temperate zone allows a longer harvesting period, which causes relatively cheaper farm-gate prices due to higher yields, as compared to the early or late harvest prices of the Mediterranean subtropical zone.

4-Close destination to İstanbul, Turkey's largest city and biggest trade-center.

5-Closer destination to target European export countries.

6-Comparatively better infra-structure facilities of the region.

7-Already existing export seaports in the region for the direct shipment of the products via frozen transport vessels.

2- EXPORT MARKET SURVEYS

Consumption of frozen fruit and vegetables is so minimal and even said to be non-existent in Turkey. This is due to lack of widespread utilization of deep-freezes in retail stores and households; thus, the cold-chain is not yet established. The demand for frozen fruit and vegetables is expected to be raised soon, because of recent increases in the production and supply of deep-freezes in Turkey.

On the other hand, consumption of frozen fruit and vegetable by households and the food sector in Europe and U.S. is habitual and growing each year. Especially in Western Europe the consumption trend is rapidly increasing. Increase in per capita consumption of frozen fruit and vegetable for some selected European countries is shown below ;

<u>PER CAPITA CONSUMPTION (KG)</u>			
<u>Country</u>	<u>1970</u>	<u>1982</u>	<u>% Increase</u>
F.R. Germany	3.4	9.6	182
France	1.6	9.9	519
U.K.	7.3	17.4	138
Sweden	12.4	20.2	163
Denmark	6.2	15.3	147
Netherlands	3.5	13.5	286
Belgium-Lux.	2.0	8.0	300

Source : Food News.

2.1. OVERALL POTENTIAL OF THE MARKET

Western European countries will be the main target markets for the frozen fruits and vegetables. Middle-East and Gulf countries are the future potential export markets because of their ever growing cold-chain and increasing imports of frozen fruits and vegetables (especially Kuwait and Saudi Arabia).

Twelve European countries' total frozen fruits and vegetables imports have increased up to \$ 623,530,000 in 1984, while it had been \$ 561,920,000, in 1980. During the same period, import volume increased from 599,730 mtons to 964,440 mtons. Frozen fruit and vegetable import quantities of these countries in 1982 to 1984 are shown in Table 6.

From the limited statistical data available on comparative import/export prices, we were able to compile Table :7 , which includes most of the commodities selected to be produced and their present market values as supplied from competing producing countries in the target markets.

TABLE : 6

IMPORTS OF FROZEN FRUITS AND VEGETABLES INTO SOME EUROPEAN COUNTRIES

<u>Countries</u>	<u>FRUITS (m Ton)</u>				<u>VEGETABLES (m Ton)</u>			
	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>%</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>%</u>
Austria	8,530	7,250	10,400	3.88	7,560	7,440	8,570	1.23
Belgium-Lux.	11,630	12,800	13,200	4.93	43,560	50,510	55,350	7.95
Denmark	9,940	10,890	15,700	4.86	12,510	13,940	15,980	2.29
Finland	3,590	2,760	4,200	1.57	1,910	1,710	2,400	0.34
France	33,640	36,680	40,300	15.05	98,190	116,460	135,870	19.50
F.R.Germany	90,560	97,200	105,850	39.52	142,810	145,910	205,390	29.49
Italy	3,150	6,280	5,610	2.09	32,460	20,380	35,690	5.12
Netherlands	29,530	28,450	39,300	14.67	44,090	36,860	65,510	9.40
Norway	3,020	2,340	3,400	1.27	0,140	1,250	2,360	0.34
Sweden	6,850	6,440	6,660	2.49	9,890	10,330	12,230	1.76
Switzerland	8,830	8,010	9,460	3.53	6,310	6,640	6,830	0.98
U.K.	11,920	15,040	13,780	5.14	140,940	148,690	150,400	21.60
TOTAL	221,190	234,140	267,850	100.00	540,370	560,120	696,580	100.00

Source : ITC, (UNCTAD-GATT), Import Tabulation System, Country Ranking and Import Analyses Tables, 1982, 1983, 1984.

TABLE : 7

SOME ACTUAL EXPORT / IMPORT PRICES FOR
FROZEN FRUITS AND VEGETABLES IN THE MARKET

<u>Product</u>	<u>Unit Price^x</u> <u>(US\$/mton)</u>	<u>Remarks</u>
Cauliflower	1,189	CIF-Canadian importers from France
Cauliflower	1,005	Duty-paid-Canadian importers from France
Cauliflower	1,099	FOB-Vancouver for domestic supply
Cauliflower	1,048	Duty-paid-U.K. import
Broccoli	851-892	FOB-Block frozen from Italy to W.Germany
Broccoli	1,280-1,300	Duty-paid-from Taiwan for Europe
Broccoli	905-944	FOB-Block Frozen-from Italy to U.K.
Carrot	437	CIF-Belgium Import
Pepper	770	CIF-From Portugal to N.America
Potatoes	655	CIF-Netherland's annual average export value
Strawberry	1,079	Duty-paid-From Poland to U.K.

(*) : Calculations based on Exchange Cross Rates on Jan.15,1985

1 US\$: 2.7789 HFL

1681.65 Lir.

2.4675 DM

7.5701 FF

1.4045 C\$

50.3482 B/L FR

0.6952 £ U.K.

Source: Food News Jan.11,1985, March 29,1985, Apr.5,1985, Oct.25,1985.

2.2. SELECTION OF TARGET MARKETS

The twelve European Countries shown in Table : 6, will be the target markets of the project. Three of them, selected as major target markets due to their considerable share in the import market and their already existing fair trade relations with Turkey. These countries are W. Germany, United Kingdom and Netherlands with their respective import market shares of 29.4 %, 21.6 % and 9.4 % of all of Europe.

In the mean time, Gulf-countries will be the secondary target markets with their steadily increasing imports from Turkey. Other importing countries such as Canada may also develop into a target market in the future.

2.3. TRADE BEHAVIOURS OF IMPORTERS

These are the expectations of the importers of frozen fruits and vegetables from another trading party ;

- Same trade mark for delivered goods with each delivery
- Standardized and stable quality of the product
- High quality products
- Packaging in consumer packages (0.5- 1 kg)
- IQF Frozen fruits and vegetables
- Planned and scheduled delivery of the products
- Stable and regular supply capacity each year
- Exporter to be the producer of the product

- Long term contract and cooperation instead of independent short term contracts and/or spot sales .
- Flexibility to supply varieties and species of fruits and vegetables according to the demand of the market.

2.4. COMMODITY BASED IMPORT QUALITIES, QUANTITIES AND PRICES IN THE TARGET MARKETS

Target market countries are importing a variety of frozen fruits and vegetables varying in quantity, quality, and price from various sources. Equilibrium price of a product in the market depends primarily on its quality, and then its processing and packaging systems. Commodities frozen with IQF system are receiving higher prices than the commodities frozen through the Block freezing system. As an example, import prices of frozen fruits and vegetables of W. Germany for various forms of freezing and packaging are illustrated below ;

<u>Product</u>	Form: Block Frozen min. 10kg <u>Package (\$/Ton)</u>	IQF in 1 kg Packages <u>(\$/Ton)</u>
Leeks	348	512
Broccoli	696	998
Bell Pepper	648	991
Strawberry	860	1,086
Cherries	1,000	1,600

Processing features have special importance in pricing a product. It is a fact that a higher price is received from calyx removed strawberries as compared to strawberries with the calyx on, and destemmed and depitted sourcherries as compared to whole sourcherries

with the stem on. Peeled, cut and/or precooked frozen potatoes yield higher prices than other forms of processed potatoes.

In summary, the price of a product is determined mainly by the following quality factors :

	<u>Higher Prices</u>	<u>Lower Prices</u>
Freezing Method	IQF	Block
Packaging	1/2-1kg	10 kg
Processing	Calyx, kernel and stem removed and/or peeled	Whole-unprocessed
Precooking	Precooked	Uncooked

Various price levels can be found for a variety of a fruit/vegetable depending on its level of processing. As an example, variation in sour-cherry import prices based on the level of processing, are illustrated below :

	<u>\$/Ton</u>
With stem and with pits, Block frozen, 10 kg Package	700
Destemmed and with pits, Block frozen, 10 kg Package	750
Destemmed and depitted, Block frozen, 10 kg Package	800
With stem and with pits, IQF, 1 kg Package	1,000
Destemmed and with pits, IQF, 1 kg Package	1,100
Destemmed and depitted, IQF, 1 kg Package	1,600
Destemmed and depitted, IQF, 1/2kg Package	1,700

Turkey's exports of frozen fruits and vegetables have been realized at lower prices, as compared to the market prices. However, as can be seen in Table 7, frozen fruit and vegetable export prices can be higher if the products are of high quality, properly packaged and frozen by the IQF system. When determining the suggested project CIF export prices in Section 3, these actual first-quality product prices in the market were analyzed and in order to be competitive in the market, project prices are kept lower than the actual values.

2.5. MAJOR COMPETING COUNTRIES

Selected major target countries' domestic producers of frozen fruits and vegetables are the major competitors of the project. For example, U.K. imported 164,180 mtons of frozen fruits and vegetables and produced approximately the same amount and also exported 18,176 mtons in 1983. One of the major producers and exporters of frozen vegetables, is the Netherlands with its imports of 65,510 tons and exports of 139,405 tons of frozen vegetables.

Major competing European countries from Eastern Europe, are Poland, Yugoslavia and Hungary with their respective exports of 40,140, 19,081 and 15,760 mtons of frozen fruits and vegetables in 1983. Taiwan, Canada and U.S.A. are the overseas competitors in the Western European market.

Major countries exporting to Western Europe and their export volumes are illustrated in Table 8.

TABLE : 8

EXPORTS OF FROZEN FRUITS AND VEGETABLES INTO SOME EUROPEAN COUNTRIES

	1983 (in metric tons)		
	<u>FRUITS</u>	<u>VEGETABLES</u>	<u>TOTAL</u>
<u>Netherlands</u>	6,652	139,405	146,057
F.R.Germany	6,258	24,496	
Denmark	31	--	
Italy	363	931	
Sweden	--	207	
France	--	35,521	
Ireland	--	9,912	
U.K.	--	68,338	
<u>Belgium-Lux.</u>	--	114,651	114,651
Netherlands	--	7,855	
France	--	52,373	
U.K.	--	24,423	
F.R. Germany	--	22,237	
Ireland	--	7,763	
<u>F.R. Germany</u>	8,266	37,598	45,864
Netherlands	4,711	6,497	
Italy	3,555	--	
France	--	11,526	
Ireland	--	648	
U.K.	--	18,927	
<u>Poland</u>	30,859	9,281	40,140
F.R.Germany	20,672	8,962	
Denmark	3,577	--	
France	4,774	--	
Netherlands	1,836	--	
Sweden	--	319	
<u>Italy</u>	9,352	24,606	33,958
F.R.Germany	639	9,465	
France	8,686	7,758	
Netherlands	27	1,803	
Sweden	--	355	
U.K.	--	5,225	

Table 8 continued

1983 (in metric tons)			
	<u>FRUITS</u>	<u>VEGETABLES</u>	<u>TOTAL</u>
<u>Yugoslavia</u>	10,254	8,827	19,081
F.R.Germany	3,959	6,090	
Italy	1,058	--	
Denmark	567	--	
Netherlands	4,670	2,737	
<u>U.K.</u>	1,446	16,730	18,176
F.R. Germany	866	--	
Denmark	204	--	
France	376	19	
Ireland	--	14,598	
Italy	--	2,113	
<u>France</u>	--	16,828	16,828
Netherlands	--	1,117	
U.K.	--	13,322	
Italy	--	2,389	
<u>Hungary</u>	3,820	11,940	15,760
F.R.Germany	2,180	9,892	
Denmark	1,640	--	
Netherlands	--	312	
U.K.	--	193	
Sweden	--	1,543	
<u>Spain</u>	7,118	6,637	13,755
F.R.Germany	489	1,880	
France	4,482	2,465	
Netherlands	1,747	--	
U.K.	--	2,292	
<u>Denmark</u>	--	12,831	12,831
F.R.Germany	--	6,568	
Italy	--	6,263	

Continued on the next page

Table 8 continued

1983 (in metric tons)			
	<u>FRUITS</u>	<u>VEGETABLES</u>	<u>TOTAL</u>
<u>Taiwan</u>	--	6,165	6,165
Netherlands	--	2,714	
F.R.Germany	--	1,973	
U.K.	--	350	
Italy	--	232	
France	--	896	
<u>Canada</u>	5,509	170	5,679
Netherlands	1,283	170	
F.R.Germany	3,459	--	
Belgium-Lux.	35	--	
France	691	--	
Italy	41	--	
<u>U.S.A.</u>	4,497	--	4,497
Netherlands	1,335	--	
Belgium-Lux.	41	--	
F.R.Germany	1,276	--	
U.K.	1,845	--	
<u>Czechoslovakia</u>	2,561	--	2,561
F.R.Germany	644	--	
Netherlands	1,189	--	
Denmark	728	--	
<u>Norway</u>	1,861	--	1,861
F.R.Germany	1,861	--	
<u>GRAND TOTAL</u>	<u>92,195</u>	<u>405,669</u>	<u>497,864</u>

Source : Food News, 1984-1985.

Foreign Agricultural Service (FAS), USDA, Washington D.C.

2.6. EXPORT POTENTIAL OF THE COMPANY TO THE TARGET MARKETS

As mentioned in previous sections, there exists over 900,000 mtons of frozen fruits and vegetables market in Europe alone. Due to steady development in the frozen food handling chain in Middle-East and Gulf countries, a potential market in these countries is also expected.

It will be possible to export more than the targeted quantity of 10,000 mtons of frozen fruits and vegetables annually, if the export oriented company to be established, successfully produces high quality products, properly processed and packaged. Following the period of penetration into the market, if the demand for the companies' products increases, operating the processing lines with two or three shifts, the volume of export can also increase accordingly.

2.7. STRATEGIES AND RECOMMENDATIONS

Turkey's frozen fruit and vegetable export figures are given in Tables 1 and 2. Analyzing this information, it can easily be concluded that Turkey's export is very poor, both in quantity and in unit price, because of irregular and fluctuating supply of unstandardized products to the export market.

Given the more advantageous conditions, existing facilities immediately cut the production of frozen fruit and vegetable and process meats or fishes for that year to maximize their short-run profits. Therefore Turkey's competitive power in the export market and long-run profits decreases to a great extent.

Also, due to lack of precooling in the system, the existing plants are producing lower quality products with lower prices for the export market. An exporter who can overcome these bottle-necks, will be able to receive higher prices for their continuous and larger volume of exports.

3. ASSESSMENT OF DELIVERED PRICES AND PROFIT MARGINS

According to the market analyses, average import prices of the target market countries for high quality frozen fruits and vegetables in consumer packages are :

		<u>\$/Metric Ton</u>
Bell Peppers	IQF 1 kg Packaging	900 - 1,000
Broccoli	IQF 1 kg Packaging	900 - 1,000
Cauliflower	IQF 1/2- 1 kg Packaging	900 - 1,000
Okra	IQF 1/2 kg Packaging	1,200 - 1,500
Sliced Leeks	IQF 1 kg Packaging	500 - 600
Diced Carrots	IQF 1/2 - 1 kg Packaging	500 - 600
Diced Potatoes	IQF 1 kg Packaging	400 - 500
Strawberries (no calyx)	IQF 1/2 - 1 kg Packaging	1,100 - 1,400
Sour cherries (depitted)	IQF 1/2 , 1 kg Packaging	1,500 - 1,700

On the other hand, expected CIF export prices of the project are calculated as follows :

	<u>\$/m ton</u>
Bell Peppers	700
Broccoli	800
Cauliflower	800
Okra	1,200
Sliced Leeks	400
Diced Carrots	400
Diced Potatoes	400
Strawberries	1,000
Cherries	1,200

Given these export prices, project's average profit margin will be 15.4 % during the credit amortization period and 22.2 % after that period (See Financial Analyses Section).

4. CONTRACT FARMING

4.1. CONTRACT FARMING OPERATION

Vegetables and annual crops, such as strawberries, will be produced through the implementation of contract-farm operations. Cherries and other fruit production will be contracted for at least one crop year and cultivation, irrigation, fertilization, pest and disease control and harvesting will be practiced under the control and technology transfer of the company's farm management team, preferably to farmers who would like to contract their orchards for longer years. The company will also lease land where it will directly produce especially new and high priced crops necessary for its operations. The production technology and programmes will be set up by the company and transferred to the contract farmers through the horticultural experts (extension team) of the company. Farmer training and control of orchards and fields will be the main responsibility of the company's extension team. Vegetable seeds and reproduction material suited to the export market demands, will either be imported or domestically obtained by the company and distributed to contract farmers. Fertilizers, pest and disease control chemical compounds will be similarly obtained and/or partially financed by the company. The company will also establish a farm machinery pool suited for large field operations of vegetable and fruit production. The machinery and equipment will be operated by the company on a lease basis to the contract farmers.

The contract with the farmers will include a minimum base price guarantee and will further give incentives and premiums to those farmers who are successful in yield and in quality production. The contract farmers may also be given an extra bonus as a premium in addition to the guaranteed base price if the company realizes a very successful export programme with large profit margins.

4.2. SIZE AND CAPACITY

Project is planned to export 10,000 m tons of frozen and packaged fruit and vegetables annually. In order for this processed product to be at demanded quality standards, contract farmers and the company should produce 16,335 m tons of fresh fruits and vegetables. 14,315 m tons of this produce will be vegetables and annual crops such as strawberries and the remaining 2,025 m tons will be tree crops such as cherries.

There will be 80 to 100 contracted farmers. Each contract farmer should on the average, be able to produce 100 to 150 m tons of produce. But this quantity depends on the variety of the product to be planted. Each potential contract farm can produce 200 - 250 m tons of potatoes, carrots and leeks, but, just 30 - 40 tons of strawberries, bell peppers and okra. The company can also produce a part of the produce on leased land.

4.3. SYSTEM

4.3.1. Incentives

In addition to the base payment, a promotion premium will be paid to the contract farmers who are adapting well to the contract farming system, properly applying the technology transferred and producing high quality products which will increase the export volume and sales price, committing to the contract terms, working in cooperation with the company's extension team and being a good example to other contract farmers.

\$ 138,900 premium for contract farms is recommended in the annual operating costs for the export capacity of 10,000 mtons of the product. (See Section 10.2.3)

4.3.2. Supports

Supports to the contract farmers will consist of :

4.3.2.1. Procurement of Seeds and Plantlets :

In order to produce high yields and specific varieties demanded by the export markets, high quality seeds and/or plantlets non-existent in Turkey, will be imported and distributed to contract farms on credit. Cost of seeds and plantlets will be deducted from the payments to the contract farmers for their produce.

4.3.2.2. Procurement of Fertilizers and Plant Protection Chemicals :

Special fertilizers, such as liquid fertilizer, and plant protection chemicals non-existent in Turkey will be imported and distributed to contract farms on credit. Cost of fertilizers and chemicals will be deducted from the sale price of delivered produce.

4.3.2.3. Procurement of Special Agricultural Farm Equipment :

Special seeding, planting, spraying, hoeing and harvesting machinery and equipment will be procured in order to maximize the quantity and quality of the crops obtained from the unit area, to maximize the cultivated lands, and to minimize the harvesting and transportation (from farm to the plant) losses. These machineries will either be imported or be ordered from domestic manufacturers by the company. Machineries will be leased to the contract farmers who are not able to purchase them, and rent will be deducted from the payments to the contract farmers.

In order to finance the supports explained in sections 4.3.2.1. and 4.3.2.2., \$ 185,000 is reserved from the annual operating costs (Section 10.2.3), \$ 50,000 expenditure is allocated for the procurement of special agricultural farm equipment within the total investment costs (Section 9).

4.3.3. Extension (Technology Transfer)

Production of high quality crops, maximization of yield, and introduction and adaptation of new varieties are the objectives of the extension work. Technology transfer will include soil tillage for the preparation of the seed-bed, seeding-planting, hoeing, spraying, irrigation, and harvesting techniques.

The field team of the company, headed by a field manager, consisting of five field specialists and seven field technicians will transfer the new technology to the contract farmers. For the operations of the field team, five 4-Wheel Drive Vehicles will be purchased, and this item is included in the investment budget (Section 9). Annual personnel costs to provide this extension service, will be \$ 90,764. (Section 10).

4.3.4. Model Contract

In general, the following articles will be included in the contract.

4.3.4.1. Undertakings of the Company

- a- Company will guarantee to purchase all the crops produced from the contracted area.
- b- Declaring that crops will be purchased at a guaranteed price announced before seeding.
- c- Contract farmers producing high quality crops (identified by the company) will be paid an additional premium or a bonus.

- d- Technology related to production will be transferred.
- e- Special seeds will be distributed to the farmers and cost of seeds will be deducted from the payments to the farmers.
- f- Special fertilizers and spraying chemicals will be distributed to the farmers and cost of fertilizers and chemicals will be deducted from the payments to the farmers.
- g- Special agricultural farm equipment not available on the market will be leased to the farmers and rent will be deducted from the payments to the farmers.

4.3.4.2. Undertakings of the Farmer

- a- All the crops cultivated on the contracted area will be guaranteed to be delivered and sold to the company.
- b- No claims will be made, above the announced price at the time of delivery to the company. The purchasing price may be higher than the guaranteed price.
- c- Technology transferred by the company's extension team will be practiced to full extent.
- d- Costs of seeds, fertilizers and chemicals supplied by the company will be paid when the crops are sold to the company.
- e- Rent of leased equipment will be paid to the company when the crops are sold.

5. TRANSPORT AND STORAGE FACILITIES

5.1. TRANSPORTATION

In Turkey, there exists a considerable number of trucks and trailers both refrigerated and normal. Besides, many countries have international transportation passing through Turkey, because of the Country's geographical position between the Middle-East, Asia and Europe. These trucks and/or trailers are also available for hiring when they are returning to their countries. Thus, no investment is necessary for establishing a transport fleet for the company.

Some technical information about transport vehicles are as follows:

Number of Axles : Vehicles generally have 5 axles, but some have 4 axles according to the vehicle type

Maximum Transporting Capacity : 22 Tons

Maximum Speed : 120 kms/hr

Weight (unloaded) : 16 Tons

Net Volume : differs between 55-66 m³ according to the thickness of isolation matter

Cooling Systems : Mainly Thermoking coolers are used. Minimum cooling temperature is -29°C

5.2. COST OF TRANSPORTATION

Frozen fruits and vegetables are transported in refrigerated trailers/trucks up to an amount of 22 tons and the transporting companies quote prices per truck bases independent of quantity. Hence, it does not

differ whether the truck is full or not, charging constant prices between 0-22 tons.

Prices from Marmara region to West European and Gulf countries are illustrated in Table 9 (December, 1985 prices).

TABLE : 9

TRUCK RENTAL PRICES FROM MARMARA REGION TO WEST EUROPEAN
AND GULF COUNTRIES

<u>Countries</u>	<u>Refrigerated (\$/truck-trailer)</u>
Kuwait	2,700
Iraq	1,700
Iran	1,700
S. Arabia	3,200
U.A. Emirates	4,300
Qatar	3,800
France	1,500
W. Germany	1,300
England	1,900
Holland	1,400

These prices obviously do change according to supply and demand and also if the trailers are available at the locations where loading will take place by chance, prices then fall about \$ 200-300 below the above mentioned rates.

Prices also depend on the quantity and the continuity of the job, target country conditions, etc. and can differ within a range of \$ 100-400.

Additionally, trucks and trailers belonging to Kuwait, Bulgaria and some other countries can transport quite cheaper than the Turkish companies, if they are turning back unloaded to their countries through Turkey.

Considering these facts an average price of \$ 2,000/truck-trailer, has been considered as the cost of transportation of the frozen produce processed by the company in this project.

Turkish transporter companies are not easily willing to transport to some countries which are listed below :

Syria has high transit costs and penalties. Besides, the trucks can enter only in groups of fifty, sometimes causing 2-3 days of delay for the formation of a 50 truck convoy.

For Jordan, because of the above-mentioned problems in Syria, trucks and trailers prefer to go through the Iraq route, causing additional costs due to longer distance and transit cost from Iraq (about 500\$/ truck).

In Denmark, foreign truck-trailers can not enter into the country, but the load is transferred to Danish truck-trailers at the border, which is a discouraging factor for transporters as well.

5.3. STORAGE COST

The Meat and Fish Corporation (E.B.K.), which is a State Economic Enterprise, charges 54 \$/T for freezing (in blocks only) and storing fruit and vegetable for a month in 1985.

However, the price charged by E.B.K. is lower than the private sector. The storage price of the private sector is more than two fold of the price of E.B.K.

In spite of the high price of the private sector, customers prefer them due to the bureaucracy applied by public sector, mainly based on the difficulties when removing the produce from storage.

The first two years of the project has some empty frozen storage space. In order to be competitive a 54 \$/T price was considered as rental income.

5.4. EXISTING STORAGE FACILITIES

Total frozen storage capacity of Turkey is 78,767 m tons, and 2,120 m tons in the project region.

The distribution of frozen storage with respect to their legal structure are summarized in Table 10 :

TABLE : 10

DISTRIBUTION OF FROZEN STORAGE CAPACITY (in mTons)

	<u>Turkey</u>	<u>Region</u>
Municipalities	1,085	--
The Meat and Fish Corp.	30,845	1,390
The Turkish Milk Ind. Corp.	135	--
Cooperatives	140	140
Other Public Enterprises	192	20
The Private Sector	<u>46,370</u>	<u>570</u>
TOTAL	78,767	2,120

Source : Fruit and Vegetable Master Plan, SPO, 1985.

6. CAPACITY SELECTION

6.1. EXPORT PLANNING

Export of 10,000 m tons of frozen fruits and vegetables is projected in order to establish a famous brand name within the market to meet the demand of every segment of the market. The main criteria in selecting capacity summarized as follows :

- Availability of raw material ; the farmers of the Marmara region are presently producing vegetables and fruits over 1.7 million and 1.1 million m tons per year respectively. They are receptive to contract farming due to their experience with canning companies.
- Availability of market ; Western Europe has been selected as a target market for this project which is importing frozen fruits and vegetables over 900,000 m ton per year. F.R. Germany, U.K. and Netherlands, who are the major importer in Western Europe, are selected as a main target marketing countries for this project. However, to penetrate and be effective in these markets, you have to have a brand name, and competitive price with sufficient volume. This volume may not be under 10,000 m ton/year
- The amount of investment required ; the cost of investment increases with the size of capacity. Thus, 10,000 m ton/year on single shift freezing capacity has been selected based on available technology and review of existing capacities in West European countries. This capacity will be sufficient to satisfy all concern as a starting capacity in frozen fruit and vegetable sector.

It is planned to achieve the projected sales volume at the third year of production. The reasons of this transition stage are the training and adaptation need of the personnel and period necessary to accomplish

maximum efficiency in the contract farming system and to penetrate into a new market with a new brand name.

Sales plan will be as follows;

<u>Years</u>	<u>Sales(mTons)</u>
1	5,000
2	7,500
From 3rd year on	10,000

Around 80 % of the exports will be oriented to the European market. The 20 % will be utilized to tap the U.S.Navy 6th Fleet the U.S.Armed Forces in Turkey and Near east and the Middle east countries' market.

6.2. PRODUCTION PLANNING

The distribution of the required raw fruits and vegetables input for the 10,000 m tons of output capacity and their respective utilization ratios are illustrated in Table 11.

TABLE: 11

<u>INPUTS AND OUTPUTS OF THE PRODUCTION</u>			
<u>Product</u>	<u>Raw Material</u>	<u>% Useable</u>	<u>Finished Product</u>
	<u>Input (mTon)</u>	<u>Material</u>	<u>Output (m tons)</u>
Bell peppers	1,250	80	1,000
Broccoli	730	55	400
Cauliflower	1,670	30	500
Okra	480	84	400
Leeks	1,540	65	1,000
Carrots	3,330	50	1,665
Potatoes	5,550	50	1,775
Strawberries	1,760	93	1,640
Cherries	2,025	80	1,620
	<u>16,335</u>		<u>10,000</u>

The main criteria in selecting the type of fruit and vegetable to be produced may be summarized as follows.

- Resource base ; These fruit and vegetable, which are presently produced in Marmara region, are listed and ranked by quality, production volume, adaptability to freezing and their average prices in fresh forms.
- Market demand ; These products are checked according to potential demand and competitiveness in West European market, and reclassified.
- Based on these procedure and considering their availability, competitiveness and the selected total capacity, 2 fruits and 7 vegetables have been selected for production program. These results have been reconfirmed by importer and exporter.

Export market demand is the main selection criterion of the species and varieties of fruits and vegetables to be produced. Therefore, production will be flexible in order to be able to meet the changing export market demand.

6.3. CAPACITY OF PROCESSING AND STORAGE UNITS

As the details are illustrated in other sections, in order to obtain 10,000 mtons of finished product, project should process 16,335 mtons of raw materials through four processing lines each year.

6.3.1. Capacity of Processing Units

Minimum theoretical and actual processing capacities of the processing (preparation) lines based on input quantities for different species are illustrated in Table :12.

TABLE : 12

THEORETICAL AND ACTUAL CAPACITIES OF THE PREPARATION LINES*

	Theoretical Capacity		Actual Capacity	
	<u>m Ton/hour</u>	<u>m Ton/day</u>	<u>m Ton/hour</u>	<u>m Ton/day</u>
<u>Line No.1 :</u>				
Broccoli	5	40	4	32
Cauliflower	10	80	8	40
Okra	4	32	2	16
<u>Line No.2 :</u>				
Bell pepper	5	40	3	24
<u>Line No.3 :</u>				
Sliced Leeks	5	40	3	24
Diced Potatoes	5	40	4	32
Diced Carrot	5	40	4	32
<u>Line No.4 :</u>				
Strawberry	5	40	3	24
Cherries	5	40	3	24

(*) : A working day is assumed as 8 hours.

6.3.2. Capacity of IQF and Frozen Storage Units

Depending on the capacity of the preparation lines, optimum IQF capacity will be 5 m tons/hour. Processed and individually quick frozen and packaged products will be stored in the frozen storage unit until they are shipped by refrigerated vehicles.

July and August are the most critical months for frozen storage. Approximately 1,700-1,800 m tons of the finished product will be stored during these months. However, taking into account the possibility of a delay in marketing and forwarding the products, frozen storage warehouse with the capacity of 3,600m tons is planned. Since one square meter storage area is required for every two tons of frozen fruit and/or vegetable, 1,800m² building area is projected for the frozen storage.

7. PRODUCTION AND PROCESSING SYSTEMS

In planning the processing systems for this plant, flexibility was one of the prime considerations in selecting the equipment and capacity of the various lines. Based on the raw material availability and potential market demand, nine products were chosen that can be frozen and sold in Europe. These are Bell Peppers, Broccoli, Cauliflower, Carrots, Okra, Leeks, Potatoes, Cherries and Strawberries.

Four basic preparation lines were used to supply two IQF (Individually Quick Frozen) freezers and one blast freezing tunnel. Depending on the products being processed, the IQF freezers have an operating capacity of 1.5 to 2.0 metric tons per hour each and the blast freezing tunnel about 1.3 metric tons per hour, for a total freezing capacity of about 5.0 tons per hour.

As the harvesting seasons for the different fruits and vegetables will vary throughout the year, two or three products can be processed simultaneously, using one of the IQF freezers and the blast freezer for each product, or if there is an excess of a single product both freezers can be used for the same product. The blast freezer should be used for those products that are packaged with sugar or do not require the IQF freezing method because of customer specifications.

Two packaging lines can handle 1/2 and 1 kilo poly bags for consumer sales and the third line will be used for 2 and 5 kilo poly bags.

The lines have been planned to operate two 8 hour shifts per day during the peak harvesting seasons. Production has been estimated at 10,000 metric tons of finished products annually on the two IQF freezers, with the plant operating at 85 % efficiency. The blast freezer will provide additional volume. Normally a plant will operate two and three shifts a day during the harvesting season in order to utilize the raw material that is being grown and to minimize the capital investment that is required for plant equipment and storage facilities.

In planning the frozen storage warehouse, a two month supply of finished product was considered sufficient to meet the sales demand. If necessary space can be rented in the different marketing areas to furnish the plant's customers with immediate deliveries of finished product. This procedure is usually less costly than building excess storage capacity at the plant site.

7.1. PRODUCTION TECHNOLOGY

In planning the farming side of the operation, consideration should be given to selecting varieties of vegetables that are suitable for freezing and planting early and late varieties that will prolong the harvesting season.

Fresh fruits and vegetables must be handled very carefully as they are being harvested to avoid damaging the produce. Rough handling in the field will bruise the product and result in waste during processing. Most of the products selected for freezing are perishable and must be

transported expeditiously to the plant in order to avoid spoilage. Cooling a product as soon as possible after picking to remove the field heat increases its shelf life and helps maintain a high quality frozen food.

Once a product has been picked it should be placed into some type of field box that a man can handle easily. Care must also be taken not to have too much weight in the box as this will damage the product.

Bell peppers, broccoli, cauliflower, okra, leeks, cherries and strawberries should all be transported to the plant as soon after picking as possible. Carrots and potatoes however, can be stored for long periods of time under controlled temperature and humidity conditions. Potatoes should be cured for 10 to 14 days at 7 to 16 degrees centigrade to permit healing of any cuts or bruises that may have occurred during harvesting.

7.2. PROCESSING TECHNOLOGY

In designing the plant, one preparation line will be used for broccoli, cauliflower and okra; one for bell peppers; one for diced carrots and potatoes; and one for cherries and strawberries. Leeks can be handled either on the broccoli line or on the diced carrot line, depending on the type of product which is required. Blanching equipment is located in only two of the lines, so bell peppers can be handled on either of the lines, depending on the production schedule that is being used. Cherries and strawberries do not require blanching so go directly from the preparation line to either the IQF freezer or the blast freezer.

7.3. PRODUCTION INPUTS

The volume of raw material required by the production line depends on the amount of waste from farm weight to frozen product, which varies with each of the items to be processed. This includes outer leaves, stalks and broken pieces of broccoli and cauliflower; the core and seeds from bell peppers; peels from carrots and potatoes; and any trimmings, pits, stems or damaged parts of other fruits and vegetables that are not suitable for freezing. Table 13 shows the amount of raw material that would be needed to operate each line at its rated capacity.

TABLE : 13

RAW MATERIAL INPUTS FOR ONE PRODUCTION LINE

<u>Product</u>	<u>Raw Material Yield. Fresh to Frozen</u>	<u>Plant Operating Capacity</u>	<u>Hourly Requirements</u>	<u>Daily Requirements 8 Hr/Day</u>
A. Bell Peppers	80%	2,450 Kgs.	3,060 Kgs.	24,480 Kgs.
B. Broccoli	55%	2,180 Kgs.	3,960 Kgs.	31,700 Kgs.
C. Cauliflower	30%	1,900 Kgs.	6,330 Kgs.	50,600 Kgs.
D. Okra	84%	2,260 Kgs.	2,650 Kgs.	21,200 Kgs.
E. Leeks	65%	2,260 Kgs.	3,480 Kgs.	27,840 Kgs.
F. Carrots	50%	2,260 Kgs.	4,520 Kgs.	36,100 Kgs.
G. Potatoes	50%	2,180 Kgs.	4,360 Kgs.	34,900 Kgs.
H. Strawberries	93%	1,820 Kgs.	1,950 Kgs.	15,600 Kgs.
I. Cherries	80%	2,180 Kgs.	2,725 Kgs.	21,800 Kgs.

The number of days when the different fruits and vegetables will be harvested depends on the seed varieties and planting dates. The following number of days seems reasonable for Turkey:

- A. Bell Peppers 48 days or 2 months working 24 days/month
- B. Broccoli 72 days or 3 months working 24 days/month
- C. Cauliflower 48 days or 2 months working 24 days/month
- D. Okra 60 days or 2 months working 24 days/month
- E. Leeks 72 days or 3 months working 24 days/month
- F. Carrots 48 days or 2 months working 24 days/month

If carrots are stored under refrigeration the packing season can be prolonged three to five months.

- G. Potatoes 72 days or 3 months working 24 days/month
Here too, potatoes held in cool storage can be held for two to four months without affecting the quality.

- H. Strawberries 72 days or 3 months working 24 days/month
- I. Cherries 48 days or 2 months working 24 days/month

These dates should be used as guidelines in planning the production schedules as they can vary depending on the contract farmer conditions. The lines may have to operate two shifts and three shifts per day during the peak harvesting season in order to meet the anticipated demand for finished product and yet maintain some flexibility in planning the harvesting and production schedules.

7.4. Processing Inputs

Freezing production line capacity is normally expressed in pounds of peas per hour and a freezing coefficient is used to determine the actual production rate for each individual fruit or vegetable. This provides the theoretical line capacity, however under actual operating conditions a plant can only work at a percent of this capacity due to slowdowns in the line such as a lack of raw material or machinery repairs. 85 % efficiency of the theoretical line capacity is considered to be an attainable volume in a well operated plant and has been taken as a norm in establishing the finished product volumes for the plant. Table 14 shows the processing inputs used in calculating the finished product capacity of the plant.

TABLE : 14

<u>ESTIMATED FINISHED PRODUCT CAPACITY FOR</u>				
<u>ONE PRODUCTION LINE PER HOUR, PER DAY</u>				
<u>Product</u>	<u>Fr. ezing</u>	<u>Theoretical</u>	<u>Operating</u>	<u>Finished</u>
	<u>Coefficient</u>	<u>Capacity</u>	<u>Capacity at</u>	<u>Product</u>
			<u>85 % Efficiency</u>	<u>8 hr/day</u>
A. Bell Peppers	0.90	2,450 Kgs	2,080 Kgs	16,600 Kgs
B. Broccoli	0.80	2,460 Kgs	2,090 Kgs	16,720 Kgs
C. Cauliflower	0.70	2,450 Kgs	2,080 Kgs	16,640 Kgs
D. Okra	0.82	1,635 Kgs	1,390 Kgs	11,100 Kgs
E. Diced Carrots	0.83	2,260 Kgs	1,920 Kgs	15,400 Kgs
F. Diced Potatoes	0.80	2,180 Kgs	1,850 Kgs	14,800 Kgs
G. Sliced Leeks	(*)	2,042 Kgs	1,736 Kgs	13,890 Kgs
H. Strawberries	0.67	2,460 Kgs	2,090 Kgs	16,720 Kgs
I. Cherries	0.80	2,430 Kgs	2,070 Kgs	16,530 Kgs

(*): Information was not available on the freezing coefficient for leeks.

Based on the above estimates, finished product capacity per line according to the number of operating days is illustrated in Table 15:

TABLE: 15

FINISHED PRODUCT OPERATION SCHEDULE PER PRODUCT AND PER YEAR

A. Bell Peppers	60 Days = 1,000 Metric Tons/Year 30 Days 1st Shift, 30 Days 2nd Shift
B. Broccoli	24 Days = 400 Metric Tons 24 Days 1st Shift,
C. Cauliflower	30 Days = 500 Metric Tons 30 Days 1st Shift,
D. Okra	36 Days = 400 Metric Tons 36 Days 1st Shift,
E. Diced Carrots	108 Days = 1,665 Metric Tons 72 Days 1st Shift, 36 Days 2nd Shift
F. Diced Potatoes	120 Days = 1,775 Metric Tons 60 Days 1st Shift, 60 Days 2nd Shift
G. Sliced Leeks	72 Days = 1,000 Metric Tons 48 Days 1st Shift, 24 Days 2nd Shift
H. Strawberries	98 Days = 1,640 Metric Tons 50 Days 1st Shift, 48 Days 2nd Shift
I. Cherries	98 Days = 1,620 Metric Tons 50 Days 1st Shift, 48 Days 2nd Shift
<hr/>	
TOTAL	646 Days = 10,000 Metric Tons 400 Days 1st Shift, 246 Days 2nd Shift

Table 16 shows a proposed production schedule for frozen fruit and vegetable processing plant according to planting and harvesting schedules implemented in the project area, the Marmara region. Chart 1 illustrates the processing flow of various lines.

TABLE : 16

PROPOSED PRODUCTION SCHEDULE FOR FROZEN FRUIT AND VEGETABLE PROCESSING PLANT

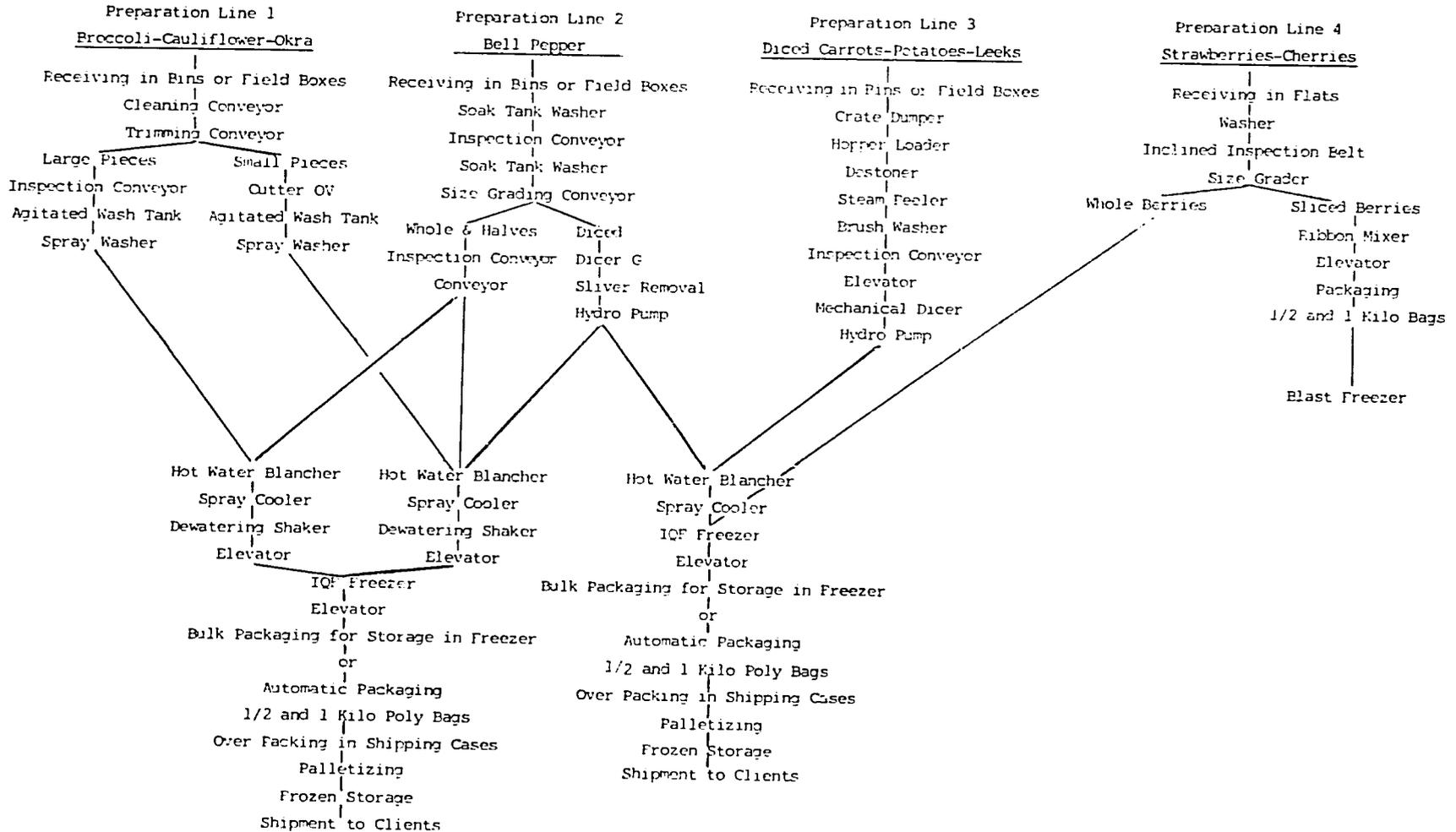
	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Days	P. Ton/ Shift	Total mTon
A. Bell peppers															
1st shift															
2nd shift							X	XXXX					30	500	1,000
							X	XXXX					30	500	
B. Broccoli (1)															
1st shift															
2nd shift										XXXX			24	400	400
C. Cauliflower															
1st shift															
2nd shift										X	XXXX		30	500	500
D. Okra															
1st shift															
2nd shift								XX	XXXX				36	400	400
E. Diced Carrots															
1st shift	XXXX	XXXX	XXXX												
2nd shift	XXXX	XX											72	1,110	1,665
													36	555	
F. Diced Potatoes															
1st shift															
2nd shift										XX	XXXX	XXXX	60	888	1,775
										XX	XXXX	XXXX	60	887	
G. Sliced Leeks															
1st shift															
2nd shift										XXXX	XXXX		48	650	1,000
										XXXX			24	350	
H. Strawberries															
1st shift						XXXX	XXXX								
2nd shift						XXXX	XXXX						48	840	1,640
													48	800	
I. Cherries															
1st shift							XXXX	XXXX	X						
2nd shift							XXXX	XXXX					54	820	1,620
													48	800	

(X) : 6 days/week

(1) : New crop to be introduced

CHART : 1

FLOW DIAGRAM OF PREPARATION AND FREEZING LINES



8. MANAGEMENT

8.1. CONTRACT FARMING

As stated previously in the contract farming section (section 4), required fruit and vegetable input for the project will be produced by 80 to 100 contract-farmers.

Overall Production Plan will be determined by the participation of Project General Manager, Process Manager, Field Manager and Marketing Manager. In accordance with this plan, the Field Manager and the Extension-team, who are responsible from the organization of contract-farming system, will establish which crops will have to be planted by which contract-farms and when. Plantation Program, in accordance with the Plant Processing Program, will be distributed to contract-farms by the Field Manager. In order to extend the processing period and to prevent the accumulation of delivered produce exceeding the processing capacity, planting and harvesting dates for each crop to be cultivated will be programmed and dispersed to a period of time within the genetic and ecological limits of that crop and farm, respectively.

An extension team consisting of five field-specialists and seven field technicians (F/T) will be responsible of the implementation of the fruit and vegetable production plan and program at the contract farm level and they will transfer the new technology and organize and follow-up the distribution of the supports to the contract-farms.

COST OF ADMINISTRATION

<u>Position</u>	<u>Number</u>	<u>Skill Level</u>	<u>Salary/Month</u> (TL)	<u>Annual Cost</u> (TL)
General Manager	1	E	500,000	6,000,000
Finance Manager	1	M-E	300,000	3,600,000
Marketing Manager	1	M-E	300,000	3,600,000
Quality Control Manager	1	M-E	300,000	3,600,000
Process Manager	1	M-E	300,000	3,600,000
Plant Engineer	1	M-E	300,000	3,600,000
Field Manager	1	M-E	300,000	3,600,000
Field Specialist	5	M-E	300,000	18,000,000
Lab. Technicians	2	ST	200,000	4,800,000
Bookkeeper	1	ST	200,000	2,400,000
Personnel Administrator	1	ST	200,000	2,400,000
Plant Foreman	2	ST	200,000	4,800,000
Field Technician	7	ST	200,000	16,800,000
Line Foreman	4	ST	175,000	8,400,000
Salesman	2	ST	160,000	3,840,000
Sec.	2	ST	125,000	3,000,000
Maintenance	2	S	125,000	3,000,000
Clerks	2	S	100,000	2,400,000
As. Clerk	1	N-S	60,000	720,000
Telex op.	1	N-S	60,000	720,000
Watchman	<u>3</u>	N-S	60,000	<u>2,160,000</u>
	42			TL 101,040,000
Cost of Social Benefits (30 %)				TL <u>30,312,000</u>
Total Cost of Management and Permanent Staff				TL 131,352,000
Total Cost of Management and Permanent Staff				\$ 238,822

Legend

- E : Executive
- M-E : Managerial Executive
- ST : Staff
- S : Skilled
- N-S : Unskilled

Administrative Office Expense

o Estimated Sales Volume per year	\$ 7,260,000
o Assume Administrative Office Expense 0.5. % of Sales	
o Administrative Office Expense	\$ 36,300
o Administrative Personnel Cost	\$ 238,822
	<hr/>
TOTAL COST OF ADMINISTRATION PER YEAR	\$ 275,122

8.3. MARKETING

Since the production of frozen fruit and vegetable is totally export oriented, there should be direct connection with the importers of the target markets. Generating this connection at least a year in advance and orienting the respective production program should be the primary objective of the management. Thus, production can be geared to marketing through the demand and preferences of the customers. Beside direct connection and agreements with importers, marketing through commissioned agents can be considered as another marketing strategy. But, priority should be given to direct channels of marketing. Long-term agreements with direct customers will guarantee and improve export sales in the long-run.

The company to be established also might have an import company as one of its share holders to overcome marketing problems, especially during the initial years, until its brand name is registered in the target markets as a mark of quality producer and supplier.

It will be a necessity to establish a marketing section that is at least bilingual or trilingual in its communications and throughout its operations.

The 1.5 percent set forth in the operating expenses, should be carefully utilized for the advertisement of the brand name and promotion of the products in the target markets. Thus, the management of the marketing section is of prime importance for the success of this company.

9. COST OF INVESTMENT

Table 17 illustrates the cost of investment. For more detailed information about the cost of investment, see Annex (II).

TABLE : 17

<u>COST OF INVESTMENT (\$)</u>	
Cost of Land	160,000
Cost of Infrastructure	170,000
Cost of Building	506,400
Cost of Imported Machinery and Equipment(CIF)	2,203,184
Cost of Local Machinery and Equipment	440,428
Cost of Vehicles	140,700
Cost of Preoperating Expenses	109,288
<hr/>	
TOTAL COST OF FIXED INVESTMENT	3,730,000
WORKING CAPITAL (*)	1,270,000
<hr/>	
TOTAL INVESTMENT COST	5,000,000

(*) : For details see Section 10.2.4

10. FINANCIAL ANALYSES

10.1. EXISTING FINANCIAL FACTORS

Financial analyses are conducted by considering the current incentives, supports, tax rebates and credit terms of Turkey. Factors related to frozen fruit and vegetable for the year 1986 are listed below.

10.1.1. Incentives

Incentives announced for the agro-industry investments are :

a- Customs Duty Exemption : All imported equipment and machinery necessary for the investment will not be subject to customs duties.

b- Tax Exemptions :

b.1. Investment Promotion: Up to 100 % of fixed investment cost is deductible from taxable corporate income as a promotion of investments in Turkey. Such investments benefiting from the incentive privileges will not be subject to the corporate tax until 100 % of the total investment expenditures (excluding working capital and the cost of land) in fully integrated investments and only 40 % in unintegrated investments are paid up. This means that in this investment, no corporate tax will be paid until 100 % of total fixed investment cost is recovered, through the reduction from the taxable corporate income. That is, no income tax will be paid until \$ 3,570,000 are deducted cumulatively from annual taxable corporate income.

b.2. Corporated Income Tax Exemption on Exports: 20 % of the export revenues will be deducted from taxable corporate income.

c- Tax Rebates :

c.1. Tax Rebates on Export Sales of Frozen Fruit and Vegetables :

Each year, 7 % of the total export revenues will be paid back by the Central Bank of Turkey, in equivalent Turkish Liras as a tax rebate.

c.2. Tax Rebates on Export Sales over Two Million Dollars :

Moreover, if the annual export sales revenue is more than \$ 2 million, for the 2-10 million dollars range, an additional 2.4 % of export sales realized during 1986, will be paid back in Turkish Liras by the Central Bank of Turkey as a tax rebate to promote exports.

c.3. For Any Kind of Export : An additional 4 % premium will be paid again in Turkish Liras by the Central Bank of Turkey from the "Resource Utilization Support Fund" for any kind of export.

10.1.2. Supports to Investments

In order to encourage investments the State is supporting the investors with some special funds. These supports are :

a- Resource Utilization Support Fund : 7 % of the expenditures made by an investor on fixed investments, are paid back from this fund.

b- Export Promotion Fund : 15 % of the value of local machinery and equipment purchased for the investment will be paid back. However, 5 % of the value of imported machinery and equipment must be paid to this fund by the investor.

10.1.3. Credits

Commercial credit interest rates normally vary between 59 % and 61 % in Turkey. This increases up to 65 % by the addition of all other expenses and taxes.

If, however the project is granted a promotion and incentive permit, the interest rate will be 45 % including all expenses. The difference is subsidized by the Central Bank of Turkey.

Credit will be allocated up to 50 or 60 % of the total project cost and the remaining 40 or 50 % will be required as capital equity, determined by SPO.

Credit repayment period is 10 years with 2 years of grace. Repayment will be by 8 equal installments starting from the third year on.

10.1.4. Nominal Values of the Incentives, Supports, Tax Rebates and Benefits on Credit Terms

a- Custom Tax Exemption : All imported machinery and equipment of the project are exempted from custom duties. Nominal value of this support will be ;

\$ 2,203,184 x 60 % (Custom Tax Rate) : \$ 1,321,910

b- Corporated Income Tax Exemption on Investment:

Total Investment	\$ 5,000,000
(less) Working Capital	\$ 1,270,000
(less) Cost of Land	\$ <u>160,000</u>
Total Subject to Exemption	\$ 3,570,000

c- Corporated Income Tax Exemption on Export: 20 % of the export revenues will be deducted from the income tax base each year. For the 10,000 m tons of export sales volume of the project amount that will be deducted from the income tax base will be ;

$$\text{\$ } 7,260,000 \times 20 \% = \text{\$ } 1,452,000$$

Therefore, nominal value of tax earnings will be ;

$$\text{\$ } 1,452,000 \times 46 \% = \text{\$ } 667,920$$

d- Incentives and Tax Rebates on Exports :

As indicated in 10.1.1.c., nominal values of incentives and tax rebates on exports, based on annual export sales volume of 10,000 m tons of frozen fruits and vegetables will be ;

d.1. Tax Rebates on Export Sales : $\text{\$ } 7,260,000 \times 7 \% = \text{\$ } 508,200$

d.2. Tax Rebates on Export Sales
over $\text{\$ } 2,000,000$: $\text{\$ } 5,260,000 \times 2.4 \% = \text{\$ } 126,240$

d.3. Premium of Resource Utilization
Support Fund : $\text{\$ } 7,260,000 \times 4 \% = \text{\$ } 290,400$

Total Incentives and Tax Rebates $\text{\$ } 924,840$

e- Supports to Investment

As explained in section 10.1.2., nominal earnings from the State supports to investment will be as follows ;

e.1. $\text{\$ } 3,730,000$ (Fixed Investments) $\times 7 \%$ (From Resource Utilization Support Fund) = $\text{\$ } 261,000$

e.2. $\text{\$ } 440,428$ (Local Machinery and Equipment) $\times 15 \%$ (From Export Promotion Fund) = $\text{\$ } 66,064$

However, 5 % of the value of imported machinery and equipment will be paid to this fund.

\$ 2,203,184 x 5 % = \$ 110,159

Hence, total supports will be ;

\$ 261,000 + \$ 66,064 - \$ 110,159 = \$ 217,005

f- Credits

\$ 2,500,000 credit will be utilized in order to meet 50 % of the total project cost. Since the project will be granted an incentive permit, as explained in section 10.1.3., 20 % of the interest rate (from 65 % to 45 %) will be subsidized by the Central Bank of Turkey. Hence, total Central Bank subsidy for the 12 years of the project will be \$ 3,250,000.

10.2. CASH FLOW

10.2.1. Export Revenues

Expected average sales price is calculated as 545 \$/m ton for the vegetables and 1099 \$/m ton for the fruits. Detailed figures are illustrated in Table 18.

TABLE : 18

	<u>EXPORT REVENUES</u>		
	<u>Quantity</u> <u>(mton)</u>	<u>CIF Value</u> <u>(\$ /mTon)</u>	<u>Total Expected</u> <u>Revenues (\$)</u>
Bell peppers	1,000	700	700,000
Broccoli	400	800	320,000
Leek	1,000	400	400,000
Cauliflower	500	800	400,000
Okra	400	1,200	480,000
Carrot	1,665	400	666,000
Potatoes	1,775	400	710,000
Strawberries	1,640	1,000	1,640,000
Cherries	<u>1,620</u>	<u>1,200</u>	<u>1,944,000</u>
TOTAL	10,000		7,260,000

10.2.2. Annual Revenues

Total annual revenues are classified into four broad categories ;
Export Revenues, Tax Rebates-Incentives on export, By-products, and Frozen Storage Rental.

a- Export Revenues : It is assumed that, with the export volume of 10,000 m tons, export revenues will be \$ 7,260,000 as indicated in section 10.2.1..

b- Incentives-Tax Rebates : Given the State incentives, tax rebate on export sales is 7 % as explained in section 10.1.1.. In addition, 4 % of the export sales revenue will be paid back as an incentive by the Resource Utilization Support Fund. Moreover, additional 2.4 % tax rebate will be paid for the export sales amounting 2 to 10 millions of dollars. Hence, nominal value of incentives will be as follows ;

$$a- \$ 7,260,000 \times 7 \% = \$ 508,200$$

$$b- \$ 7,260,000 \times 4 \% = \$ 290,400$$

$$c- (\$ 7,260,000 - \$ 2,000,000) \times 2.4 \% = \$ 126,240$$

$$\text{Total Incentives and Tax Rebates} \quad \$ 924,840$$

c- By-Products : As explained in section 10.2.3.1., 16,335 m tons of fruit and vegetables will be processed and 10,000 m tons of finished products will be exported. 6,335 m tons will remain as discard. If 50 % of this amount is assumed to be peels, seeds, stalks, leaves, etc., the remaining 50 % can be sold as a by-product. The by-products can be used as fresh, or as a raw material for canned foods, ready foods, animal feeds, etc. Sales value of by-products is assumed to be \$ 10 per m ton. Hence, total income from the sales of by-products will be ;

$$3,167 \text{ m tons} \times 10 \$/\text{m ton} = \$ 31,670$$

d- Frozen Storage Rental : Frozen storage area of the plant can be rented during idle periods. As indicated in section 5.3., freezing and storage price of E.B.K. is 54 \$/month for this region. 3,600 mtons of frozen products (-20°C) can be stored in 1,800 square meters of storage area. Therefore, in the frozen storage rental case, \$ 194,400 income per month will be earned. It will not be possible to rent frozen storage area when the project reaches its full capacity. But, for the first two years, frozen storage rental income can be considered. Hence, we can calculate the rental income for the first year, with 50 % capacity, and for the second year, with 25 % capacity of the storage warehouse.

First Year ; 194,400 \$/month x 6 months = \$ 1,166,400

Second Year ; 194,400 \$/month x 3 months = \$ 583,200

TABLE : 19

<u>SUMMARY TOTAL ANNUAL REVENUES (1,000\$)</u>				
Year :	1	2	3	4
Utilized Capacity :	(50%)	(75%)	(Full)	(Full)
a. Export Revenues	3,630	5,445	7,260	7,260
b. Incentives-Tax Rebates	438	682	925	925
c. By-Products	16	24	32	32
d. Frozen Storage Rental	1,166	583	--	--
Total Revenues	5,250	6,734	8,217	8,217

10.2.3. Annual Operating Costs

10.2.3.1. Direct Operating Costs :

Direct operating costs for the first three years of the operation are shown in Table 20. After third year, these costs will be fixed because of stable export volume of 10,000 m tons of frozen fruits and vegetables annually. For more detailed information see Annex (III).

TABLE : 20

	<u>DIRECT OPERATING COSTS (\$)</u>		
	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>
Raw Materials	1,458,450	2,187,675	2,916,900
Direct Labor	87,268	130,902	174,536
Utilities	329,839	329,839	329,839
Packaging	426,130	639,194	852,259
Transportation	536,300	804,450	1,072,600
Administration	275,122	275,122	275,122
Sales Expense	54,450	81,675	108,900
Maintenance	75,436	75,436	75,436
C/F Supports and R/D	92,500	138,750	185,000
TOTAL DIRECT OPERATING COSTS	<u>3,335,495</u>	<u>4,663,043</u>	<u>5,990,592</u>

10.2.3.2. Depreciation :

Depreciation was calculated on a straight line basis over the expected economic life of each capital item. Depreciation is a non-cash expense used to account for the economic loss arising from age or obsolescence of a capital asset.

A sinking fund is sometimes used in lieu of depreciation to allow for replacement of say, a particular piece of equipment.

Consideration should be given to establishing such a fund so that cash is available for replacing major product equipment in the future.

TABLE : 21

<u>DEPRECIATION</u>			
<u>Item</u>	<u>Life(Years)</u>	<u>Original Cost(\$)</u>	<u>Annual Depreciation(\$)</u>
Land	50	160,000	3,200
Infrastructure	20	170,000	8,500
Buildings	20	506,400	25,320
Machinery and Equipment	10	2,643,612	264,361
Vehicles	5	140,700	28,140
Preoperating Expenses	5	109,288	21,858
		<u>3,730,000</u>	<u>351,379</u>

ANNUAL DISTRIBUTION OF DEPRECIATION

<u>Years</u>	<u>1-5</u>	<u>6-10</u>	<u>11-20</u>	<u>21-50</u>
Depreciation (\$)	351,379	301,381	37,020	3,200

10.2.3.3. Interest :

The total fixed investment is estimated to be \$ 3,730,000. The total investment with working capital would be \$ 5,000,000. It is assumed that 50 % of the total investment will be financed by the credit equity at 45 % interest rate. Credit repayment period will be 10 years with two years grace.

Credit utilization will be realized within first three years, because working capital requirement (section 10.2.4.) will increase during this period.

TABLE : 22

Years	<u>COST OF INTEREST</u>			
	<u>Credit at the Beginning (\$)</u>	<u>Amortization Repayment(\$)</u>	<u>Remaining Balance(\$)</u>	<u>Interest Cost(\$)</u>
1	1,900,000(κ)	--	1,900,000	855,000
2	2,200,000	--	2,200,000	990,000
3	2,500,000	237,500	2,262,500	1,125,000
4	2,262,500	275,000	1,987,500	1,018,125
5	1,987,500	312,500	1,675,000	894,375
6	1,675,000	312,500	1,362,500	753,750
7	1,362,500	312,500	1,050,000	613,125
8	1,050,000	312,500	737,500	472,500
9	737,500	312,500	425,000	331,875
10	425,000	312,500	112,500	191,250
11	112,500	75,000	37,500	50,625
12	37,500	37,500	0	16,875
		<u>2,500,000</u>		<u>7,312,500</u>

(κ) : Total Fixed Investment - Capital Equity :\$ 1,230,000
 Working Capital Requirement for the first year :\$ 670,000
 Credit Utilization for the first year :\$ 1,900,000

10.2.4. Working Capital

Working Capital Requirement is calculated as follows;

<u>Item</u>	<u>Period(Days)</u>	<u>Amount(\$)</u>
Accounts Receivable(*)	30	499,216
Inventory:		
Raw Materials	15	121,538
Packaging	90	213,064
Finished Product(*)	15	249,608
Direct Labor	30	14,545
Utilities	30	27,487
Transportation	15	44,692
Administration	30	22,927
Sales Expense	60	18,150
Maintenance	30	6,286
C/F Supports and R/D (1)	90	46,250
Others		6,237
		<hr/>
	Total Working Capital	1,270,000

(*) : Based on annual total direct operating costs for the 3rd year of operation

(1) : C/F = Contract Farm Operations

R/D = Research and Development Expenditure

Working Capital Requirement depending on the capacity of the project for the first four years will be as follows ;

<u>Years</u>	<u>Incremental Working Capital(\$)</u>	<u>Total Working Capital (\$)</u>
1	669,282(κ)	669,282
2	300,359	969,641
3	300,359	1,270,000
4	0	1,270,000

(κ) : Fixed working capital requirement (Utilities +
Sales expense + Administration) \$ 68,564
50 % of the variable working capital
requirement \$ 600,718
Working Capital requirement for the first year \$ 669,282

10.2.5. Cash Flow

In order to analyze cash flow, Revenues/Direct Operating Costs Table, is prepared (Table 23). It is assumed that the company will operate with 50 % capacity during the first year and with 75 % capacity during the second year. When calculating the figures of this table, annual operating costs for full capacity has been taken as a base. Since there is no direct relation between the capacity of the project and utilities, administrative and maintenance expenses, these are accepted as fixed expenses starting from the first year on.

Interest expense of the initial investment year will be financed by the utilization of the Resource Utilization Support Fund and Export Promotion Fund (Section 10.1.4/e).

Investment costs of the initial investment year will be financed preferably by the utilization of the capital equity.

Credit utilization will be ;

\$ 3,730,000 (Fixed Investment) - \$ 2,500,000 (Capital Equity) = \$ 1,230,000 for the initial year, and this will occur at the last 4.5 months of the year.

Therefore, interest expense will be ;

$$\frac{4.5}{12} \times \$ 1,230,000 \times 45 \% \text{ (Interest rate)} = \$ 207,563$$

and this amount will be financed from the Resource Utilization Support Fund and Export Promotion Fund.

Funds flow of the project for 20 years, is illustrated in Table 24.

TABLE : 23

REVENUES/DIRECT OPERATING COSTS (1000 \$)

<u>REVENUES :</u>	YEARS :	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
A- Export Revenues		3,630	5,445	7,260	7,260
B- Incentives		438	682	925	925
C- By-products		16	24	32	32
D- Frozen Storage Rental		<u>1,116</u>	<u>583</u>	<u>--</u>	<u>--</u>
TOTAL REVENUES		5,250	6,734	8,217	8,217
 <u>DIRECT OPERATING COSTS :</u>					
A- Raw Materials		1,458	2,188	2,917	2,917
B- Direct Labor		87	131	175	175
C- Utilities		330	330	330	330
D- Packaging		426	639	852	852
E- Transportation		536	804	1,073	1,073
F- Administration		275	275	275	275
G- Sales Expense		54	82	109	109
H- Maintenance		75	75	75	75
I- Supports to C/F and R/D		<u>93</u>	<u>139</u>	<u>185</u>	<u>185</u>
TOTAL DIRECT OPERATING COSTS		3,334	4,663	5,991	5,991

TABLE : 24

PROFORMA INCOME AND FUNDS FLOW STATEMENT(1,000 \$)

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13-20</u>
REVENUES	5,250	6,734	8,217	8,217	8,217	8,217	8,217	8,217	8,217	8,217	8,217	8,217	8,217
(less) DIR.OPER.COSTS	3,334	4,663	5,991	5,991	5,991	5,991	5,991	5,991	5,991	5,991	5,991	5,991	5,991
(less) DEPRECIATION	351	351	351	351	351	301	301	301	301	301	37	37	37
(less) INTEREST EXP.	855	990	1,125	1,018	894	754	613	473	332	191	51	17	--
TAXABLE INCOME	710	730	750	857	981	1,171	1,312	1,452	1,593	1,734	2,138	2,172	2,189
(less) C. INCOME TAX (49%) (*)	--	--	--	--	--	--	--	--	69	138	336	353	361
NET INCOME AFTER TAX	710	730	750	857	981	1,171	1,312	1,452	1,524	1,596	1,802	1,819	1,828
(Add) DEPRECIATION	351	351	351	351	351	301	301	301	301	301	37	37	37
NET INCOME	1,061	1,081	1,101	1,208	1,332	1,472	1,613	1,753	1,825	1,897	1,839	1,856	1,865
(less) AMORTIZATION REPAYMENT	0	0	237.5	275	312.5	312.5	312.5	312.5	312.5	312.5	75	37.5	--
FUNDS FLOW	1,061	1,081	863.5	933	1,019.5	1,159.5	1,300.5	1,440.5	1,512.5	1,584.5	1,764	1,818.5	1,865
CUMULATIVE FUNDS FLOW	1,061	2,142	3,005.5	3,938.5	4,958	6,117.5	7,418	8,858.5	10,371	11,955.5	13,719.5	15,538	30,458

(*) : 20 % of the export revenues (\$ 7,260,000 x 0.20 = \$ 1,452,000) will not be subject to tax.

This amount is deducted from taxable income in calculation of income tax.

10.3. PROJECT VIABILITY INDICATORS

Project capital equity pay-back period is 2 years 5 months and total investment pay-back period is 5 years of operation (see Table:24).

Project internal rate of return is 28.05 % (see Table:25). Export of 5,318 m tons of frozen fruits and vegetables constitutes the project's break even quantity, and project reaches its cash break-even point with the export of 4,016 m tons (see Tables:26 and 27).

Net income after tax and Net income after tax/Revenues ratio are increasing steadily because of changing interest, depreciation and income tax expenses during the credit repayment period. Therefore, two separate profit margins were calculated. These are 15.4 % for the credit amortization period and 22.2 % for the period after credit amortization (see Table:28).

Thus, this investment is very viable and should be considered interesting for both foreign and domestic investors.

The project has been prepared by calculating the economical indicators based on U.S. dollar values. This calculation method was selected to generate a project which will carry its viability for a long time. Thus, the domestic inflation rate risk, is overridden.

TABLE : 25

CALCULATION OF INTERNAL RATE OF RETURN (IRR)

Years:	<u>Initial</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13-20</u>
CASH OUTFLOWS	3,730	670	670	300	--	--	--	--	--	--	--	--	--	--
Investment	3,730	--	--	--	--	--	--	--	--	--	--	--	--	--
Working Capital	--	670	300	300	--	--	--	--	--	--	--	--	--	--
CASH INFLOWS	--	1,061	1,081	1,101	1,208	1,332	1,472	1,613	1,753	1,825	1,897	1,839	1,856	1,865
Revenues	--	5,250	6,734	8,217	8,217	8,217	8,217	8,217	8,217	8,217	8,217	8,217	8,217	8,217
(less) Operating Costs	--	3,334	4,663	5,991	5,991	5,991	5,991	5,991	5,991	5,991	5,991	5,991	5,991	5,991
(less) Interests	--	855	990	1,125	1,018	894	754	613	473	332	191	51	17	--
(less) C. Income Tax	--	--	--	--	--	--	--	--	--	69	138	336	353	361
NET FLOWS ('000 \$)	(3,730)	391	781	801	1,208	1,332	1,472	1,613	1,753	1,825	1,897	1,839	1,856	1,865
Discount Factor : 28 %	1.0	0.781	0.610	0.477	0.373	0.291	0.227	0.178	0.139	0.108	0.085	0.066	0.052	0.159
Present Value of Net Flows	(3,730)	305	476	382	451	388	334	287	244	197	161	121	97	216
Net Present Value of Net Flows : \$ 9,000														
Discount Factor : 30 %	1.0	0.769	0.592	0.455	0.350	0.269	0.207	0.159	0.123	0.094	0.073	0.056	0.043	0.126
Present Value of Net Flows	(3,730)	301	462	364	423	358	305	256	216	172	138	103	80	235
Net Present Value of Net Flows : -\$ 318,000														

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IRR Interpolation Formula :

$$\text{IRR} : \text{Lower discount rate} + \frac{\text{Difference between two rates}}{\left(\frac{\text{NPV of Net Flows at Lower Discount Rate}}{\text{Difference between two NPV's of Net Flows}} \right)}$$

$$\text{IRR} : 28 + 2 \left(\frac{9,000}{327,000} \right)$$

$$\text{IRR} : 28.05 \%$$

TABLE : 26

BREAK - EVEN ANALYSIS

Fixed Costs :

Administration	\$ 275,122
Depreciation ⁽¹⁾	\$ 326,380
Interest exp. ⁽²⁾	<u>\$ 731,250</u>
Total Fixed Costs	\$ 1,332,752

(1): Arithmetic mean of first ten years' depreciation expense.

(2): Total interest expense divided by 10 years credit repayment period.

Unit Variable Costs :

Raw Materials	\$ 292/m.Ton
Direct Labor	\$ 17.5/m.Ton
Utilities	\$ 33/m.Ton
Packaging	\$ 85.2/m.Ton
Transp. and Insurance	\$ 107.3/m.Ton
Sales exp.	\$ 10.1/m.Ton
Maintenance	\$ 7.5/m.Ton
C/F Supports	<u>\$ 18.5/m.Ton</u>
Total Variable Costs	\$ 571.1/m.Ton

Unit Revenues : 821.7 \$/m.Ton

Continued Table 26

$$\text{Break-even Quantity} = \frac{\text{Total Fixed Costs}}{\text{Revenues} - \text{Variable Costs}}$$

$$\text{Break-even Quantity} = \frac{1,332,752}{821.7 - 571.1} = 5,318 \text{ m. Tons}$$

$$\text{Cash Break-even Quantity} = \frac{\text{Total Fixed Costs} - \text{Depreciation}}{\text{Revenues} - \text{Variable Costs}}$$

$$\text{Cash Break-even Quantity} = \frac{1,332,752 - 326,380}{821.7 - 571.1} = 4,016 \text{ m. Ton}$$

TABLE : 27

VARIATION IN COSTS-REVENUES AND PROFITS BASED ON QUANTITY

<u>Quantity (m. Tons)</u>	<u>Fixed Cost (\$)</u>	<u>Variable (\$)</u>	<u>Revenue (\$)</u>	<u>Profit(loss) (\$)</u>	<u>Cash Gain (Loss) ^(*) (\$)</u>
0	1,332,752	0	0	(1,332,752)	(1,006,372)
1,000	1,332,752	571,100	821,700	(1,082,152)	(755,772)
2,000	1,332,752	1,142,200	1,643,400	(831,552)	(505,172)
3,000	1,332,752	1,713,300	2,465,100	(580,952)	(254,572)
4,000	1,332,752	2,284,400	3,286,800	(330,352)	(3,972)
5,000	1,332,752	2,855,500	4,108,500	(79,752)	246,628
6,000	1,332,752	3,426,600	4,930,200	170,848	497,228
7,000	1,332,752	3,997,700	5,751,900	421,448	747,828
8,000	1,332,752	4,568,800	6,573,600	672,048	998,428
9,000	1,332,752	5,139,900	7,395,300	922,648	1,249,028
10,000	1,332,752	5,711,000	8,217,000	1,173,248	1,499,628

(*) : Cash Gain (loss) = Total Revenues - (Total Cost - Depreciation)

Revenues/Costs
(\$1,000,000)

BREAK-EVEN CHART

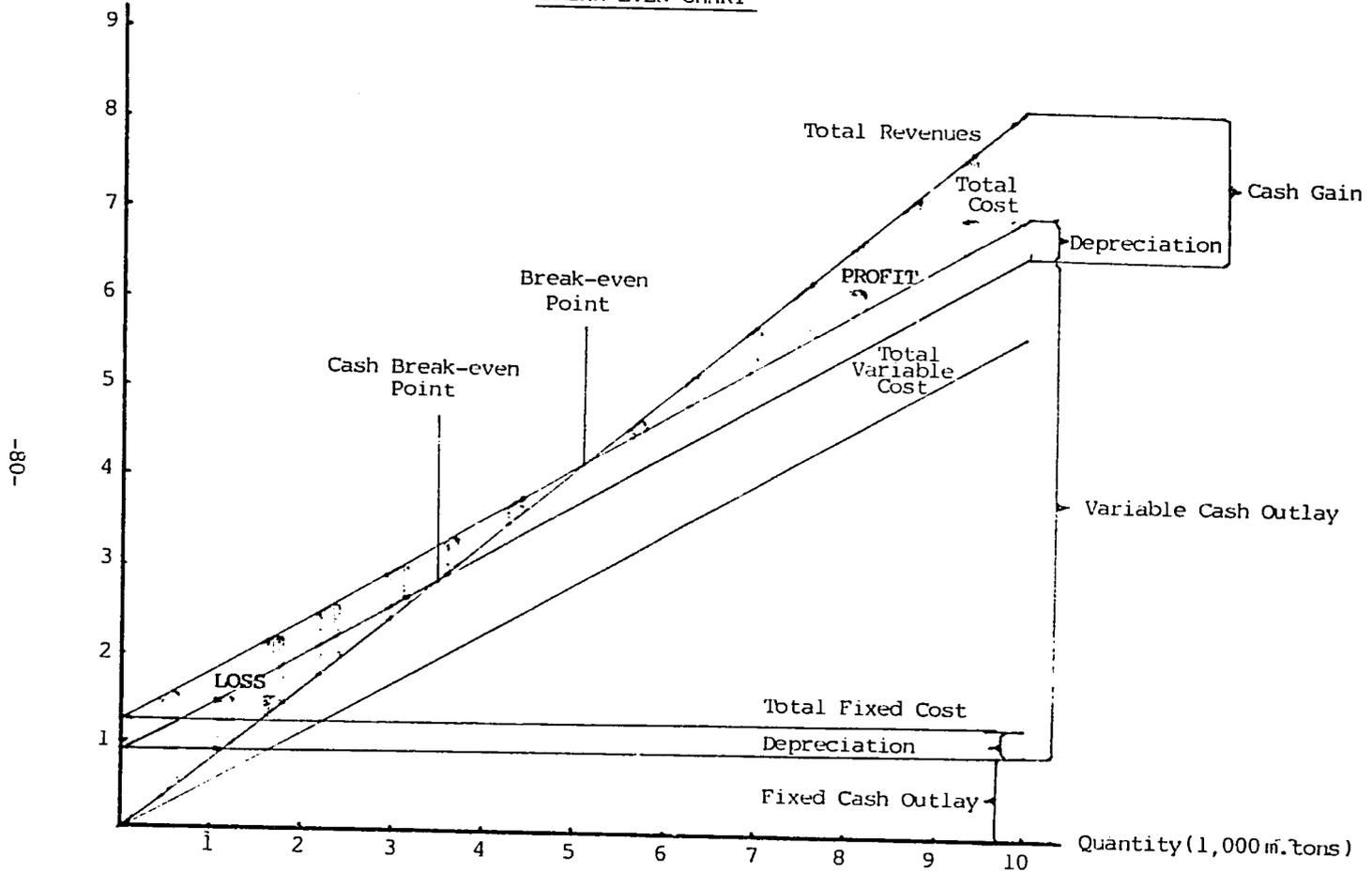


TABLE : 28

CALCULATION OF PROFIT MARGIN

1- Average Profit Margin for the credit amortization period

(1-12 years) :

$$\text{Profit Margin} = \frac{\sum_{1}^{12} \text{Net Income After Tax}}{\text{Revenues}} = \frac{14,524,000}{94,154,000} = 15.4 \%$$

2- Average Profit Margin for the period after the credit amortization

(13-20 years) :

$$\text{Profit Margin} = \frac{\sum_{13}^{20} \text{Net Income After Tax}}{\text{Revenues}} = \frac{14,624,000}{65,736,000} = 22.2 \%$$

10.4. CAPITAL SOURCES

10.4.1. Company Establishment Models

There are three alternative establishment models of the company that can implement such a project.

- a- All Turkish Partners,
- b- All Foreign partners,
- c- Combination of Turkish and foreign partners.

Combination of Turkish and foreign partners seems to be the best alternative model.

Local farmers(preferably contract farmers) and large export marketing companies as a partner may form the Turkish party.

Foreign partners preferably should be the producers of frozen fruits and vegetables in their countries to supply know-how, and/or importers and marketing firms of these products, and/or financial institutions that will invest in such a project. From one of the Gulf countries which has the possibility of being a good export market in the future, a large food importing company can be selected as a financing and future marketing partner.

10.4.2. Capital Sources

Partners of the company will supply the equity capital that the company will invest in assets. Turkish partner(s) can put their land as a capital in kind for the project. Some foreign partners can bring the machinery and equipment that will be imported for the project as capital in kind.

10.4.3. Credit Sources and Cost of Credit

Investment credit necessary for the project can be borrowed from the Turkish banks using the incentive privileges. Cost of credit will be 45 % due to the incentive privileges as explained in the previous sections.

Project is totally export oriented, therefore it will be also possible to utilize foreign credit sources. Foreign partner or foreign financing institutions can supply this credit. In this case, cost of credit will be lower, such as LIBOR + 3/4 percent.

10.4.4. Equity/ Credit Balance

It is planned to finance the total investment cost (fixed investment cost plus working capital) 50 % by the capital equity and 50 % with credit. In order to grant the incentive privileges to bank credits in Turkey, at least 40 % of the investment should be capital equity. Under certain conditions, this portion increases up to 60 %. However, if it will be possible to utilize foreign credit sources, credit equity portion can be reduced down to 30 %. In this theoretical company, a 50 % credit utilization has been accepted.