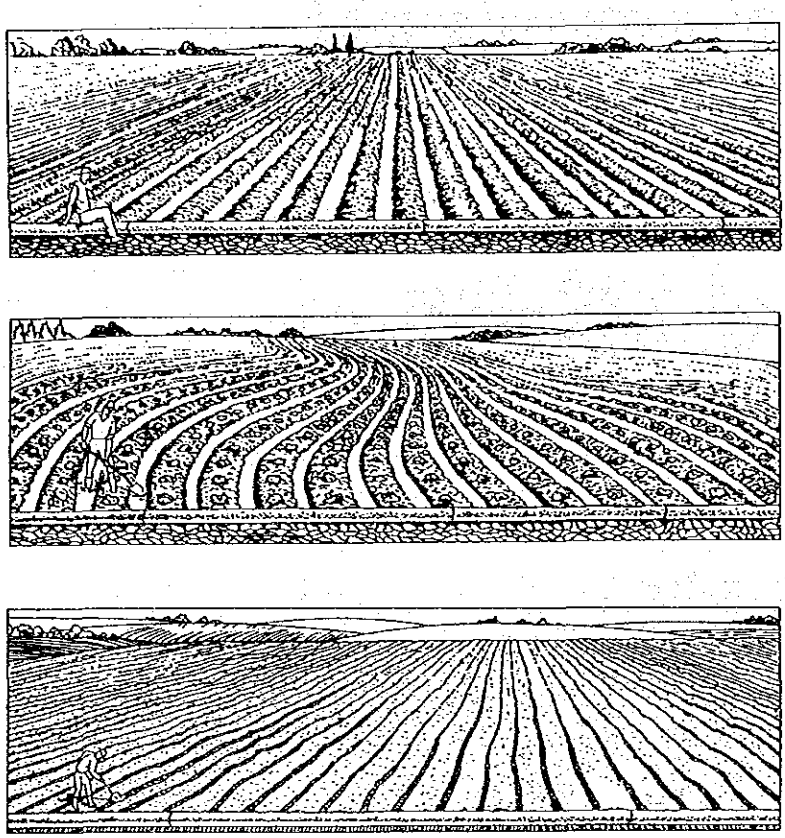
8 Soil Chemical and Physical Analysis (by DSI)

Sample No.	Soil Depth (cm)	Permeability (cm/hr)	pH Saturation Extract	pH 1/5	Salt Percent (%)	EC μ S/cm	CEC me/100g	Exch.Na me/100g	Soluble Na me/100g	Lime (%)	Organic contents (%)
A-1	0- 45	6.37	7.60	8.10	39.00	752	34.79	0.39	0.03	35.20	1.84
A-2	0- 30	4.16	7.70	8.30	44.00	752	32.46	0.38	0.04	46.08	1.38
A-3	30- 60	1.56	7.70	8.30	40.00	627	26.09	0.38	0.04	63.36	-
A-4	0- 35	2.47	7.60	8.20	35.00	1,254	25.20	0.38	0.04	53.28	1.56
A-5	0- 30	8.32	7.70	8.40	49.00	815	40.00	0.39	0.09	36.72	1.44
A-6	30- 60	5.59	7.80	8.40	52.00	564	30.42	0.39	0.03	-	-
A-7	0- 40	1.95	7.80	8.40	38.00	1,003	35.12	0.38	0.04	-	-
A-8	0- 30	10.66	7.70	8.20	48.00	689	37.72	0.39	0.03	-	-
A-9	30- 90	7.15	7.90	8.50	52.00	564	37.72	0.37	0.05	-	-
A-10	0- 30	7.54	7.70	8.30	46.00	752	40.60	0.37	0.05	43.20	1.27
A-11	30-150	5.40	7.80	8.40	51.00	627	32.00	0.35	0.07	59.04	-
A-12	0- 30	6.11	7.70	8.40	41.00	438	32.56	0.38	0.04	50.40	1.27
A-13	30-150	2.60	7.70	8.40	52.00	627	28.08	0.37	0.05	58.32	-
A-14	0- 30	5.98	7.70	8.40	38.00	1,003	32.00	0.35	0.07	53.28	1.38
A-15	30-150	4.55	7.80	8.40	49.00	815	26.08	0.23	0.19	72.00	-
A-16	0- 40	1.82	7.80	8.40	40.00	940	25.20	0.36	0.06	59.76	1.32
A-17	0- 40	2.60	7.60	8.10	40.00	1,504	34.78	0.36	0.06	42.48	1.79
A-18	0- 40	6.24	7.60	8.10	39.00	1,692	21.72	0.34	0.08	61.20	1.96
A-19	0- 40	3.25	7.80	8.40	37.00	313	27.82	0.39	0.03	49.68	2.02
A-20	0- 40	9.36	7.80	8.60	45.00	1,128	32.44	0.39	0.03	46.80	1.32

Remark: Location of those data is unknown in Adatepe-Afsin Plain



Appendix-V

Agriculture and Agricultural Economy

V-1 Agriculture

1. General

The Province of Kahramanmaras in which the Project area is situated belongs to Eastern Mediterranean region according to Turkish Agricultural Division. This region plays an important role in the agricultural production of Turkey, and accounts for approximately 5% of GNP.

The Project area lies in highland in the northern end of this region, and expands over 44,030 ha of agricultural land. This area has some constraints for agricultural production such as limitations of topo-graphical feature and climatic condition, and lack of irrigation water. Consequently, its agricultural production shows low productivity and is unstable. Main crops in the area are wheat, barley and chick-pea but sugar beet, pulses, vegetables and sunflower as summer cropping are cultivated in the irrigated area. The summer cropping in the dry area (non-irrigated area) is exceedingly limited, and most of the land is fallow.

Animal husbandry in this area is centered around traditional sheep raising by family size, and the milk cow breeding aimed at the improvement of farmer's nutrition is promoted in recent years.

Agricultural production at the national level, provincial level and at Afsin and Elbistan Districts including the Project area is shown in Table V-1. From the view point of production yield, it is obvious that its productivity in the area is lower than the national level owing to the above-mentioned matters.

The farm household in the area is about 6,800 families. The average family size in rural area is relatively small and its family labor force is presented as shown in Table V-2. Their farming size is also relatively small and the average farming size can be classified into three sizes; 6.29 ha in the gravity area, 3.93 ha in the southern pumping area and 10.28 ha in the northern pumping area. Farming pattern in the area is common as simple pattern except for that of irrigated area.

The labor requirement by present cropping pattern is shown in Table V-2.

2. Proposed Crops

In selecting crops for the Project, the following crops are selected taking into account; i) the basic Project conception, ii) present cropping conditions, iii) intention of farmers, iv) cultivation technique of farmers, v) importance of crops, vi) profitability and vii) marketability.

Wheat, Barley, Dry bean, Sugar beet, Sunflower, Potato, Vegetables, Alfalfa,Fruit,Grape and Poplar.

The present major crops in the project area, i.e., wheat, barley, sugar beet and dry bean have been selected as the principal crops in the cropping plan. The cultivation of sunflower is envisaged increasing in the area to be incorporated in the crop rotation system with the principal crops. Among the present crops, chick-pea, lentil and cow vetch are omitted from the cropping plan because of the reasons mentioned below.

- -Chick-pea: In the Project, irrigation system will be introduced for the whole area. Profitability of this crop is lower than that of dry bean which is cultivated in the existing irrigated area.
- -Lentil : The same reason as for the above-mentioned crop.
- -Cow vetch: In the project, alfalfa as high quality fodder crop will de introduced in place of this crop.

In the Project area, some kinds of vegetables are presently cultivated for self-consumption of farmers. In the present plan, however, only the cultivation of major vegetables such as tomato which hold on important position in the pre-harvest season of the Adana and Mersin markets and have relatively stabilized market price is planned.

Fruit growing in the project area is mainly apple and apricot, and this area is most suitable to cultivate and produce high quality fruit(specially apple) which is very popular among the local markets.

3. Proposed Cropping Pattern

(1) Proposed rotation system

Cultivation of annual crops such as wheat, barley, sugar beet, dry bean and sunflower should be practiced under the rotation system. The introduction of the following rotation system is proposed:

- Sugar beet - Wheat/Barley - Dry bean/Sunflower

(2) Proposed cropping pattern

Although farming condition is harsh in the Project area, year-round cultivation of crops is possible. The optimum cropping seasons of major crops is defined as follows:

- Wheat ..... Sowing: October Harvest: July
- Barley ..... Sowing: October Harvest: July
- Sugar beet ... Planting: April Harvest: November
- Dry bean ..... Sowing: May Harvest: September
- Sunflower .... Sowing: April Harvest: August

The following table outlines the proposed cropping pattern.

PROPOSED CROPPING PATTERN

Cropping pattern/Rotation system	Area(ha)	%
Sugar beet - Wheat - Dry bean Barley Sunflower	29,141	75.8
Potato	1,465	3.8
Alfalfa	2,595	6.8
Vegetables	1,081	2.8
Fruit	2,306	6.0
Grape	768	2.0
Poplar	1,082	2.8
Total	38,438	100.0

(3) Cropping intensity

The increase in planted area is projected from the present 40,631 ha (Net 36,568 ha) to the future 44,030 ha (Net 38,438 ha) or an increase of 3,399 ha (Net 1,870 ha, about 8.4% of the present planted area). The cropping intensity will increase from the present 92% to 100% under the Project. The increase in cropping intensity and planted area is mainly attributable to the intensification of land use by the introduction an irrigation system.

4. Expected Crop Production

(1) Target yields

The present crop yields in the project area are relatively low as compared with those in other areas of Turkey. Crop yields considerably fluctuate year by year due to climatic conditions and lack of irrigation water. With the completion of the project, crop yields will be increased and stabilized through construction of irrigation facilities, renovation of farming practices and strengthening of agricultural supporting systems. The projected target yields at full development are assumed based on yield level of the existing similar projects in the surrounding areas as shown in Table V-3.

The target yields are assumed to be attained in 3 years. The crop yields during the build-up period are assumed as shown in Table V-3.

(2) Expected Crop Production

The crop production in the Project area will increase year by year with the increase in crop yields. Based on the projected increase of crop yields in 3 years assumed in Table V-3 (Sheet 1), the expected annual crop production is estimated in Table V-3 (Sheet 2). The annual crop production at full development are estimated at about; i) wheat 33,803 tons, ii) barley 7,880 tons, iii) sugar beet 360,690 tons, iv) dry bean 22,763 tons, v) sunflower 7,400 tons, vi) potato 36,625 tons, vii) vegetables 27,025 tons, viii) alfalfa 36,330 tons, ix) fruit 48,426 tons and x) grape 11,520 tons.

The expected production increases with the Project are also estimated at about; i) wheat 7,299 tons 28%, ii) barley 1,292 tons 20%, iii) sugar beet 274,135 tons 317%, iv) dry bean 18,450 tons 428%, v) sunflower 6,487 tons

711%, vi) potato 31,485 tons 613%, vii) vegetables 25,526 tons 1,703%, viii) fruit 43,470 tons 877% and ix) grape 6,990 tons 154%.

5. Proposed Farming Practices

To realize increased agricultural potential by the construction of irrigation facilities, the improvement of farming practices should be achieved through the strengthening of agricultural supporting systems. The proposed farming practices have been formulated on the basis of the present farming practices as well as the farming practices of farmers in the surrounding irrigated area constructed by DSI and the recommendations of Agricultural Engineering Office, Regional Agricultural Institute and Regional Agricultural Experimental Station relating to the project area.

Said practices are proposed hereunder.

(1) Wheat

1) Variety and sowing

Bezostia is the recommended variety in the project area. A seed rate of 200kg/ha is recommended to be sown by tractor.

2) Fertilization

The total fertilizer requirement for sustaining target yield would be 150kg/ha of DAP 18-46 and 150kg/ha of ammonium nitrate.

3) Plant protection

Corsicol, fungicides, should be applied for seed before sowing.

4) Harvesting

Harvesting by combine harvester is proposed as presently practiced.

(2) Barley

1) Variety and sowing

Varieties presently used in the area , such as Cumhuriyet-50, Zafer-160, are recommended under the project as well. A seed rate of 200kg/ha is recommended to be sown by tractor.

2) Fertilization

The following fertilizations are recommended:

- Compound 20-20-0 250kg/ha
- Ammonium Nitrate 150kg/ha

3) Plant protection

Plant protection for barley is applicable to wheat.as wheat.

(3) Sugar beet

Sugar beet producers in the Project area are experienced and capable, practicing relatively reliable cultivation methods under the guidance of Elbistan Sugar Factory. Conditions for sugar beet cultivation in the project area are thus considered highly favorable.

1) Variety and planting

Cultivation of improved varieties, Julia and Bella, presently popular in the Project area is recommended. Recommended seed rate is 3,500kg/ha to be planting by semi-mechanization.

2) Fertilization

Chemical fertilizer required to obtain higher yield would be 300kg/ha of urea and 1,000kg/ha of triple sulfate. These fertilizer should be divided into three applications.

3) Plant protection

Chemical spraying to prevent disease and insect is required using Dipterex and Imprator.

4) Harvesting

Harvesting by hand is proposed as presently practiced.

(4) Dry bean

1) Variety and sowing

The present variety Yalova-5 is recommended for the time being. Recommended seed rate is 120kg/ha to be sown by tractor.

2) Fertilization

The following fertilizations are recommended:

- DAP 18-46 150kg/ha
- Ammonium Nitrate 150kg/ha

3) Plant protection

Chemical spraying to prevent disease and insect should be required using Hectaxin, Lebaycid and Neoron.

4) Harvesting

Harvesting by hand picking is proposed as presently practiced.

(5) Sunflower

1) Variety and sowing

Variety presently used in the area such as Vinimik-8931 is recommended. The adequate guidance of related agencies is required for the introduction of the new hybrid varieties. A seed rate of 10kg/ha is recommended to be sown by tractor.

2) Fertilization

Proposed fertilization is 150kg/ha of triple sulphate and 150kg/ha of ammonium nitrate.

3) Plant protection

Dithane M45(fungicide) should be applied to prevent disease infestation.

4) Harvesting

Harvesting by hand picking is proposed as presently practiced.

(6) Potatoes

1) Planting

Proposed planting distance is 1.2 x 0.3m, while seed potato requirement is about 2,000kg/ha. Proposed variety is cosima.

2) Fertilization

The recommended fertilization consists of manure(organic fertilizer) at a rate of 40,000kg/ha, compound 20-20-0 at 300kg/ha and ammonium nitrate at 350kg/ha.

3) Plant protection

Chemical spraying to prevent disease and insect should be required using Dithane M45 and Trikilon 80.

(7) Vegetables(Tomato)

1) Planting

Proposed varieties include H.ES and 24F. Proposed plant population is about 25,000/ha.

2) Fertilization

The following fertilizations are recommended:

- Manure(organic fertilizer) 10,000kg/ha
- DAP 18-46 250kg/ha
- Ammonium Nitrate 200kg/ha

3) Plant protection

Chemical spraying to prevent disease should be required using Dikotan 2.78.

(8) Alfalfa

1) Variety and sowing

Elci is the recommended variety in the project area. A seed rate of 6kg/ha is recommended to be sown by tractor.

2) Fertilization

The following fertilizations are recommended:

- Manure(organic fertilizer) 5,000kg/ha
- DAP 18-46 250kg/ha
- Ammonium Nitrate 200kg/ha

(9) Fruit(apple)

1) Variety

Proposed varieties include Star King, Golden Delicious and Erzincan. Recommended density of planting is 300 trees/ha.

2) Fertilization

About 7,500kg/ha of manure(organic fertilizer) is recommended for a matured orchard along with 100kg/ha of compound 20-20-0 and 100kg/ha of ammonium nitrate.

3) Plant protection

Chemical spraying to prevent disease and insect should be required using Lebaycide, Meoron, CuSO4 and Desis.

(10) Grape

Varieties and cultivation methods presently adopted are proposed to be maintained.

6. Future Farm Labor Force

Study on the balance between available labor and labor requirement for the proposed cropping pattern is shown in Table V-2.

Available labor is estimated based on the number of farm households in rural area of the Project area.

As the result of the study, labor deficits are indicated in the said table in May and September during the planting and sowing season of summer

crops such as sugar beet and dry bean, and harvesting season of dry bean and vegetables. For the following reasons, however, the proposed cropping pattern is possible in term of the future labor balance:

-Farm households in urban areas are not considered in the study of the labor balance;

- Considerable proportion of peak harvesting is presently carried out by migrant laborers from the mountain areas. The employment of these laborers will be possible in the future; and,

- Surplus labor exists in the urban areas.

With the intensification of land use and agriculture under the Project, the annual labor requirement will increase from the present 1,812,300 man/days to 3,857,800 man/days in the future. The increase in labor opportunities of 2,045,500 man/days per year is expected under the Project.

7. Future Farm Machinery Balance

According to the information of agricultural engineering office, the number of farm tractors in the Project area is about 1,160 units. Most farmers in the area are experienced in practicing relatively reliable farm mechanization. Conditions for farm mechanization in the Project area are thus favorable.

Study on the farm tractor operating hours required by crops for the proposed cropping pattern is presented in Table 1.18-1.19. Assuming eight hours/day and 150 days/year of operation per unit, the annual operating hours will be 1,392,000 hours. As a result, the farm machinery in the area still has a favorable balance of operation.

8. Animal Husbandry

The purpose of animal husbandry in the Project area is mainly home consumption to improve farmer's nutrition. Only sheep farming is conducted commercially for the products of milk, wool and live sheep. The number of

animals presently raised per farm is 0.7 head of milk cow and 20.3 head of sheep in the gravity area and southern pumping area, and 2.2 head of milk cow and 58.4 head of sheep in the northern pumping area. Present production of animal husbandry is estimated as shown in Table 1.9. The productivity of sheep products is 1.5kg/head of wool, 48.0kg/head of milk and 13.0kg/head of meat.

Under the Project, the increased yield is sought through the improvement of the raising conditions, such as sanitation, nutrition and grassland. Proposed productivity of sheep is 3.0kg(wool),75.0kg(milk) and 15.0kg(meat). The future sheep farming will be maintained under the existing condition because of the limited raising capacity of farmer and established handling and feeding techniques. For the milk cow breeding, the increase in number of milk cow and milk production condition is planned. The expected production of animal husbandry in detail is shown in Table V-8.

V-2 Agricultural Economy

1. General

The agricultural sector of Turkey has an indispensable place in the nation's industrialization and development and the sectorial shares of the GNP(1987) accounts for 16.3% at current prices as shown below.

Sectoral Shares of the GNP at Current Prices(%) Source: SIS

Year	Agriculture	Industry	Services
1983	18.3	27.0	49.0
1984	18.4	28.2	49.0
1985	16.3	30.0	47.4
1986	16.8	28.9	45.0
1987	16.3	28.9	45.5

About 47percent of the population is rural, and most of it is engaged in agricultural production. About 27.6 percent of all exports are agricultural products in 1987. In view of its high number of farmer population, feeding for the increasing population and because of it significant contribution to the national economy, agricultural production continues to maintain its strategic importance.

Agriculture in the Project area is lesser developed than other areas in the region, consequently there is low productivity per unit of land or per animal. In order to raise productivity, better utilization of the inputs and intensive cultivation by irrigation are necessary.

The cultivation of wheat, barley and chick-pea are dominant in the area but sugar beet, dry bean and sunflower are produced in some irrigated areas. Wheat is the most important crop for export in Turkey and its production is of high standing in the agricultural policy of the government. Also, this crop is as one of the fundamental nutrients of the national diet. Barley is a traditional fodder crop in Turkey and has a close connection with the promotion of animal husbandry in the area. The representative summer crop in the dry area of the Project area is chick-pea and its demand in local markets is high. This crop is also exported. Most of the crops produced in the area are, however, shipped to the local markets and the factories such as Elbistan sugar factory and processing factories in the surrounding areas.

2. Policies

The national policies related to agricultural development are formulated by the Ministry of Agriculture, Forestry and Rural Affairs in accordance with the Fifth Five Year Development Plan 1984-1989.

According to this plan, the targets in agriculture are as follows:

(1) The outputs of the agricultural sector will develop by a yearly 3.6% on average during the 5th Plan period, the average annual growth rates of such agricultural sub-sectors as vegetable production, livestock breeding, water products and forestry products being respectively 3.0%, 4.7%, 7.7%, and 3.1%.

(2) The 24.8% share of the agricultural sectors production in the overall physical production in 1984 is estimated to drop to 21.5% at the end of the Plan period.

(3) Total agricultural exports are expected to reach the level of 241.6 billion TL, in 1984 and are expected to grow by an average annual 9.1% and rise to 374 billion TL at the end of the Plan period, of which 66.2 will account for vegetable production, 27.4% for animal husbandry, 3.0% for forestry and 3.4% for water products.

(4) The aim is to raise the share of agricultural products exports in the overall production from 7.1% to 9.1% during the Plan period.

Sectorial principles and policies related to agriculture are summarized as follows:

(1) To support co-operative operations aimed at processing and marketing agricultural products, and to improve and strengthen agricultural credit conditions,

(2) To sustain the emphasis being placed on irrigation investments in order to increase agricultural yield, diversify the vegetal pattern and to apply advanced technology in-field and soil preservation services and especially the development of small water sources and underground water sources, entering these investments on arid areas,

(3) To achieve effective cooperation between interested organizations so as to develop the South-Eastern Anatolia projects,

(4) To continue practices aimed at taking advantage of fallow fields, through the cultivation of edible pulses and feed pulses, in regions with

suitable average rainfalls,

(5) To plan sugar beet production on the basis of domestic demand,

(6) To create seed stock industry enabling the breeding of high yield standard species of all vegetable crops and

(7) To promote orchards and vineyards through the supply of seed stocks, shrubs, seedlings and vine saplings.

3. Institutional Organizations

The administration of the agricultural sector is enforced by the Ministry of Agriculture, Forestry and Rural Affairs and its organization is shown in Plate V-1.

The authorities concerned in the Project area are the District Directorate of Ministry in Afsin and Elbistan of Provincial Directorate of Ministry in Kahramanmaras. There are established district agricultural engineering offices for agricultural extension including administration of livestock. Besides, the Ministry of Agriculture, Forestry, and Rural Affairs has established the Provincial Directorates of Village Services and Forestry in Kahramanmaras. The works relating to the rural development in the area are conducted by the Provincial Directorate of Village Services.

The fruit nursery station in Afsin is established by the Ministry and this station promotes orchards through the supply of improved nursery tree to farmer in the area.

Public institutions concerned are as follows:

(1) TMO - Turkish Grain Board(Soil Products Office)

TMO is an organization under which the markets of cereal, grain and pulses are organized and controlled in domestic and foreign trade. In the Project area,there is an office in Elbistan which belongs to the Regional Directorate in Iskenderun. This office purchases a portion of such production each year.

(2) TZDK - Agricultural Supplies Organization

TZDK is an organization in charge of the agricultural inputs' supply and agricultural tractor manufacture. The offices in Afsin and Elbistan are supplying agricultural inputs to farmers in the area.

(3) TIGEM - General Directorate of Agricultural Enterprises

TIGEM produces and distributes seed, saplings and studs required by

farmers. The farmers in the area obtain certificated and improved seeds produced by TIGEM through agricultural engineering office.

(4) Agricultural Bank

The Agricultural Bank is one of the public banking services as a government enterprise, performing the activities for agricultural credits. The Agricultural Bank also extends credits to the agricultural credit and sales cooperatives of the communities. There are two branch offices in Afsin and Elbistan.

(5) Sugar Bank

The Sugar Bank is one of the public banking services as a government enterprise and supports sugar beet production with a range of credits.

The Sugar Bank has established two branch offices in Afsin and Elbistan for the sugar beet producers in the area.

(6) TSEK - Dairy Industries Organization

TSEK is commissioned to evaluate milk production to develop proper cattle breeding. In Kahramanmaras, this organization has established a dairy processing factory to produce the dairy products such as butter and cheese in the provincial level.

(7) TSF A.S. - Joint-Stock Corporation of Sugar Industries

TSF A.S. is a quasi government enterprise to produce sugar under the national policy of sugar beet production. There is a sugar factory in Elbistan which performs an important role in sugar beet production of the area.

(8) DSI - General Directorate of State Hydraulic Works

DSI of the Ministry of Public Works has jurisdiction over the country's water resources, and follows a program of development which includes irrigation, drainage, flood control and hydroelectric power. The branch office No.204 belonging Regional Directorate in Kahramanmaras is established in Afsin and this office is responsible for implementing the Project directly.

(9) Local Government

The Project area belongs to both administrative districts of Afsin and Elbistan and is under the jurisdiction of a representative of the central government appointed by the Ministry of Interior.

4. Agricultural Production and Net Return

Study on the agricultural production and net return without and with the project conditions has been conducted based on the data and information obtained from the agricultural engineering offices and farming survey in the Project area. In order to calculate the balance of crop and animal husbandry productions, the price data on product,as farm-gate price of crop, obtained from the agricultural engineering offices and farm survey and agricultural inputs,such as fertilizer,agrochemicals,etc., supplied by agricultural authorities and organization based on the Commodity Price List for 1988 are used.

As aforementioned,present conditions of agricultural production in the Project area are unfavorable due to constraints by topographic features and climatic conditions and lack of irrigation water. Present annual outputs of agriculture are estimated at about TL 21,711 million and its net returns are TL 8,809 million TL. as shown in Table V-5. and V-6.

With the Project implementation, annual outputs of agriculture will be increased by TL 71,108 million and TL 41,351 million of net returns is expected as showns in Table V-5. and V-6. The increased outputs attain to 49,397 million TL and it shows twice as much as present outputs.

Besides, the production of animal husbandry in the area will also be increased by improving the conditions of animal raising after completion of the Project. Present and future outputs and net returns of animal husbandry are estimated as showns in Table V-7 and V-8.

5. Foreign Trade of Agricultural Products

The amount of exported agricultural products was 27.6 percent of total exports in 1987. The exports by main sectors are tabulated in Table V-9.

Export of agricultural products by sub-groups between 1982-1987 is given in Table V-9, too. As can be seen from the figures, export of agricultural products declined in 1983 and in 1985. In 1986 it rose again with the increase of vegetal products but in 1987 it declined by 1.8% going down to the level $1,852.8 million. On commodity basis, exports of hazel nut, tobacco, wheat, raisins and lemon increased while export of dry fig, pistachio and cotton declined.

Imports related to the agricultural sector and animal husbandry are 5.5% of the total amount of imports in 1987.

6. Marketing

(1) Price policy

In Turkey, support prices are set by the government for the following crops: wheat, barley, maize, oat, rice, pulses, raisin, dried fig, hazel nuts, pistachio, sugar beet, cotton, sunflower, tobacco, fresh tea and olive oil. In addition the animal products such as beef, mutton, poultry meat, milk, merino wool, prices for mohair and silkworm cocoon are also set.

The markets dealing with the above crops and animal products are organized and controlled by government economic organizations.

The organizations purchase a portion of these crops and animal products each year. The purpose of government purchasing is to prevent the market price from falling below the support price, and to guarantee a certain price to the producer.

Other crops and animal products are sold at free market prices.

(2) Marketing conditions

1) Wheat

Nutrition in Turkey is dependent on cereals, in other words on wheat. So supply of wheat requirement in the local market is of almost strategical significance. Concerning the wheat production, the first and most important goal of Turkey is self-sufficiency. To increase production and export of wheat will also be very beneficial.

Over 9.4 million hectares of agricultural land are cultivated for wheat and it accounts for 50.1% of total land of cultivation. In 1987, the wheat production in the national level was 18,900,000 tons. Wheat production increased 15.2% from 1983 to 1987. The demand for wheat is estimated at 10,133,000 tons, assuming that an apparent consumption per capita for the year of 1987 is 200kg/year. Production thus surpasses levels for self-sufficiency.

As for the Project area, about 85% is purchased by grain traders and

the remaining portion by TMO in 1988. The markets for wheat produced in the area are Kahramanmaras, Adiyaman, Gaziantep, Adana and Hatay.

2) Barley

Barley is not only an important fodder crop, but is also the main raw material of the beer industry. Land under barley cultivation in Turkey is 17.6% of the total cultivated land, and is approximately 3.3 million hectares. As clear from these figures, barley is the second important cereal after wheat. This is due to the fact that barley can grow even in dry seasons.

In 1987, barley production was 6,900,000 tons. Increase in wheat production from 1983 to 1987 was 27.2%. and is higher than that of wheat. Barley does not account for a significant share of exports.

The barley market is controlled by the procurement of TMO and by the supporting prices determined by the state. There are great fluctuations in barley procurement according to the years.

Market mechanism applied for barley in the area is similar to that of wheat.

3) Sugar beet

In Turkey, of 350 thousands hectare area in cultivation, there is around 10 million tons of sugar beet sown each year. The yield per hectare runs around 30 tons. Cultivation of sugar beet is carried out in small scale farms under the management of the Joint-Stock Corporation of Sugar

Industries in accordance with teaching of modern agricultural concepts. 74% of sugar beet growers cultivate about 1 hectare.

Sugar beet production policy in Turkey is mainly directed to meeting domestic requirements and not for exporting. Market mechanism for this crop is completely established by the policy.

4) Dry bean

Dry bean is a nutrition material rich in proteins, vitamins and minerals and is a crop with capacity of enriching soil in respect of nitrogen through nodules at its roots. Dry bean sown areas amounted in 1987 to 180 thousands hectares. Irrigation is indispensable for cultivation of dry bean, consequently, its sown area is limited in Turkey. The marketability and profitability of dry bean are

advantageous over the other pulses.

In particular this crop is widely cultivated as rotation crop for sugar beet production and summer crop in existing irrigated area of the Project area. Market mechanism applied for dry bean is similar to cereals such as wheat and barley.

5) Sunflower

Sunflower, which is one of the basic raw materials of the margarine industry, is largely cultivated in Thrace and Marmara regions. Sunflower is being cultivated in over 775,000 hectares. Areas under of sunflower cultivation are approximately 4.1% of the total sown area.

Sunflower cropping fails to meet domestic demand and therefore there is no stocking of the same.

Raw sunflower oil import is unrestricted.

Supporting sunflower production is being undertaken by the Joint-Stock Corporation of Sugar Industries. In the Project area, sunflower seeds are shipped to the factories in Gaziantep, Adana and Mersin via middlemen because market price is higher than the support price, though Elbistan Sugar Factory purchased sunflower seeds from farmers until 1986.

6) Potatoes

Potatoes are one of the most important and stable vegetables grown in Turkey. They are grown in all the regions of the country. In 1987, the planted area of potatoes was 194 thousands hectares. Annual production is around 4 million tons.

Although exports of potatoes have decreased in recent years, export figures in 1987 showed a recovery. Indeed exports reached 45 thousands tons while those of 1986 were only 8,400 tons. Principal markets are the Middle-Eastern countries. Market mechanism for exporting potatoes is established by trading firms.

Potatoes produced in the Project area are mostly for self-consumption of farmers and are shipped in small quantity to the Elbistan wholesale market via middlemen. The quantity of potatoes shipped only accounts for 30% of potatoes handled by the market.

7) Vegetables and fruit

Vegetal production is the leading subsector of Turkish agriculture, the vegetal perishables, such as vegetables and fresh fruit, constituting the backbone of the sector. Out of the 80 types of fresh produce grown in Turkey, 30 kinds of vegetables and 20 kinds of fruits are virtually subject to exports. The leading commodities of this sector are tomatoes, onions, fresh peppers, and melons according to the order of importance in terms of their export revenue. Exports of fresh fruits and vegetables make up about one tenth of the total agricultural exports while, it constitutes 11% of the vegetal exports.

Market mechanism applied for these products is established by wholesalers and trading firms.(Refer to Plate V-2. Marketing channels for fresh fruit and vegetable)

Vegetables produced in the Project area are for self-consumption as well as potatoes. In the Elbistan market, the percents of deal in vegetables produced in the area are; tomatoes 40%, spinach 40%, garlic 30% and cabbage 80%.

Fruit, apple and apricot, are grown in the area. These fruits have high quality and favorable market conditions. Those are shipped to the local markets such as Kayseri, Malatya, Kahramanmaras, Gaziantep and Adana via middlemen.

Improvements are being made on the distribution systems under the 5th 5-year plan, and new facilities are under construction to be constructed in 1989 at Elbistan wholesale market. Similar improvements are being made in the nearby cities.

8) Livestock

Total livestock reaches to some 77 millions mainly consisting of sheep, goat and cattle species. Turkey's red meat production per annum is over one million ton. The percentage breakdown is; 47% beef and 39% mutton-lamb. The remainder is goat and buffalo meat. On the other hand, per capita red meat consumption in Turkey is around 22kgs. Animals slaughtered and consumed in rural regions are of a large quantity. The slaughterhouses are owned and operated by the municipalities, in addition the Meat and Fish Organization which is a government economic enterprise. There are also modern

7. Farmer's Organization and Agricultural Supporting System

(1) Agricultural Supporting System

1) Agricultural extension services

The agricultural extension by the General Directorate of Rural Affairs of the Ministry of Agriculture, Forestry and Rural Affairs(MAFRA) is executed at the provincial and district levels by extension staff of the farmers education and extension section. Under the extension specialists, there exist village group technicians who bring services via leader farmers to the villages allocated to them. The extension staff are supported by agricultural technicians and animal health technicians.

Various extension services are provided to the farmers in the Project area mainly by Afsin and Elbistan Agricultural Engineering Offices of MAFRA. The personnel organizations of these offices are listed in Plate V-3. Within the area, Afsin Agricultural Engineering Office has established three branch office in Aritas, Cobanbeyli and Tanir, and an agricultural technician resides at each branch office to carry out the services. In addition, five pest control and bull stations are set up in the major villages. Present extension activities in the area are not, however, considered adequately extensive. The reason that such activities have not had the desired impact at the farmer level is that a lengthy period is considered necessary to wean farmers away from traditional farming practices controlled by the historic rural social structure. In addition the same offices have no extension such as vehicles, audio-visual education aids and farm machinery for education.

Afsin Fruit-tree Nursery Research Station of MAFRA is in charge of production of high-grade fruit saplings, their sales to the farmers and promoting fruit growing among them. Elbistan Sugar Factory provides sugar beet producers with technical guidance on farm management and crop growing.

2) Input supply system

Seed production and distribution in Turkey had been handled by the

extending farm credits to the farmers of the Project area. The former offers credit either directly or through the latter to the farmers. The Sugar Bank offers credit to sugar beet growers.

The credit conditions applied by the Agricultural Bank and the Agricultural Cooperatives are formulated based on the credit report prepared by the Agricultural Engineering Office. However, a limit is put on the credit according to kind of crop as shown in Table 2.20. Annual interest rates are set at 39% for cereals and 30% for livestock. The rate of interest is adjusted according to that of inflation.

The Agricultural Bank has three main sources of funds: its own capital, the Central Bank sources and the deposits of customers. It is also an banking agency for credits from foreign banking institutions. The credits are short term production credits, medium term machinery and equipment credits and medium and long term investment credits.

The agricultural credit cooperatives related to the area number five in Afsin and one in Elbistan as below.

Cooperatives	Members	Amount of Credits(TL)
Afsin	3,380	1,400,000,000
Aritas	1,100	700,000,000
Alemdar	900	700,000,000
Esence	400	400,000,000
Tanir	1,800	800,000,000
Elbistan	545	350,000,000

(2) Farmer's organization

In the course of the field study, the following two farmer's organizations are identified.

1) The chamber of agriculture

The Elbistan Chamber of Agriculture with legal status is established in the Project area, but this chamber is not active due to financial problems. The Chamber of Agriculture Law, issued in 1957, gives authority and responsibility to each chamber to engage in extension, research, input provision, marketing and other activities to support farmers.

2) Sugar beet producers' cooperatives

Only the sugar beet producers' cooperatives established by the Associations Law are functioning in the Project area. They are operated under the guidance of the government and the Joint-Stock Corporation of Sugar Industries with their products directly sent to Elbistan Sugar Factory. Only the members of the cooperatives are allowed to produce sugar beet. The cooperatives provide their members farm machinery as well as supporting them by selling materials and input of growing of sunflower and vegetables.

(3) Establishment of agricultural training center

The farmers in the Project area presently have almost no experience in irrigation farming. In order to achieve the objectives of the Project, establishment of the agricultural training center which has one component in the program for technology transfer with regards to irrigated farming practices will be planned.

The following tasks are to be undertaken at the center.

- To investigate the methods of improved irrigation/agronomy
- To provide effective hands-on training on water use and application technologies to the farmers
- To conduct technical assistance to the farmers on the planning-design of irrigation systems
- To demonstrate irrigated farming practices for field crops, fruit and vegetables to the farmer

The center will be established at the site of Agricultural Engineering Office and Fruit-tree Nursery Research Station in Afsin.

The center will furnish a training building, garage, training equipment, vehicles and field facilities.(Refer to Table V-11)

(4) Establishment of marketing cooperatives

With the Project, agricultural production of the Project area will be considerably increased. Moreover, it will be possible to produce agricultural products of good quality. Under the present circumstances, marketing and distribution of most of the agricultural products in the area, except for sugar beet, are handled and controlled by middlemen and traders.

Taking into consideration the present social structure in the area, the cooperatives are organized in the village unit and are operated under the coordination and guidance of agricultural engineering office. In the future these cooperatives will organize a Commission at the district level and a Union in the area and will extend their marketing activities. The cooperatives Union will install a cool storage facility for fruit, milk and daily products in the area. Management of the Union will be conducted by president, secretary and treasurer elected by representatives of the Commissions. In establishing the cooperatives, strong supports and guidance by the government to the farmers is recommended.(Refer to Plate V-4)

8. Farm Household Economy

In order to evaluate the irrigation project from farm household economy viewpoint, analysis of farm budgets for model farms was carried out. Three model farms, consisting of the typical farm in the gravity, northern pumping and southern pumping areas, were taken as representatives of farms existing in the area for the farm household economy survey.

For these model farms, a typical farming practice have been assumed both for non-irrigated/partly-irrigated(without project) and irrigated (with project) cases, considering the characteristics of present farming conditions. For each case, income and expenditure have been estimated for crop cultivation and animal husbandry activities.

The detailed results are given in Table V-12. From these results, the net income per ha is calculated for each farm with and without project as follows.

Area	Wuthout Project	With Project
Gravity	432,928 TL	1,500,555 TL
Southern Pumping	639,410	1,396,183
Northern Pumping	373,274	1,658,233

As mentioned above, the income levels will more than double at the individual farm levels by the introduction of irrigation.

Note-<1>: Criteria for Production Cost

1. Price of agricultural input(seed, fertilizer, agrochemicals,etc.) are based on the price list of TZDK.
2. Labor costs for farm and animal husbandry are based on the collected data from farm survey and agricultural engineering office.
   Farm labor: 5,000TL/day
   Animal husbandry labor: 4,000TL/day
3. Other costs are based on the credit report prepared by the Agricultural Engineering Office.
4. Production and raising cost for animal husbandry prepared by DSI are used.

Note-<2>: Criteria for Farm Household Economy

1. Machinery: In case of farmer owned tractor, no account of machinery cost is made, although 4/10 of machinery cost is estimated as other cost.
2. Interest: Annual interest of 39% is applied for fertilizer and agro-chemicals.
3. General cost: General cost including administration and amortizatio costs is estimated at 10% of total expenditure.(excluding interest)
4. Home consumption: Home consumption by farmers is based on the 5th 5-Year Plan.
5. Living expenses: Living expenses are based on the information of the Agricultural Engineering Office.

Main Crop Production in Turkey(1987)

Crops	Cropped Area(ha)	Production (ton/ha)	Yield (kg/ha)
Wheat	9,415,000	18,900,000	2,007
Barley	3,314,000	6,900,000	2,082
Maize	570,000	2,400,000	4,211
Rice	53,000	165,000	3,113
Chick-pea	665,000	725,000	1,090
Dry bean	180,000	210,000	1,167
Lentil	916,000	925,000	1,010
Cow Vetch	226,000	180,000	796
Sugar beet	391,592	12,717,000	32,475
Cotton	585,800	536,786	916
Sunflower	757,600	1,100,000	1,451
Dry onion	73,000	1,300,000	17,808
Dry garlic	9,500	67,000	7,053
Potatoes	194,000	4,300,000	22,173
Alfalfa	184,000	1,064,000	-
Sainfoin	104,000	265,000	-
Vegetables(total)	608,971	15,222,465	
Cabbage		500,000	
Spinach		130,000	
Green bean		400,000	
Green pea		40,000	
Squash		300,000	
Cucumber		800,000	
Eggplant		710,000	
Tomatoes		5,000,000	
Green onion		150,000	
Green pepper		250,000	

Source: MAFRA

Main Fruit Production in Turkey (1987)

Fruit	Number of Tree	Production (ton)
Pear	15,065,000	370,000
Apple	39,935,000	1,680,000
Plum	7,878,000	135,000
Apricot	9,095,000	210,000
Cherry	5,898,000	120,000
Peach	11,465,000	235,000
Sour cherry	4,416,000	75,000
Lemon	4,617,000	340,000
Mandarin	7,255,000	270,000
Orange	10,910,000	700,000
Grape*	590,000	3,300,000
Mulberry	3,903,000	85,000
Fig	10,475,000	355,000

Note: * hectare
Source: MAFRA

Main Crop Production in K. Maras
(1987)

Crops	Cropped Area(ha)	Production (ton/ha)	Yield (kg/ha)
Wheat	190,627	398,207	2,090
Barley	53,714	115,631	2,153
Maize	1,884	4,932	2,618
Rice	127	313	2,465
Chick-pea	50,588	49,124	973
Dry bean	18,536	28,481	1,537
Lentil	892	810	894
Cow Vetch	409	413	1,010
Sugar beet	9,614	292,251	30,959
Cotton	22,000	19,517	887
Sunflower	4,336	7,355	1,696
Dry onion	862	14,754	17,116
Dry garlic	170	1,192	7,012
Potatoes	953	12,623	13,246
Alfalfa	1,712	11,716	-
Sainfoin	350	1,605	-
Vegetables(total)	5,236	94,050	
Cabbage		11,720	
Spinach		75	
Green bean		1,707	
Green pea		0	
Squash		1,747	
Cucumber		9,570	
Eggplant		4,010	
Tomatoes		53,935	
Green onion		2,110	
Green pepper		861	

Source: MAFRA

Main Fruit Production in K.Maras
(1987)

Fruit	Number of Tree	Production (ton)
Pear	148,800	6,110
Apple	670,700	34,800
Plum	23,350	341
Apricot	283,980	9,424
Cherry	69,700	779
Peach	38,610	955
Sour cherry	50,060	1,042
Lemon	0	340,000
Mandarin	0	270,000
Orange	0	700,000
Grape*	29,252	101,735
Mulberry	72,600	1,672
Fig	39,350	966

Note: * hectare
Source: MAFRA

Main Crop Production in Afsin
(1987)

Crops	Cropped Area(ha)	Production (ton/ha)	Yield (kg/ha)
Wheat	31,722	26,099	823
Barley	5,561	5,064	911
Maize	108	231	2,139
Rice	0	0	0
Chick-pea	18,141	15,254	843
Dry bean	2,004	3,379	1,686
Lentil	150	91	607
Cow Vetch	249	253	1,016
Sugar beet	2,620	82,984	32,340
Cotton	0	0	0
Sunflower	1,334	2,619	1,963
Dry onion	80	1,274	15,925
Dry garlic	40	202	5,050
Potatoes	199	2,735	13,744
Alfalfa	299	1,499	-
Sainfoin	40	80	-
Vegetables(total)	503	-	
Cabbage		700	
Spinach		0	
Green bean		450	
Green pea		0	
Squash		200	
Cucumber		1,020	
Eggplant		0	
Tomatoes		11,200	
Green onion		75	
Green pepper		9	

Source: MAFRA

Main Crop Production in Elbistan
(1987)

Crops	Cropped Area(ha)	Production (ton/ha)	Yield (kg/ha)
Wheat	64,435	100,136	1,354
Barley	38,003	82,677	2,176
Maize	0	0	0
Rice	0	0	0
Chick-pea	17,277	10,377	602
Dry bean	7,515	13,758	1,831
Lentil	0	0	0
Cow Vetch	120	120	1,000
Sugar beet	4,391	124,302	28,661
Cotton	0	0	0
Sunflower	1,890	3,339	1,767
Dry onion	100	796	7,960
Dry garlic	15	46	3,067
Potatoes	599	7,032	11,740
Alfalfa	70	1,399	-
Sainfoin	0	0	-
Vegetables(total)	500	-	
Cabbage		5,600	
Spinach		0	
Green bean		150	
Green pea		0	
Squash		450	
Cucumber		1,875	
Eggplant		0	
Tomatoes		4,025	
Green onion		300	
Green pepper		201	

Source: MAFRA

Main Fruit Production in Afsin
(1987)

Fruit	Number of Tree	Production (ton)
Pear	12,000	475
Apple	50,000	2,233
Plum	600	42
Apricot	67,000	596
Cherry	7,500	77
Peach	2,400	31
Sour cherry	13,250	398
Lemon	0	0
Mandarin	0	0
Orange	0	0
Grape*	2,107	7,297
Mulberry	2,700	372
Fig	0	0

Note: * hectare
Source: MAFRA

Main Fruit Production in Elbistan
(1987)

Fruit	Number of Tree	Production (ton)
Pear	38,000	4,040
Apple	181,000	18,008
Plum	0	0
Apricot	170,000	8,042
Cherry	10,300	328
Peach	8,200	332
Sour cherry	12,200	417
Lemon	0	0
Mandarin	0	0
Orange	0	0
Grape*	5,518	27,300
Mulberry	18,800	646
Fig	0	0

Note: * hectare
Source: MAFRA

Family Labor Force in Project Area

Gravity Area

Age Group	Female	Male	Total	%	Labor Force
0 - 6	0.57	0.67	1.26	21.00	-
7 - 14	0.78	0.93	1.71	28.50	0.86
15 - 49	1.05	1.16	2.21	36.80	1.94
50 - 64	0.45	0.37	0.82	13.70	0.49
65 - over	-	-	-	-	-
Total	2.85	3.15	6.00	100.00	3.29

Pumping Area

Age Group	Female	Male	Total	%	Labor Force
0 - 6	0.50	0.55	1.05	23.60	-
7 - 14	0.40	0.45	0.85	19.10	0.43
15 - 49	1.00	1.10	2.10	47.20	1.85
50 - 64	0.25	0.20	0.45	10.10	0.27
65 - over	-	-	-	-	-
Total	2.15	2.30	4.45	100.00	2.55

Necessary Labor Force (Present)

Kind of Crop	Area (ha)	Family Labor (Man·day/ha)	Family Labor (Man·day)	Hired Labor (Man·day/ha)	Hired Labor (Man·day)	Total (Man·day)
Wheat (Dry)	14,939	3.6	53,780	5.8	86,646	140,427
Wheat (Irr.)	1,863	7.2	13,414	7.2	13,414	26,827
Barley (Dry)	3,572	3.9	13,931	6.3	22,504	36,434
Barley (Irr.)	291	7.2	2,095	7.2	2,095	4,190
Sugar Beet (Irr.)	2,473	58.7	145,165	59.3	146,649	291,814
Dry Bean (Irr.)	2,270	36.1	81,947	29.3	66,511	148,458
Chick Pea (Dry)	8,165	13.1	106,962	14.8	120,842	227,804
Lentil (Dry)	151	14.5	2,190	16.4	2,476	4,666
Cow Vetch (Dry)	510	13.5	6,885	15.6	7,956	14,841
Potato (Irr.)	257	71.5	18,376	39.9	10,254	28,630
Vegetable (Irr.)	111	76.8	8,525	35.0	3,885	12,410
Sunflower (Irr.)	507	32.5	16,478	23.4	11,864	28,341
Fruit (Irr.)	413	49.0	20,237	58.8	24,284	44,521
Vineyard (Dry)	604	34.2	20,657	44.6	26,938	47,595
Poplar (Irr.)	442	39.4	17,415	21.7	9,591	27,006
Other	3,059	—	—	0.4	1,224	1,224
Sub Total	39,627	—	528,055	—	557,134	1,085,188
Kind of Animal	Number	Family Labor (Man·day/head)	Family Labor (Man·day)	Hired Labor (Man·day/head)	Hired Labor (Man·day)	Total (Man·day)
Cow	11,100	16.56	183,816	—	—	183,816
Sheep	108,100	3.91	422,671	—	—	422,671
Sub Total	119,200	—	606,487	—	—	606,487
Total	—	—	1,134,542	—	557,134	1,691,675

Table V - 2
Sheet 3

Monthly Labor Force (Present) (Unit : Man·day/ha, Man·day/Head)

Kind of Crop	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	TOTAL
Wheat (Dry)				0.4	0.5		4.0	3.5	0.4	0.6			9.4
Wheat (Irr.)				0.4	1.5	1.5	5.0	5.0	0.4	0.6			14.4
Barley (Dry)				0.4	0.8		4.2	3.8	0.4	0.6			10.2
Barley (Irr.)				0.4	1.5	1.5	5.0	5.0	0.4	0.6			14.4
Sugar Beet (Irr.)			1.4	1.0	34.2	30.0	4.0	7.0	20.0	20.0	0.4		118.0
Dry Bean (Irr.)			0.4	1.0	22.0	11.0	1.0	1.0	1.0	23.0	5.0		65.4
Chick Pea (Dry)			0.2	0.8	4.0	3.5	12.0	7.0		0.4			27.9
Lentil (Dry)			0.2	0.8	4.0	3.5	14.0	8.0		0.4			30.9
Cow Vetch (Dry)			1.0	0.3	2.4	3.0	15.0	7.0		0.4			29.1
Potato (Irr.)			0.4	1.0	25.0	30.0	6.0	8.0	30.0	10.6	0.4		111.4
Vegetable (Irr.)			0.4	30.4	34.0	5.0	6.0	4.0	31.6	0.4			111.8
Sunflower (Irr.)				0.4	11.5	11.5	2.0	1.5	19.0	10.0			55.9
Fruit (Irr.)				13.9	20.9	4.5	1.5	55.0	12.0				107.8
Vineyard (Dry)				20.3	22.0	3.0		30.0	3.5				78.8
Poplar (Irr.)			25.0	12.0	2.5	20.0	0.4	0.4	0.4	0.4			61.1
Others										0.4			0.4

Kind of Animal	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	TOTAL
Cow	0.94	0.85	1.66	1.84	1.93	1.84	1.93	1.93	1.17	0.54	0.99	0.94	16.56
Sheep	0.27	0.27	0.54	0.54	0.54	0.54	0.54	0.54	0.13	0.09	0.09	0.27	3.91

Table V-2
Sheet 4

Monthly Labor Force (Present) (Unit : Man-day)

Kind of Crop	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	TOTAL
Wheat (Dry)				5,976	7,470		59,756	52,287	5,976	8,963			140,427
Wheat (Irr.)				745	2,795	2,795	9,315	9,315	745	1,118			26,827
Barley (Dry)				1,429	2,858		15,002	13,574	1,429	2,143			36,434
Barley (Irr.)				116	437	437	1,455	1,455	116	175			4,190
Sugar Beet (Irr.)			3,462	2,473	84,577	74,190	9,892	17,311	49,460	49,460	989		291,814
Dry Bean (Irr.)			908	2,270	49,940	24,970	2,270	2,270	2,270	52,210	11,350		148,458
Chick Pea (Dry)			1,633	6,532	32,660	28,578	97,980	57,155		3,266			227,804
Lentil (Dry)			30	121	604	529	2,114	1,208		60			4,666
Cow Vetch (Dry)			510	153	1,224	1,530	7,650	3,570		204			14,841
Potato (Irr.)			103	257	6,425	7,710	1,542	2,056	7,710	2,724	103		28,630
Vegetable (Irr.)			44	3,374	3,774	555	666	444	3,508	44			12,410
Sunflower (Irr.)				203	5,831	5,831	1,014	761	9,633	5,070			28,341
Fruit (Irr.)				5,741	8,632	1,859	620	22,715	4,956				44,521
Vineyard (Dry)				12,261	13,288	1,812		18,120	2,114				47,595
Poplar (Irr.)			11,050	5,304	1,105	8,840	177	177	177	177			27,006
Others										1,224			1,224
Sub Total			17,741	46,955	221,617	159,633	209,453	202,416	88,093	126,838	12,442		1,085,188

Kind of Animal	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	TOTAL
Cow	10,434	9,435	18,426	20,424	21,423	20,424	21,423	21,423	12,987	5,994	10,989	10,434	183,816
Sheep	29,187	29,187	58,374	58,374	58,374	58,374	58,374	58,374	14,053	9,729	9,729	29,187	471,316
Sub Total	39,621	38,622	76,800	78,798	79,797	78,798	79,797	79,797	27,040	15,723	20,718	39,621	655,132
Total	39,621	38,622	94,541	125,753	301,414	238,431	289,250	282,213	115,133	142,561	33,160	39,621	1,740,320

Table V-2
Sheet 5

Necessary Labor Force (Future)

Kind of Crop	Area (ha)	Family Labor (Man·day/ha)	Family Labor (Man·day)	Hired Labor (Man·day/ha)	Hired Labor (Man·day)	Total (Man·day)
Wheat	9,658	8.7	84,025	9.3	89,819	173,844
Barley	1,970	8.6	16,942	9.8	19,306	36,248
Sugar Beet	6,558	68.5	449,223	71.9	471,520	920,743
Potato	1,465	78.3	114,710	44.1	64,607	179,316
Dry Bean	9,105	40.0	364,200	33.5	305,018	669,218
Sunflower	1,850	36.1	66,785	32.1	59,385	126,170
Alfalfa	2,595	38.3	99,388	23.9	62,020	161,409
Vegetable	1,081	88.0	95,128	52.9	57,185	152,313
Fruit	2,306	48.6	112,072	20.8	47,965	160,036
Vineyard	768	43.0	33,024	62.3	47,846	80,870
Poplar	1,082	40.2	43,496	23.1	24,994	68,491
Sub Total	38,438	—	1,478,993	—	1,249,665	2,728,658
Kind of Animal	Number	Family Labor (Man·day/head)	Family Labor (Man·day)	Hired Labor (Man·day/head)	Hired Labor (Man·day)	Total (Man·day)
Cow	14,200	18.45	261,990	—	—	261,990
Sheep	108,100	4.35	470,235	—	—	470,235
Sub Total	122,300	—	732,225	—	—	732,225
Total	—	—	2,211,218	—	1,249,665	3,460,883

Monthly Labor Force (Future) (Unit : Man·Day/ha, Man·Day/Head)

Kind of Crop	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	TOTAL
Wheat			0.4	0.4	2.5	2.5	5.5	5.6	0.4	0.3	0.4		17.9
Barley			0.4	0.4	2.5	2.5	5.5	6.0	0.4	0.3	0.4		18.4
Sugar Beet			1.4	21.0	31.2	14.0	2.4	30.0	30.0	10.4			140.4
Potato			0.4	4.0	22.0	25.0	10.5	10.5	25.0	25.0			122.4
Dry Bean			0.4	0.6	22.0	13.0	1.2	1.2	19.7	15.4			73.5
Sunflower			0.4	1.4	19.0	15.0	1.2	1.2	15.0	15.0			68.2
Alfalfa		0.2	0.2	0.6	16.0	1.6	16.0	1.6	14.0	12.0			62.2
Vegetable			0.4	4.5	34.0	26.5	11.5	11.5	26.0	26.5			140.9
Fruit		0.2	21.2	25.0	15.0	3.2	1.2	1.2	1.2	1.2			69.4
Vineyard			0.2	29.5	23.5	5.0		41.1	6.0				105.3
Poplar		1.3	22.6	17.8	14.0	3.6	1.0	1.0	1.0	1.0			63.3
Kind of Animal	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	TOTAL
Cow	1.05	0.95	1.85	2.05	2.15	2.05	2.15	2.15	1.30	0.60	1.10	1.05	18.45
Sheep	0.30	0.30	0.60	0.60	0.60	0.60	0.60	0.10	0.15	0.10	0.10	0.30	4.35

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Monthly Labor Force (Future) (Unit : Man·day)

Kind of Crop	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	TOTAL
Wheat			3,863	3,863	24,145	24,145	53,119	54,085	3,863	2,897	3,863		173,844
Barley			788	788	4,925	4,925	10,835	11,820	788	591	788		36,248
Sugar Beet			9,181	137,718	204,610	91,812	15,739	196,740	196,740	68,203			920,743
Potato			586	5,860	32,230	36,625	15,383	15,383	36,625	36,625			179,316
Dry Bean			3,642	5,463	200,310	118,365	10,926	10,926	179,369	140,217			669,218
Sunflower			740	2,590	35,150	27,750	2,220	2,220	27,750	27,750			126,170
Alfalfa		519	519	1,557	41,520	4,152	41,520	4,152	36,330	31,140			161,409
Vegetable			432	4,865	36,754	28,647	12,432	12,432	28,106	28,647			152,313
Fruit		461	48,887	57,650	34,590	7,379	2,767	2,767	2,767	2,767			160,036
Vineyard			154	22,656	18,048	3,840		31,565	4,608				80,870
Poplar		1,407	24,453	19,260	15,148	3,895	1,082	1,082	1,082	1,082			68,491
Sub Total		2,387	93,248	262,269	647,430	351,535	166,022	343,171	518,028	339,919	4,651		2,728,658
Kind of Animal	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	TOTAL
Cow	14,910	13,490	26,270	29,110	30,530	29,110	30,530	30,530	18,460	8,520	15,620	14,910	261,990
Sheep	32,430	32,430	64,860	64,860	64,860	64,860	64,860	10,810	16,215	10,810	10,810	32,430	470,235
Sub Total	47,340	45,920	91,130	93,970	95,390	93,970	95,390	41,340	34,675	19,330	26,430	47,340	732,225
Total	47,340	48,307	184,376	356,239	742,820	445,505	261,412	384,511	552,703	359,249	31,081	47,340	3,460,883

Series of Expected Crop Yield

Unit: ton/ha, m3/ha

Crops/Year	Present	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
Wheat	1.4	2.1	2.8	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Barley	1.6	2.4	3.2	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Sugar beet	35.0	41.0	48.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0
Dry bean	1.9	2.1	2.3	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Sunflower	1.8	2.5	3.2	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Potatoes	20.0	21.7	23.4	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Vegetables	13.5	17.3	21.1	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Alfalfa	-	12.0	13.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Fruit(exist)	12.0	15.0	18.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Fruit(new)	-	-	-	-	-	-	-	10.0	13.0	17.0	21.0
Grape(exist)	7.5	10.0	12.5	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Grape(new)	-	-	-	5.0	7.5	10.0	15.0	15.0	15.0	15.0	15.0
Poplar(exist)	18.0	24.0	29.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Poplar(new)	-	-	-	-	-	-	35.0	35.0	35.0	35.0	35.0

Series of Expected Crop Production

Unit: ton/ha, m3/ha

Crops/Year	Area(ha)	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
Wheat	9,658	20,282	27,042	33,803	33,803	33,803	33,803	33,803	33,803	33,803	33,803
Barley	1,970	4,728	6,304	7,880	7,880	7,880	7,880	7,880	7,880	7,880	7,880
Sugar beet	6,558	268,878	314,784	360,690	360,690	360,690	360,690	360,690	360,690	360,690	360,690
Dry bean	9,105	19,121	20,942	22,763	22,763	22,763	22,763	22,763	22,763	22,763	22,763
Sunflower	1,850	4,625	5,920	7,400	7,400	7,400	7,400	7,400	7,400	7,400	7,400
Potatoes	1,465	31,791	34,281	36,625	36,625	36,625	36,625	36,625	36,625	36,625	36,625
Vegetables	1,081	18,701	22,809	27,025	27,025	27,025	27,025	27,025	27,025	27,025	27,025
Alfalfa	2,595	31,140	33,735	36,330	36,330	36,330	36,330	36,330	36,330	36,330	36,330
Fruit(exist)	401	6,015	7,218	8,421	8,421	8,421	8,421	8,421	8,421	8,421	8,421
Fruit(new)	1,905	0	0	0	0	0	0	19,050	24,765	32,385	40,005
Grape(exist)	586	5,860	7,325	8,790	8,790	8,790	8,790	8,790	8,790	8,790	8,790
Grape(new)	182	0	0	910	1,365	1,820	2,730	2,730	2,730	2,730	2,730
Poplar(exist)	429	10,296	12,441	15,015	15,015	15,015	15,015	15,015	15,015	15,015	15,015
Poplar(new)	653	0	0	0	0	0	26,180	26,180	26,180	22,855	22,855
Total (ton)	38,438	411,140	480,360	550,637	551,092	551,547	552,457	571,507	577,222	584,842	592,462
Total (m3)		10,296	12,441	15,015	15,015	15,015	41,195	41,195	41,195	37,870	37,870

Operating Hour of Machinery (Present)

Crop		Area (Ha)	Machinery (Hour/ha)	Machinery (Hour)
Wheat	Dry	14,939	13.88	207,353
Wheat	Irr.	1,863	14.92	27,796
Barley	Dry	3,572	14.25	50,901
Barley	Irr.	291	15.63	4,548
Sugar beet	Irr.	2,473	41.97	103,792
Dry bean	Irr.	2,270	11.07	25,129
Chick pea	Dry	8,165	11.61	94,796
Lentil	Dry	151	12.48	1,884
Cow vetch	Irr.	510	10.24	5,222
Potato	Irr.	257	28.13	7,229
Vegetable	Irr.	111	30.18	3,350
Sunflower	Irr.	507	11.00	5,577
Fruit	Irr.	413	25.72	10,622
Vineyard	Dry	604	18.67	11,277
Poplar	Irr.	442	0.00	0
Other		3,059	0.00	0
Total		39,627		559,476

Operating Hour of Machinery (Future)

Crop	Area (Ha)	Machinery (Hour/ha)	Machinery (Hour)
Wheat	9,658	17.15	165,635
Barley	1,970	18.17	35,795
Sugar beet	6,558	65.02	426,401
Dry bean	9,105	11.94	108,714
Potato	1,465	32.18	47,144
Vegetable	1,081	41.69	45,067
Sunflower	1,850	11.27	20,850
Fruit	2,306	21.91	50,524
Vineyard	768	25.03	19,223
Poplar	1,082	0.00	0
Alfalfa	2,595	12.91	33,501
Total	38,438		952,854

Balance of Present Crop Production

Kind of Crop	Yield (ton/ha)	Farm-gate Price(TL/ton)	Gross Return (TL/ha)	Production Cost(TL/ha)	Net Return (TL/ha)	Return Ratio (%)
Wheat(Dry)	1.4	168,000.0	235,200.0	212,691.0	22,509.0	9.6%
Wheat(Irri.)	3.0	168,000.0	504,000.0	271,983.0	232,017.0	46.0%
Barley(Dry)	1.6	133,000.0	212,800.0	210,005.0	2,795.0	1.3%
Barley(Irri.)	3.0	133,000.0	399,000.0	260,222.0	138,778.0	34.8%
Sugar beet(Irri.)	35.0	42,000.0	1,470,000.0	1,204,700.0	265,300.0	18.0%
Chick-pea(Dry)	1.0	450,000.0	450,000.0	288,625.0	161,375.0	35.9%
Lentil(Dry)	1.0	425,000.0	425,000.0	275,105.0	149,895.0	35.3%
Cow vetch(Irri.)	1.0	250,000.0	250,000.0	233,075.0	16,925.0	6.8%
Dry bean(Irri.)	1.9	725,000.0	1,377,500.0	561,125.0	816,375.0	59.3%
Sunflower(Irri.)	1.8	400,000.0	720,000.0	446,810.0	273,190.0	37.9%
Potatoes(Irri.)	20.0	100,000.0	2,000,000.0	1,840,450.0	159,550.0	8.0%
Vegetables(Irri.)	13.5	130,000.0	1,755,000.0	857,400.0	897,600.0	51.1%
Fruit-Apple(Irri.)	12.0	200,000.0	2,400,000.0	770,625.0	1,629,375.0	67.9%
Vineyard(Dry)	7.5	200,000.0	1,500,000.0	586,215.0	913,785.0	60.9%
Poplar(Irri.)*	18.0	75,000.0	1,350,000.0	350,000.0	1,000,000.0	74.1%
Wheat straw(Dry)	1.4	50,000.0	70,000.0		70,000.0	
Wheat straw(Irri.)	3.0	50,000.0	150,000.0		150,000.0	
Barley straw(Dry)	1.6	50,000.0	80,000.0		80,000.0	
Barley straw(Irri.)	3.0	50,000.0	150,000.0		150,000.0	
Chick-pea stalk(Dry)	1.0	25,000.0	25,000.0		25,000.0	
Lentil stalk(Dry)	1.0	25,000.0	25,000.0		25,000.0	
D. bean stalk(Irri.)	1.9	75,000.0	142,500.0		142,500.0	
TOTAL			15,691,000.0	8,369,031.0	7,321,969.0	

Note: * Production of poplar is shown in cubic meter per hectare.

Present Crop Production in Project Area
(Gravity Area)

Kind of Crop	Cultivated Area(ha)	Gross Return (1,000TL)	Production Cost(1,000TL)	Net Return (1,000TL)
Wheat(Dry)	11,738.0	2,760,777.6	2,496,672.6	264,105.0
Wheat(Irri.)	1,491.0	751,464.0	405,552.0	345,912.0
Barley(Dry)	2,976.0	633,292.8	624,960.0	8,332.8
Barley(Irri.)	291.0	116,109.0	75,718.2	40,390.8
Sugar beet(Irri.)	2,325.0	3,417,750.0	2,800,927.5	616,822.5
Chick-pea(Dry)	6,378.0	2,870,100.0	1,840,690.8	1,029,409.2
Lentil(Dry)	85.0	36,125.0	23,383.5	12,741.5
Cow vetch(Irri.)	362.0	90,500.0	84,382.2	6,117.8
Dry bean(Irri.)	2,047.0	2,819,742.5	1,148,571.7	1,671,170.8
Sunflower(Irri.)	507.0	365,040.0	226,527.6	138,512.4
Potatoes(Irri.)	198.0	396,000.0	364,419.0	31,581.0
Vegetables(Irri.)	111.0	194,805.0	95,171.4	99,633.6
Fruit-Apple(Irri.)	376.0	902,400.0	289,745.6	612,654.4
Vineyard(Dry)	455.0	682,500.0	266,721.0	415,779.0
Poplar(Irri.)	383.0	517,050.0	134,050.0	383,000.0
Fallow	2,463.0	0.0	0.0	0.0
Wheat straw(Dry)	11,738.0	821,660.0		821,660.0
Wheat straw(Irri.)	1,491.0	223,650.0		223,650.0
Barley straw(Dry)	2,976.0	238,080.0		238,080.0
Barley straw(Irri.)	291.0	43,650.0		43,650.0
Chick-pea stalk(Dry)	6,378.0	159,450.0		159,450.0
Lentil stalk(Dry)	85.0	2,125.0		2,125.0
D. bean stalk(Irri.)	2,047.0	291,697.5		291,697.5
TOTAL	32,186.0	18,333,968.4	10,877,493.1	7,456,475.3

Present Crop Production in Project Area
(Pumping Area)

Kind of Crop	Cultivated Area(ha)	Gross Return (1,000TL)	Production Cost(1,000TL)	Net Return (1,000TL)
Wheat(Dry)	3,201.0	752,875.2	680,852.7	72,022.5
Wheat(Irri.)	372.0	187,488.0	101,184.0	86,304.0
Barley(Dry)	596.0	126,828.8	125,160.0	1,668.8
Barley(Irri.)	0.0	0.0	0.0	0.0
Sugar beet(Irri.)	148.0	217,560.0	178,295.6	39,264.4
Chick-pea(Dry)	1,787.0	804,150.0	515,728.2	288,421.8
Lentil(Dry)	66.0	28,050.0	18,156.6	9,893.4
Cow vetch(Irri.)	148.0	37,000.0	34,498.8	2,501.2
Dry bean(Irri.)	223.0	307,182.5	125,125.3	182,057.2
Sunflower(Irri.)	0.0	0.0	0.0	0.0
Potatoes(Irri.)	59.0	118,000.0	108,589.5	9,410.5
Vegetables(Irri.)	0.0	0.0	0.0	0.0
Fruit-Apple(Irri.)	37.0	88,800.0	28,512.2	60,287.8
Vineyard(Dry)	149.0	223,500.0	87,343.8	136,156.2
Poplar(Irri.)	59.0	79,650.0	20,650.0	59,000.0
Fallow	596.0	0.0	0.0	0.0
Wheat straw(Dry)	3,201.0	224,070.0		224,070.0
Wheat straw(Irri.)	372.0	55,800.0		55,800.0
Barley straw(Dry)	596.0	47,680.0		47,680.0
Barley straw(Irri.)	0.0	0.0		0.0
Chick-pea stalk(Dry)	1,787.0	44,675.0		44,675.0
Lentil stalk(Dry)	66.0	1,650.0		1,650.0
D. bean stalk(Irri.)	223.0	31,777.5		31,777.5
TOTAL	7,441.0	3,376,737.0	2,024,096.7	1,352,640.3

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Sheet 3

Present Crop Production in Project Area
(Whole Area)

Kind of Crop	Cultivated Area(ha)	Gross Return (1,000TL)	Production Cost(1,000TL)	Net Return (1,000TL)
Wheat(Dry)	14,939.0	3,513,652.8	3,177,525.3	336,127.5
Wheat(Irri.)	1,863.0	938,952.0	506,736.0	432,216.0
Barley(Dry)	3,572.0	760,121.6	750,120.0	10,001.6
Barley(Irri.)	291.0	116,109.0	75,718.2	40,390.8
Sugar beet(Irri.)	2,473.0	3,635,310.0	2,979,223.1	656,086.9
Chick-pea(Dry)	8,165.0	3,674,250.0	2,356,419.0	1,317,831.0
Lentil(Dry)	151.0	64,175.0	41,540.1	22,634.9
Cow vetch(Irri.)	510.0	127,500.0	118,881.0	8,619.0
Dry bean(Irri.)	2,270.0	3,126,925.0	1,273,697.0	1,853,228.0
Sunflower(Irri.)	507.0	365,040.0	226,527.6	138,512.4
Potatoes(Irri.)	257.0	514,000.0	473,008.5	40,991.5
Vegetables(Irri.)	111.0	194,805.0	95,171.4	99,633.6
Fruit-Apple(Irri.)	413.0	991,200.0	318,257.8	672,942.2
Vineyard(Dry)	604.0	906,000.0	354,064.8	551,935.2
Poplar(Irri.)	442.0	596,700.0	154,700.0	442,000.0
Fallow	3,059.0	0.0	0.0	0.0
Wheat straw(Dry)	14,939.0	1,045,730.0		1,045,730.0
Wheat straw(Irri.)	1,863.0	279,450.0		279,450.0
Barley straw(Dry)	3,572.0	285,760.0		285,760.0
Barley straw(Irri.)	291.0	43,650.0		43,650.0
Chick-pea stalk(Dry)	8,165.0	204,125.0		204,125.0
Lentil stalk(Dry)	151.0	3,775.0		3,775.0
D. bean stalk(Irri.)	2,270.0	323,475.0		323,475.0
TOTAL	39,627.0	21,710,705.4	12,901,589.8	8,809,115.6

Balance of Expected Crop Production

Kind of Crop	Yield (ton/ha)	Farm-gate Price(TL/ton)	Gross Return (TL/ha)	Production Cost(TL/ha)	Net Return (TL/ha)	Return Ratio (%)
Wheat	3.5	168,000.0	588,000.0	297,458.0	290,542.0	49.4%
Barley	4.0	133,000.0	532,000.0	290,408.0	241,592.0	45.4%
Sugar beet	55.0	42,000.0	2,310,000.0	1,371,700.0	938,300.0	40.6%
Dry bean	2.5	725,000.0	1,812,500.0	827,650.0	984,850.0	54.3%
Sunflower	4.0	400,000.0	1,600,000.0	550,855.0	1,049,145.0	65.6%
Potatoes	25.0	100,000.0	2,500,000.0	2,072,850.0	427,150.0	17.1%
Vegetables(Tomato)	25.0	160,000.0	4,000,000.0	1,687,350.0	2,312,650.0	57.8%
Alfalfa	14.0	90,000.0	1,260,000.0	587,050.0	672,950.0	53.4%
Fruit(Apple)	21.0	200,000.0	4,200,000.0	586,946.0	3,613,054.0	86.0%
Vineyard	15.0	200,000.0	3,000,000.0	788,315.0	2,211,685.0	73.7%
Poplar*	35.0	75,000.0	2,625,000.0	385,500.0	2,239,500.0	85.3%
Wheat straw	3.5	50,000.0	175,000.0		175,000.0	
Barley straw	4.0	50,000.0	200,000.0		200,000.0	
Dry bean stalk	2.5	75,000.0	187,500.0		187,500.0	
TOTAL			24,990,000.0	9,446,082.0	15,543,918.0	

Table V- 5
Sheet 5

Expected Crop Production in Project Area
(Gravity Area)

Kind of Crop	Cultivated Area(ha)	Gross Return (1,000TL)	Production Cost(1,000TL)	Net Return (1,000TL)
Wheat	7,492.0	4,405,296.0	2,228,870.0	2,176,426.0
Barley	1,248.0	663,936.0	362,419.2	301,516.8
Sugar beet	5,620.0	12,982,200.0	7,708,954.0	5,273,246.0
Dry bean	7,805.0	14,146,562.5	6,460,198.5	7,686,364.0
Sunflower	1,561.0	2,497,600.0	859,954.9	1,637,645.1
Potatoes	1,248.0	3,120,000.0	2,586,979.2	533,020.8
Vegetables(Tomato)	937.0	3,748,000.0	1,581,093.8	2,166,906.2
Alfalfa	1,873.0	2,359,980.0	1,099,638.3	1,260,341.7
Fruit(Apple)	1,873.0	7,866,600.0	1,099,263.7	6,767,336.3
Vineyard	624.0	1,872,000.0	491,899.2	1,380,100.8
Poplar	937.0	2,459,625.0	361,213.5	2,098,411.5
Wheat straw	7,492.0	1,311,100.0		1,311,100.0
Barley straw	1,248.0	249,600.0		249,600.0
Dry bean stalk	7,805.0	1,463,437.5		1,463,437.5
TOTAL	31,218.0	59,145,937.0	24,840,484.3	34,305,452.7

Expected Crop Production in Project Area
(Pumping Area)

Kind of Crop	Cultivated Area(ha)	Gross Return (1,000TL)	Production Cost(1,000TL)	Net Return (1,000TL)
Wheat	2,166.0	1,273,608.0	644,385.0	629,223.0
Barley	722.0	384,104.0	209,668.8	174,435.2
Sugar beet	938.0	2,166,780.0	1,286,654.6	880,125.4
Dry bean	1,300.0	2,356,250.0	1,076,010.0	1,280,240.0
Sunflower	289.0	462,400.0	159,210.1	303,189.9
Potatoes	217.0	542,500.0	449,819.3	92,680.7
Vegetables(Tomato)	144.0	576,000.0	242,985.6	333,014.4
Alfalfa	722.0	909,720.0	423,886.2	485,833.8
Fruit(Apple)	433.0	1,818,600.0	254,127.7	1,564,472.3
Vineyard	144.0	432,000.0	113,515.2	318,484.8
Poplar	145.0	380,625.0	55,897.5	324,727.5
Wheat straw	2,166.0	379,050.0		379,050.0
Barley straw	722.0	144,400.0		144,400.0
Dry bean stalk	1,300.0	243,750.0		243,750.0
TOTAL	7,220.0	12,069,787.0	4,916,160.0	7,153,627.0

Expected Crop Production in Project Area
(Whole Area)

Kind of Crop	Cultivated Area(ha)	Gross Return (1,000TL)	Production Cost(1,000TL)	Net Return (1,000TL)
Wheat	9,658.0	5,678,904.0	2,873,255.0	2,805,649.0
Barley	1,970.0	1,048,040.0	572,088.0	475,952.0
Sugar beet	6,558.0	15,148,980.0	8,995,608.6	6,153,371.4
Dry bean	9,105.0	16,502,812.5	7,536,208.5	8,966,604.0
Sunflower	1,850.0	2,960,000.0	1,019,165.0	1,940,835.0
Potatoes	1,465.0	3,662,500.0	3,036,798.5	625,701.5
Vegetables(Tomato)	1,081.0	4,324,000.0	1,824,079.4	2,499,920.6
Alfalfa	2,595.0	3,269,700.0	1,523,524.5	1,746,175.5
Fruit(Apple)	2,306.0	9,685,200.0	1,353,391.4	8,331,808.6
Vineyard	768.0	2,304,000.0	605,414.4	1,698,585.6
Poplar	1,082.0	2,732,050.0	417,111.0	2,314,939.0
Wheat straw	9,658.0	1,690,150.0		1,690,150.0
Barley straw	1,970.0	394,000.0		394,000.0
Dry bean stalk	9,105.0	1,707,187.5		1,707,187.5
TOTAL	38,438.0	71,107,524.0	29,756,644.3	41,350,879.7

Production Cost per Hectare - Without Project

Unit: TL

Crops	Seed	Fert.	Agrochem.	Farm Labor		Mach.	Transp.	Others	Total
				Family	Hired				
Wheat(D.A)	33,000	35,900	1,016	18,000	29,000	91,000	4,775	0	212,691
Wheat(I.A)	44,000	35,900	5,058	36,000	36,000	105,000	10,025	0	271,983
Barley(D.A)	30,000	30,900	1,355	19,500	31,500	91,250	5,500	0	210,005
Barley(I.A)	30,000	30,900	4,132	36,000	36,000	105,000	18,190	0	260,222
Sugar beet(I.A)	147,000	191,000	73,800	293,500	296,500	106,000	96,900	0	1,204,700
Chick-pea(D.A)	55,000	17,250	0	65,500	74,000	73,500	3,375	0	288,625
Lentil(D.A)	30,000	17,250	0	72,500	82,000	70,000	3,355	0	275,105
Cow vetch(I.A)	37,500	0	0	67,500	78,000	49,500	575	0	233,075
Dry bean(I.A)	88,000	53,100	2,600	180,500	146,500	85,000	5,425	0	561,125
Sunflower(I.A)	12,000	53,100	0	162,500	117,000	84,500	5,110	12,600	446,810
Potatoes(I.A)	500,000	451,500	0	357,500	199,500	139,000	76,225	116,725	1,840,450
Vegetables(I.A)	14,000	125,100	12,000	384,000	175,000	78,000	41,300	28,000	857,400
Fruit(I.A)	0	132,800	11,000	245,000	294,000	85,000	2,825	0	770,625
Grape(D.A)	0	60,000	3,840	171,000	223,000	42,000	20,750	65,625	586,215
Poplar(I.A)	0	28,000	4,000	197,000	108,500	12,500	0	0	350,000

Production Cost per Hectare - With Project

Unit: TL

Crops	Seed	Fert.	Agrochem.	Farm Labor		Mach.	Transp.	Others	Total
				Family	Hired				
Wheat	44,000	31,200	2,633	43,500	46,500	118,000	11,625	0	297,458
Barley	30,000	34,350	2,758	43,000	49,000	118,000	13,300	0	290,408
Sugar beet	147,000	191,000	73,800	342,500	359,500	106,000	151,900	0	1,371,700
Dry bean	132,000	53,100	167,200	200,000	167,500	99,500	8,350	0	827,650
Sunflower	30,000	38,100	2,600	180,500	160,500	100,000	11,155	28,000	550,855
Potatoes	500,000	474,400	82,600	391,500	220,500	168,000	90,075	145,775	2,072,850
Vegetables	250,000	182,800	2,000	440,000	264,500	93,500	86,475	368,075	1,687,350
Alfalfa	750	132,800	0	191,500	119,500	135,500	7,000	0	587,050
Fruit	0	97,900	21,696	243,000	104,000	116,500	3,850	0	586,946
Grape	0	36,000	23,840	215,000	311,500	29,400	41,325	131,250	788,315
Poplar	0	45,100	6,400	201,000	115,500	17,500	0	0	385,500
Fruit(new)	130,000	97,900	21,696	243,000	104,000	116,500	3,850	0	716,946
Grape(new)	100,000	36,000	23,840	215,000	311,500	29,400	41,325	0	757,065
Poplar(new)	50,000	0	0	15,500	7,000	66,000	0	0	138,500

Present Animal Husbandry Production

Gravity Area

Products	Kind of Animal	Production Animal (head)	Yearly Production (kg)	Total Production (kg)	Unit Price (TL/kg)	Total Production Amount (TL)
Milk	Cultured Cow	0.3	1,800.0	540.0	400.0	216,000.0
Milk	Local Cow	0.4	1,200.0	480.0	400.0	192,000.0
Milk	Sheep	8.3	48.0	398.4	450.0	179,280.0
Meat	Cultured Cow	0.3	75.0	22.5	2,750.0	61,875.0
Meat	Local Cow	0.4	63.0	25.2	2,750.0	69,300.0
Meat	Sheep	8.3	13.0	107.9	3,000.0	323,700.0
Wool	Sheep	12.0	1.5	18.0	2,500.0	45,000.0
Slaughter's Meat Value						305,584.6
Manure				5,484.0	10.0	54,840.0
TOTAL						1,447,579.6
Production Amount per ha (1,447,579.6/6.29)						230,139.8

Pumping Area

Products	Kind of Animal	Production Animal (head)	Yearly Production (kg)	Total Production (kg)	Unit Price (TL/kg)	Total Production Amount (TL)
Milk	Cultured Cow	0.9	1,800.0	1,620.0	400.0	648,000.0
Milk	Local Cow	1.3	1,200.0	1,560.0	400.0	624,000.0
Milk	Sheep	24.0	48.0	1,152.0	450.0	518,400.0
Meat	Cultured Cow	0.9	75.0	67.5	2,750.0	185,625.0
Meat	Local Cow	1.3	63.0	81.9	2,750.0	225,225.0
Meat	Sheep	24.0	13.0	312.0	3,000.0	936,000.0
Wool	Sheep	34.4	1.5	51.6	2,500.0	129,000.0
Slaughter's Meat Value						915,166.8
Manure				16,192.0	10.0	161,920.0
TOTAL						4,343,336.8
Production Amount per ha (4,343,336.8/10.28)						422,503.6

Note: Southern pumping area (Tombak, Kamiscih, Koture, Alimpinar, etc.) is excluded from the pumping area.

Table V - 7
Sheet 2

Expected Animal Husbandry Production

Gravity Area

Products	Kind of Animal	Production Animal (head)	Yearly Production (kg)	Total Production (kg)	Unit Price (TL/kg)	Total Production Amount (TL)
Milk	Cultured Cow	0.5	3,900.0	1,950.0	400.0	780,000.0
Milk	Local Cow	0.7	2,400.0	1,680.0	400.0	672,000.0
Milk	Sheep	8.3	72.0	597.6	450.0	268,920.0
Meat	Cultured Cow	0.5	88.0	44.0	2,750.0	121,000.0
Meat	Local Cow	0.7	75.0	52.5	2,750.0	144,375.0
Meat	Sheep	8.3	15.0	124.5	3,000.0	373,500.0
Wool	Sheep	12.0	3.0	36.0	2,500.0	90,000.0
Slaughter's Meat Value						466,616.8
Manure				6,416.0	10.0	64,160.0
TOTAL						2,980,571.8
Production Amount per ha (2,980,571.8/6.29)						473,858.8

Pumping Area

Products	Kind of Animal	Production Animal (head)	Yearly Production (kg)	Total Production (kg)	Unit Price (TL/kg)	Total Production Amount (TL)
Milk	Cultured Cow	1.8	3,900.0	7,020.0	400.0	2,808,000.0
Milk	Local Cow	2.2	2,400.0	5,280.0	400.0	2,112,000.0
Milk	Sheep	24.0	72.0	1,728.0	450.0	777,600.0
Meat	Cultured Cow	1.8	88.0	158.4	2,750.0	435,600.0
Meat	Local Cow	2.2	75.0	165.0	2,750.0	453,750.0
Meat	Sheep	24.0	15.0	360.0	3,000.0	1,080,000.0
Wool	Sheep	34.4	3.0	103.2	2,500.0	258,000.0
Slaughter's Meat Value						1,471,254.0
Manure				16,816.0	10.0	168,160.0
TOTAL						9,564,364.0
Production Amount per ha (9,564,364.0/10.28)						930,385.6

Note: Southern pumping area (Tombak, Kamiscih, Koture, Alimpinar, etc.) is excluded.

Table V - 8
Sheet 1

Net Production Value of Animal Husbandry

Without Project (Gravity Area) Unit:TL

Kind of Animal	Number	Production Value	Production Cost	Net Production Value
Cultured Cow				
-Live	0.3	61,875.0	58,811.4	3,063.6
-Produced	0.3	216,000.0	51,572.4	164,427.6
Local Cow				
-Live	0.4	69,300.0	54,979.2	14,320.8
-Produced	0.4	192,000.0	52,712.0	139,288.0
Sheep				
-Live	12.0	368,700.0	183,636.0	185,064.0
-Produced	8.3	179,280.0	120,723.5	58,556.5
Slaughter's				
Meat Value		305,584.6		305,584.6
Manure		54,840.0		54,840.0
Total		1,447,579.6	522,434.5	925,145.1
Net Production Value per ha(925,145.1/6.29)				147,081.9

Without Project (Pumping Area) Unit:TL

Kind of Animal	Number of Head	Production Value	Production Cost	Net Production Value
Cultured Cow				
-Live	0.9	185,625.0	176,434.2	9,190.8
-Produced	0.9	648,000.0	154,717.2	493,282.8
Local Cow				
-Live	1.3	225,225.0	178,682.4	46,542.6
-Produced	1.3	624,000.0	171,314.0	452,686.0
Sheep				
-Live	34.4	1,065,000.0	526,423.2	538,576.8
-Produced	24.0	518,400.0	349,080.0	169,320.0
Slaughter's				
Meat Value		915,166.8		915,166.8
Manure		161,920.0		161,920.0
Total		4,343,336.8	1,556,651.0	2,786,685.8
Net Production Value per ha(2,786,685.8/10.28)				271,078.4

Net Production Value of Animal Husbandry

With Project (Gravity Area) Unit:TL

Kind of Animal	Number	Production Value	Production Cost	Net Production Value
Cultured Cow				
-Live	0.5	121,000.0	120,253.5	746.5
-Produced	0.5	780,000.0	209,721.5	570,278.5
Local Cow				
-Live	0.7	144,375.0	142,535.4	1,839.6
-Produced	0.7	672,000.0	156,117.5	515,882.5
Sheep				
-Live	12.0	463,500.0	205,044.0	258,456.0
-Produced	8.3	268,920.0	135,746.5	133,173.5
Slaughter's Meat Value		466,616.8		466,616.8
Manure		64,160.0		64,160.0
Total		2,980,571.8	969,418.4	2,011,153.4
Net Production Value per ha(2,011,153.4/6.29)				319,738.2

With Project (Pumping Area) Unit:TL

Kind of Animal	Number of Head	Production Value	Production Cost	Net Production Value
Cultured Cow				
-Live	1.8	435,600.0	432,912.6	2,687.4
-Produced	1.8	2,808,000.0	754,997.4	2,053,002.6
Local Cow				
-Live	2.2	453,750.0	447,968.4	5,781.6
-Produced	2.2	2,112,000.0	490,655.0	1,621,345.0
Sheep				
-Live	34.4	1,338,000.0	587,792.8	750,207.2
-Produced	24.0	777,600.0	392,520.0	385,080.0
Slaughter's Meat Value		1,471,254.0		1,471,254.0
Manure		168,160.0		168,160.0
Total		9,564,364.0	3,106,846.2	6,457,517.8
Net Production Value per ha(6,457,517.8/10.28)				628,163.2

Table V - 9

Exports by Main Sectors

Unit: Million $

Sectors	1,986.0 Value	Share(%)	1987 Value	Share(%)
Agriculture	1,885.6	25.3	1,852.5	18.2
Mining and Quarrying	246.9	3.3	272.3	2.7
Industry	5,324.3	71.4	8,065.2	79.1
(Agricultural based)	666.7	8.9	953.9	9.4
(Industrial products)	4,657.6	62.5	7,111.3	69.7
Total	7,456.8	100.0	10,190.0	100.0

Exports of Agricultural Products

Unit: Million $

Products	1982	1983	1984	1985	1986	1987
A-Vegetal Products	1,699.5	1,484.4	1,382.0	1,441.5	1,546.8	1,484.3
a)Cereals	130.2	187.3	91.9	63.0	0.3	32.0
b)Pulses	207.1	189.0	175.2	171.4	242.7	234.0
c)Industrial plants	686.5	493.8	446.8	550.6	461.5	395.2
d)Fruit	576.3	525.6	564.7	527.6	694.0	704.4
e)Others	99.4	88.7	103.4	128.3	145.6	118.7
B-Animal Products	389.6	362.0	323.2	244.2	285.3	310.9
C-Fishery	24.0	20.3	20.3	21.1	39.7	44.7
D-Forestry Products	28.1	13.9	23.7	12.7	13.7	12.7
Total	2,141.2	1,880.6	1,749.2	1,719.5	1,885.6	1,852.5

Export of Major Agricultural Commodities

Unit: Thousand $

Commodities	1982	1983	1984	1985	1986	1987
Cotton	287,849	196,503	168,079	169,792	154,441	34,463
Hazel Nuts	240,694	245,986	304,801	255,393	377,975	390,742
Tobacco	348,320	237,757	216,357	330,143	270,228	315,809
Wheat	50,880	99,354	45,318	48,078	1,836	28,304
Raisins	100,323	71,438	62,309	74,395	102,909	108,291
Pistachio	14,838	9,465	10,583	21,610	22,204	13,150
Dry figs	33,485	27,385	31,715	31,994	34,157	32,640
Lemons	46,295	42,230	37,250	28,187	27,380	29,789
Barley	78,703	87,256	43,225	17,555	106	1,790
Chick pea	65,196	60,824	63,336	84,197	98,310	98,851

Source: SIS

Table V- 10

Limit of Farm Credit per Hectare

Unit:TL

Crops	Amount	Crops	Amount
Wheat	80,000	Alfalfa	250,000
Maize(hybrid)	300,000	Fruit	600,000
Maize(local)	150,000	Grape	240,000
Rice	450,000	Vegetable	700,000
Chick-pea	120,000	Melon	200,000
Lentil	110,000	Cotton	450,000
Dry bean	300,000	Tobacco	200,000
Soybean	300,000	Sesame	200,000
Potatoes	300,000	Groundnuts	200,000
Sunflower	170,000	Sugar beet	-

No limitation for animal husbandry.

Table V- 11
Sheet 1

Facilities for Agricultural Training Center

1. Building for Training		
	Director's room	24 m3
	Offices	60
	Computer room	20
	Meeting room	90
	Reception room	24
	Storage	24
	Rest room	30
	Laboratory	48
	Others (25% of above)	80
	Total	400
2. Garage for Machinery		
	Garage	100 m3
Total building area		500 m3
Total area of irrigation field		40 ha
3. Equipment for Training Building		
	Personal Computer and accessories	1 set
	Photocopier	1
	Blackboard	1
	Permanent large projection screen	1
	Camera and accessories	1
	Slide projector	1
	Overhead projector	1
	24" TV set with Videorecorder	1
	Video camera and accessories	1
	Sound system	1
	Training room furniture	1
	Office furniture	1
4. Equipment for Laboratory		
	Electric top loading balances	
	Laboratory infiltration apparatus	
	Soil-water model tank	
	Permeability apparatus	

(Continued)

Pressure plate extractors/compressor	
Test sieves and sieve shakers	
Laboratory hardware	
Drying ovens	
Friction loss testing boards	
Field drain filter test apparatus	
5. Equipment for Field Irrigation	
Water table measurement equipment	
Current flow meters	
Cut-throat flames	
H-flames	
Partial flames	
Thin plate weirs	
Channel sections	
Surface irrigation field trial units	
Sprinkler irrigation field trial units	
Trickle irrigation field trial units	
Sprinkler testing kits	
Water testing kits	
Auger sets	
Soil sampler sets	
6. Vehicles and Machinery for Center	
Sedan	1
Jeep	1
Microbus	1
Pick-up	1
Motorcycles	3
Tractors and its attachment	2
Mini-cultivator	2
7. Personnel	
Director(Head of agricultural engineering office concurrently holds director for the centre)	1
Administrator	1
Secretary clerk	2
Assistant(technician)	2
Driver	1
Workers(temporary)	3
Watchman	1

Table V- 12

Balance of Present Farm Household Economy

	Model A	Model B	Model C
Location :	Gravity Area (Dry Area)	Pumping Area (Southern Area)	Pumping Area (Northern Area)
Land Tenure :	6.0 ha	4.5 ha	10.0 ha
Number of Family :	6 persons	7 persons	5 persons
Family Labor Force:	3.3 persons	3.8 persons	2.6 persons
Farm Mechanization:	Own Tractor	Rental Tractor	Own Tractor
Animal Husbandry :	2 cows, 12 sheeps	1 cow, 12 sheeps	2 cows, 34 sheeps
Farming Pattern :	Wheat(3.0ha)	Wheat(1.0ha)	Wheat(6.0ha)
	Chick-pea(3.0ha)	Chick-pea(2.0ha)	Chick-pea(3.0ha)
		Dry bean(1.0ha)	Cow vetch(1.0ha)
		Poplar(0.5ha)	
	TL	TL	TL
Gross Income :	4,201,575	4,529,300	6,646,975
Farm Income	2,340,600	3,450,200	3,506,200
Other farm income	0	0	0
Animal H. Income	1,860,975	1,079,100	3,140,775
Expenditure :	1,604,008	1,651,955	2,914,231
Seed	264,000	231,000	400,500
Fertilizer	211,050	168,700	370,350
Agrochemicals	3,048	5,616	6,096
Machinery	85,500	329,250	198,000
Hired Labor	309,000	432,000	474,000
Interest	83,498	170,890	372,727
Others	172,980	16,950	282,740
Raising expenses	474,932	297,549	809,818
Net Income :	2,597,567	2,877,345	3,732,744
General Cost :	152,051	148,107	254,150
Home Consumption :	567,840	662,480	473,200
Living Expenses :	1,500,000	1,700,000	2,000,000
Balance :	377,676	366,758	1,005,393
	*Dry Area: 6.0 ha	*Irrigated Area: 1.5 ha Dry Area: 3.0 ha	*Dry Area:10.0 ha

Balance of Future Farm Household Economy

	Model A	Model B	Model C
Location :	Gravity Area (Dry Area)	Pumping Area (Southern Area)	Pumping Area (Northern Area)
Land Tenure :	6.0 ha	4.5 ha	10.0 ha
Number of Family :	6 persons	7 persons	5 persons
Family Labor Force:	3.3 persons	3.8 persons	2.6 persons
Farm Mechanization:	Own Tractor	Rental Tractor	Own Tractor
Animal Husbandry :	3 cows, 12 sheeps	2 cow, 12 sheeps	4 cows, 34 sheeps
Farming Pattern :	Wheat(2.5ha)	Wheat(1.5ha)	Wheat(5.0ha)
	Sugar beet(1.0ha)	Sugar beet(0.5ha)	Sugar beet(1.0ha)
	Sunflower(0.5ha)	Dry bean(1.0ha)	Dry bean(2.0ha)
	Vegetables(0.5ha)	Sunflower(0.5ha)	Sunflower(0.5ha)
	Fruit(0.5ha)	Alfalfa(0.2ha)	Alfalfa(1.0ha)
		Potatoes(0.3ha)	Fruit(0.5ha)
		Poplar(0.5ha)	
	TL	TL	TL
Gross Income :	12,360,450	9,840,575	22,209,950
Farm Income	9,117,500	7,414,000	14,285,000
Other farm income	0	0	0
Animal H. Income	3,242,950	2,426,575	7,924,950
Expenditure :	3,357,119	3,557,750	5,627,617
Seed	250,000	363,150	499,750
Fertilizer	428,400	405,880	654,000
Agrochemicals	93,529	237,329	433,511
Machinery	74,000	610,750	159,000
Hired Labor	740,250	645,050	1,178,750
Interest	464,876	498,438	823,069
Others	519,514	193,470	496,391
Raising expenses	786,550	603,683	1,383,146
Net Income :	9,003,331	6,282,825	16,582,333
General Cost :	289,224	305,931	480,455
Home Consumption :	749,208	773,640	544,700
Living Expenses :	1,500,000	1,700,000	2,000,000
Balance :	6,464,898	3,503,253	13,557,178

Organization of Ministry of Agriculture,
Forestry and Rural Affairs

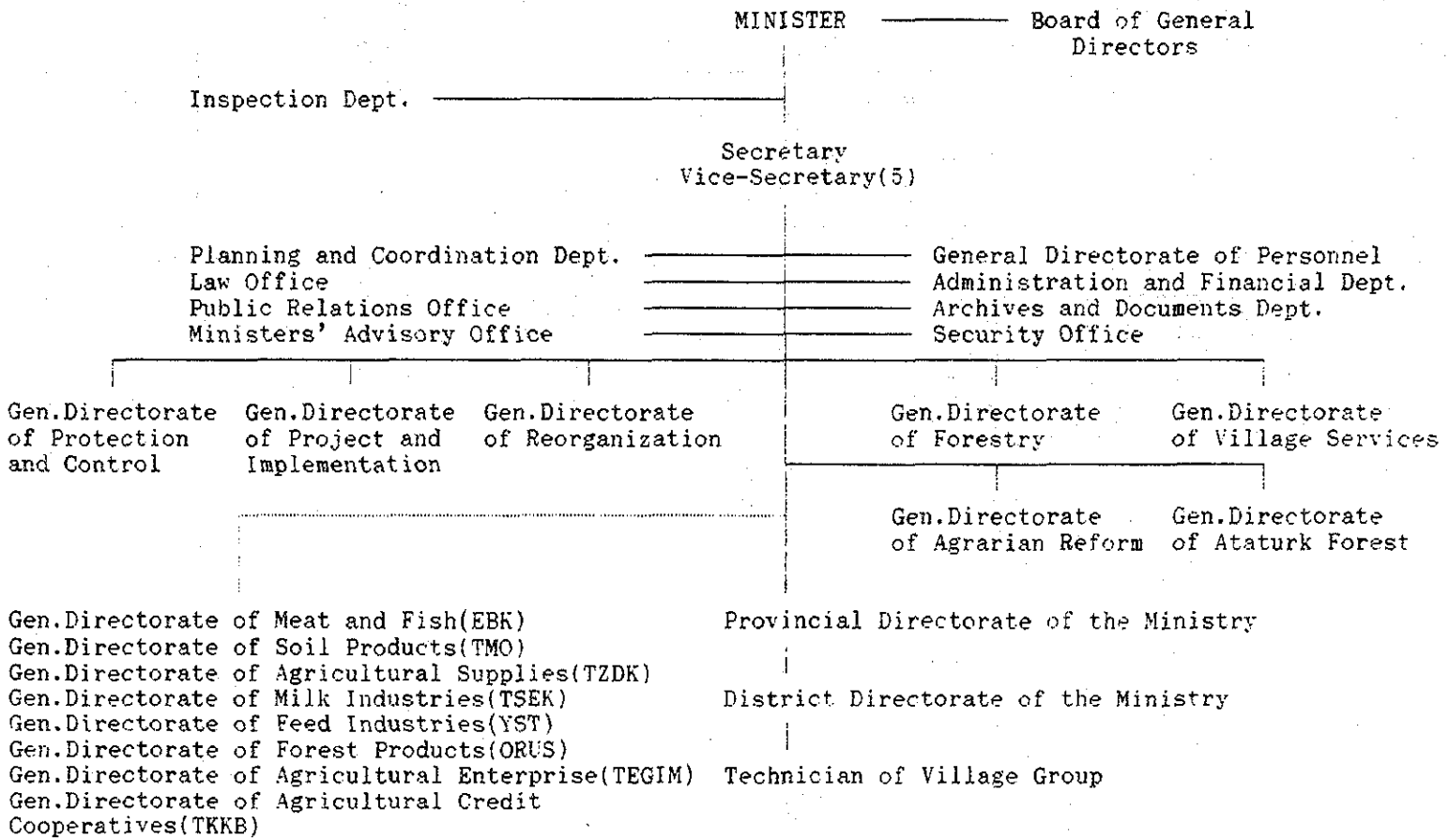
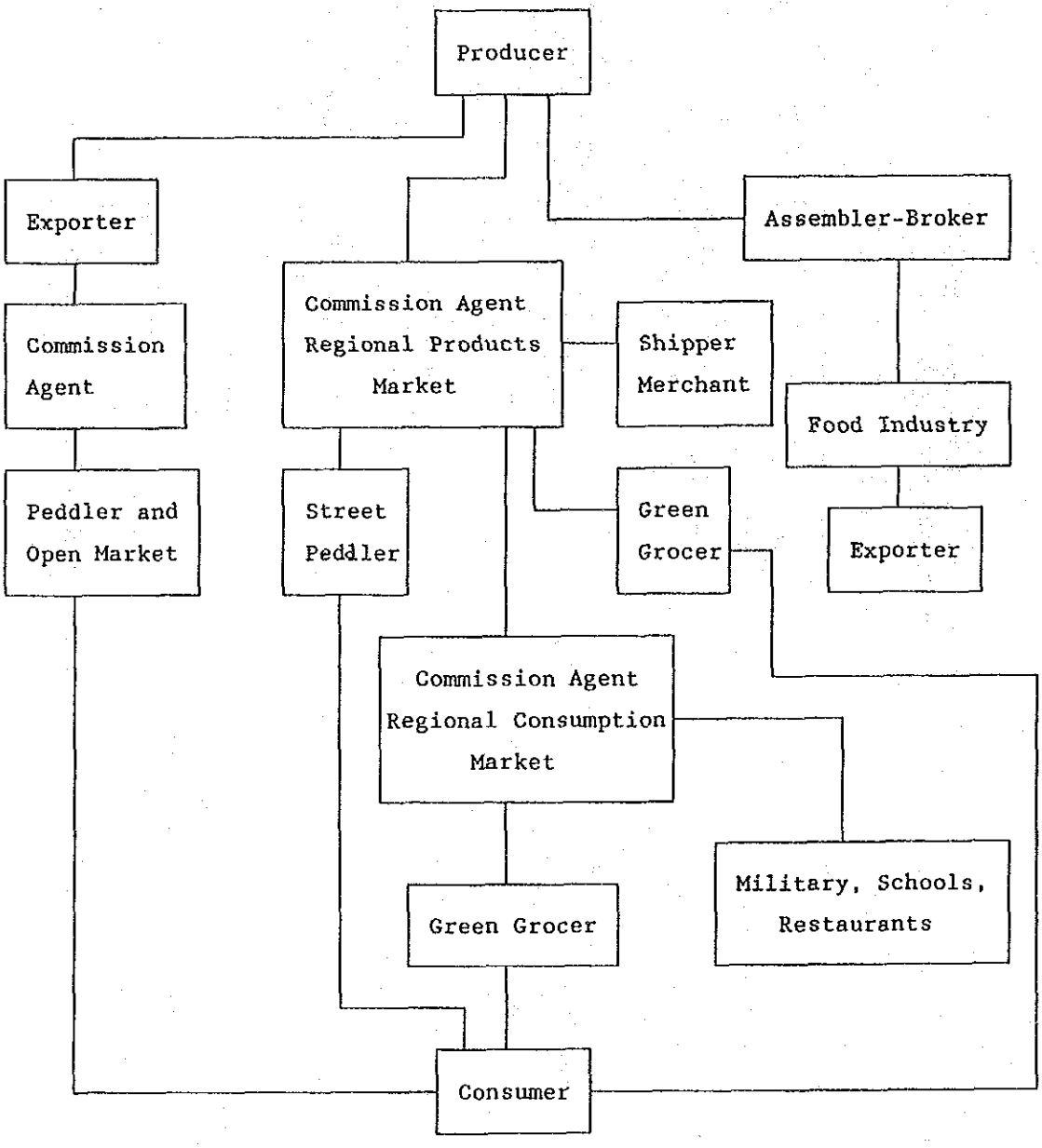


Plate V- 2
Sheet 1

Marketing Channel for Fresh Fruit and Vegetable



Marketing Channel for Dairy Products

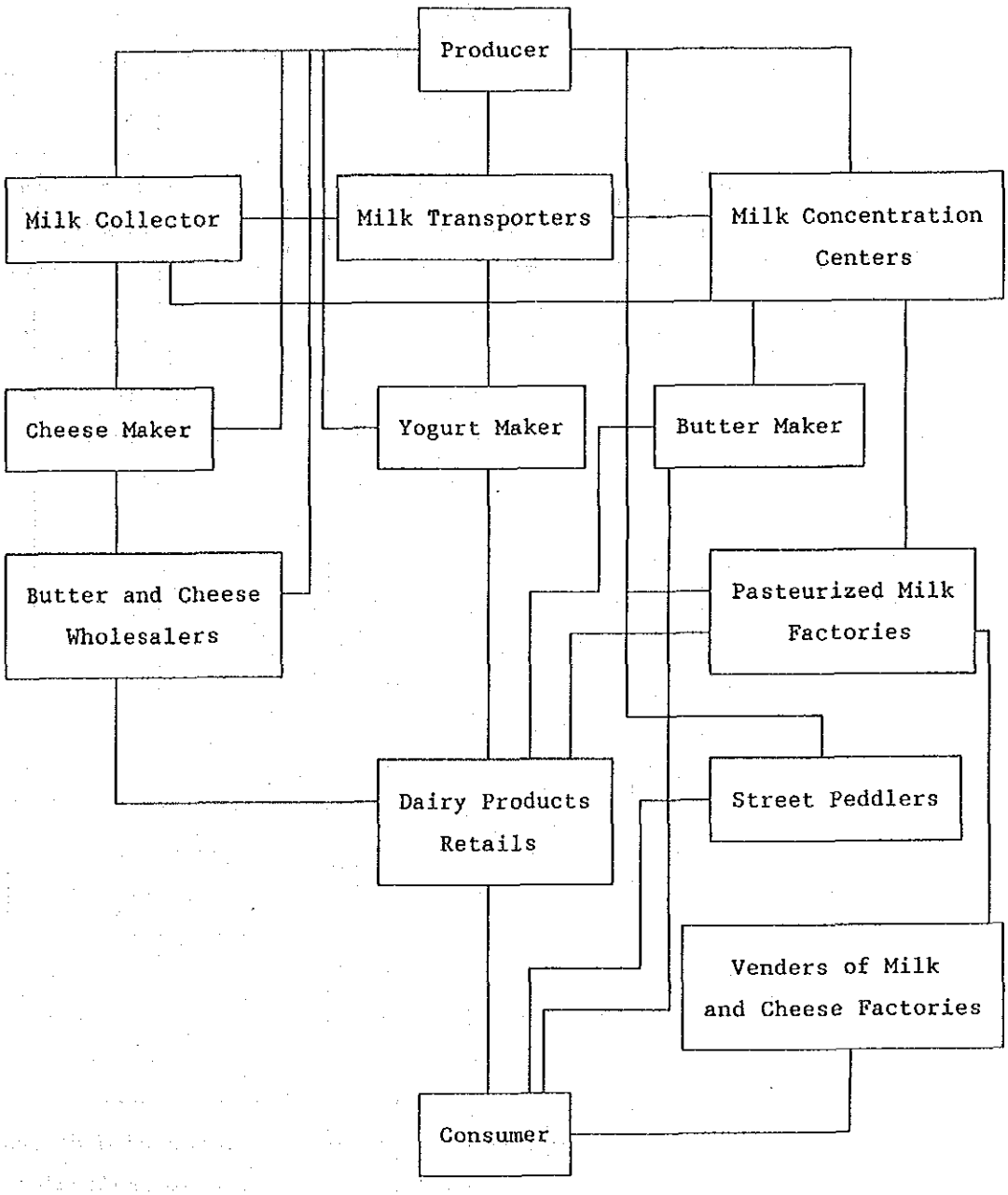
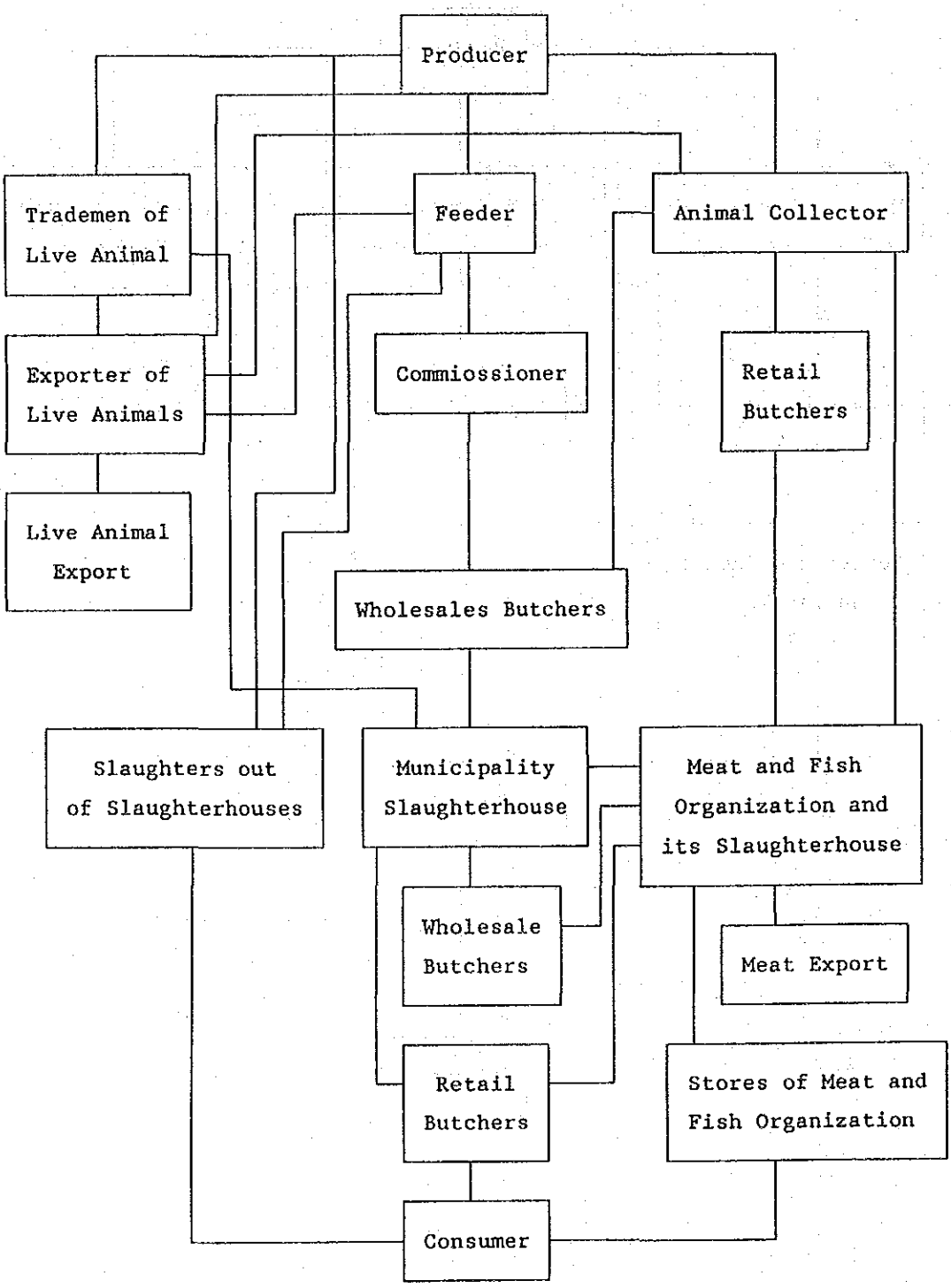


Plate V - 2
Sheet 3

Marketing Channel for Live Animal and Meat



Agricultural Engineering Office Chart

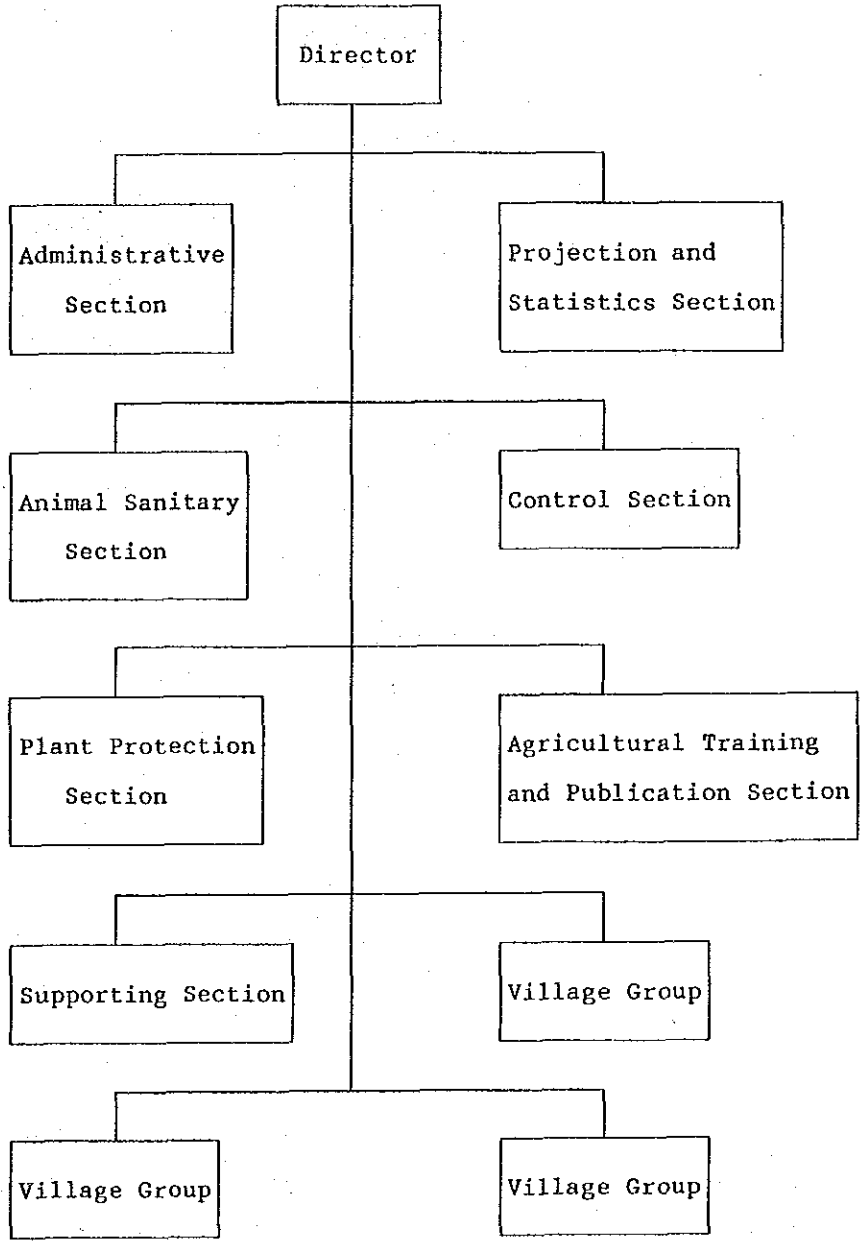
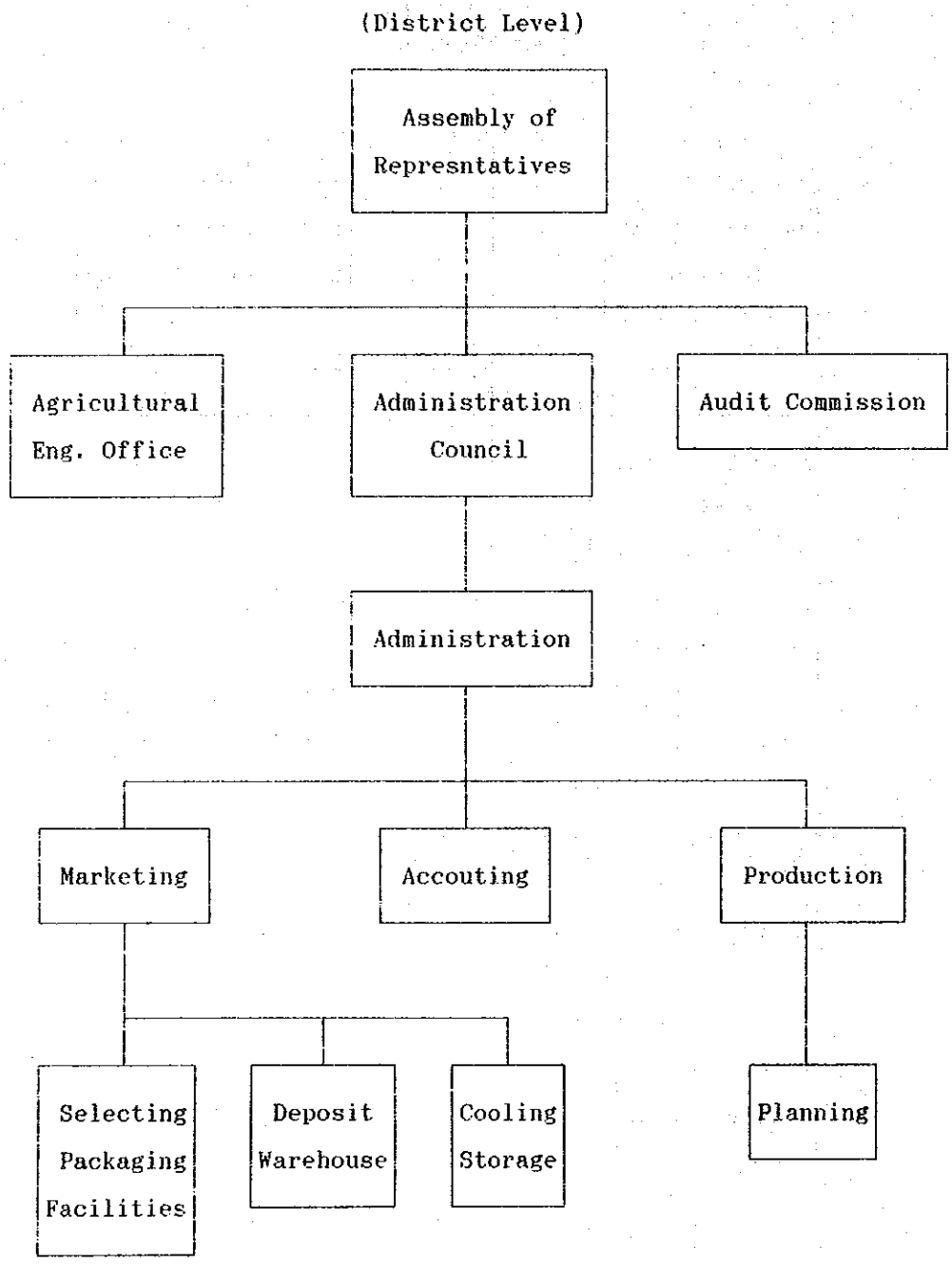
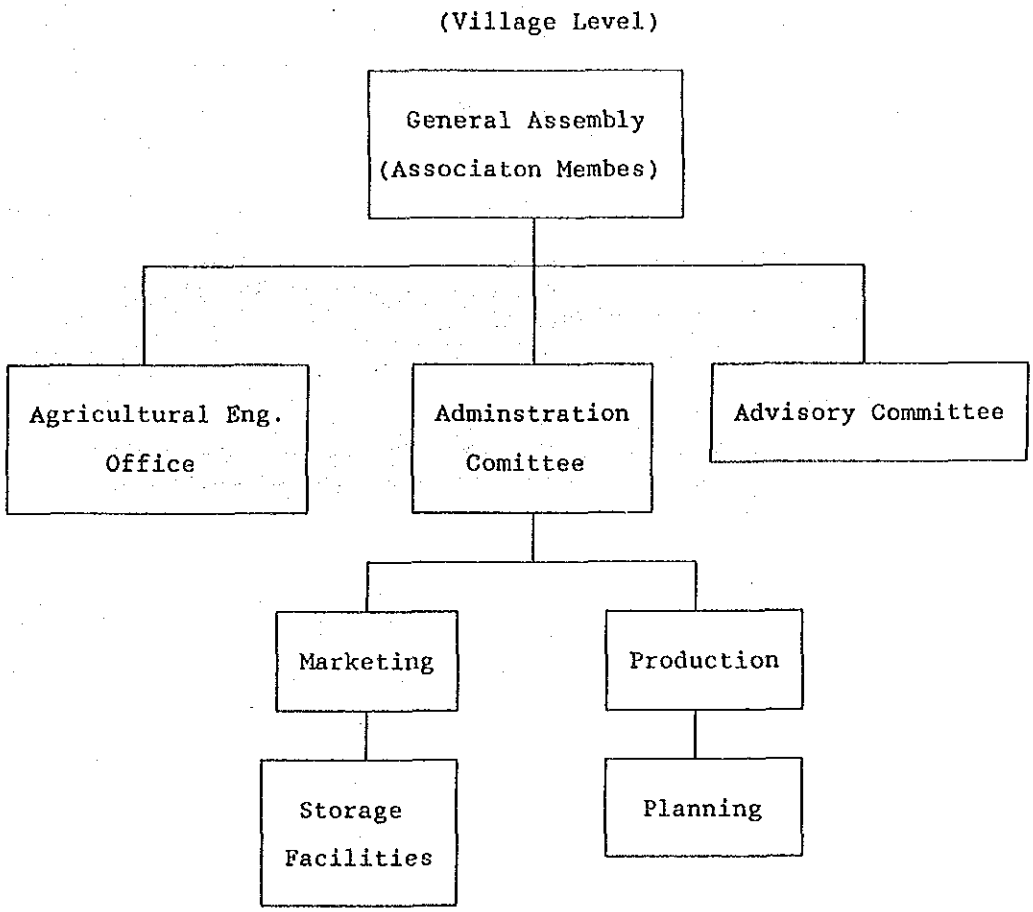


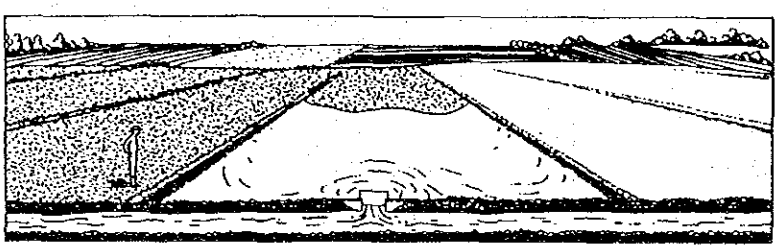
Plate V- 4
Sheet 1

Proposed Agricultural Marketing Cooperatives Chart



Proposed Agricultural Marketing Cooperatives Chart





Appendix-VI

Irrigation

VI-1 PRELIMINARY STUDY ON THE OPTIMUM DEVELOPMENT SIZE

1. Introduction

The Adatepe project area has been demarcated and it has been identified that the area which can be developed under the Adatepe irrigation project is estimated at 44,030 ha. Out of which, 35,760 ha will be irrigated by gravity and 8,270 ha by pump irrigation. The farthest area included in the project area is located about 110km (expressed in planned canal length) downstream the Adatepe Dam. Considering the above-mentioned situation, this study has preliminarily been made to identify whether or not it is feasible to include such an area in the project, as follows:

2. Study Cases

The following study cases were taken up.

Case-1: Area allocation considering the whole gravity and pump irrigation area.

Case-2: Area allocation considering the area to be irrigated by gravity only.

Case-3: Further reduction of the area which is far from the Adatepe Dam, also considering the gravity irrigation only.

In each study case, the area is given as follows: (See Fig. - 1).

	Gross Area (ha)	Net Area (ha)
Case-1:	44,030	39,600*
Case-2:	35,760	32,200
Case-3:	30,060	27,000

* Since the study is roughly made, the area conversion rate of 0.90 has been adopted.

3. Rough Cost Estimates in Each Study Case

In rough cost estimates for each study case, the following were taken into account.

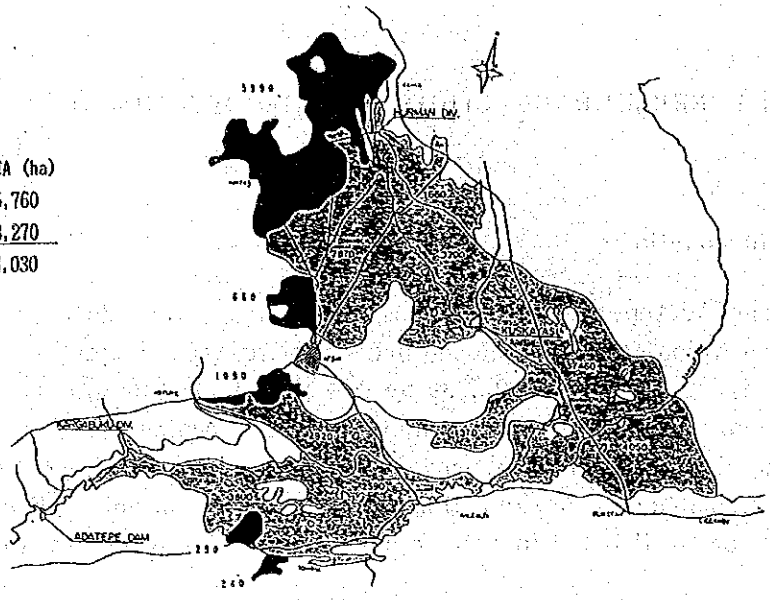
(1) Construction Cost

a) Dam: The construction cost of Adatepe Dam for each study case was estimated by deciding the size of the dam by water-balance calculations

CASE 1

IRRIGATION AREA (ha)

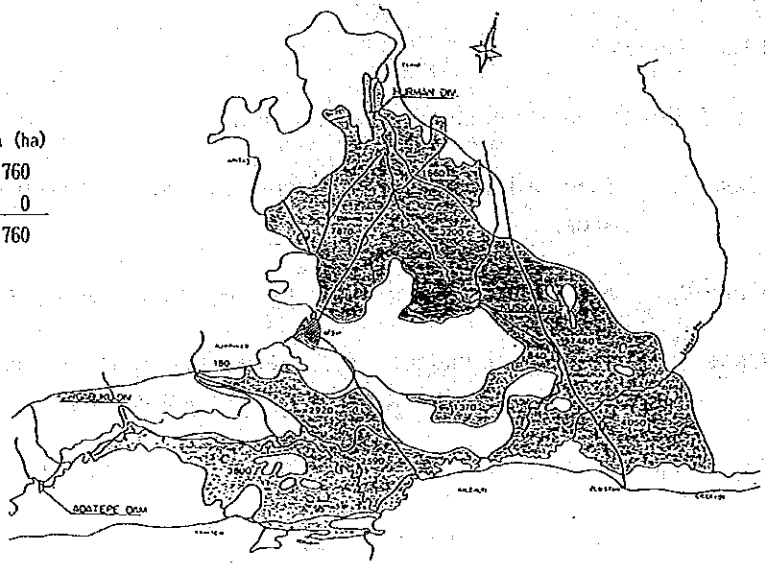
GRAVITY	35,760
PUMPING	8,270
TOTAL	44,030



CASE 2

IRRIGATION AREA (ha)

GRAVITY	35,760
PUMPING	0
TOTAL	35,760



CASE 3

IRRIGATION AREA (ha)

GRAVITY	30,060
PUMPING	0
TOTAL	30,060

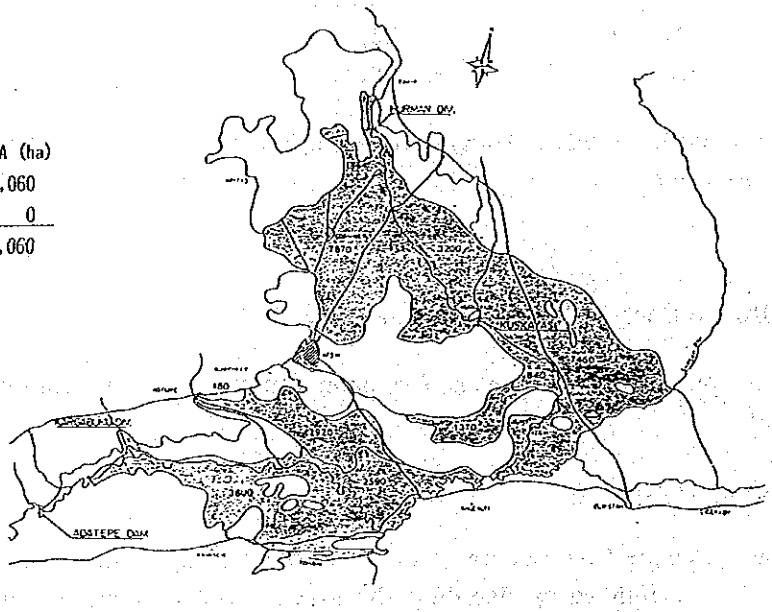


Fig. – 1 Area Allocation for Case Study

for the dam and paying attention to the construction cost of the dam given in the Karakuz F/S Report.

b) Canals: The length of the canals and discharge in the canals were decided taking into consideration the following data:

i) Irrigation System and Cost Diagram (1986, DSI)
ii) Pump Station Cost Diagram (1987, DSI)

(2) Engineering Fee (Survey and Detailed Design)

The engineering fee for each study case was estimated as 15% of the construction cost.

(3) Contingency

The contingency for each study case was estimated as 15% of the construction cost and engineering fee.

(4) Annual Operation and Maintenance Cost

The annual operation and maintenance cost was estimated paying attention to the Karakuz F/S Report.

(5) Replacement Cost

Replacement cost for pumps with accessories, which will be required 25 years after its installation, was considered.

Thus, the rough project cost and annual operation and maintenance cost were estimated as shown in Table-1.

Table-1 Rough Project Cost of Adatepe Project

(1988, Unit : 10^6 TL)

Case	⟨1⟩ Construction Cost	⟨2⟩ Engineering Fee ⟨1⟩ × 15%	⟨3⟩ Contingency (⟨1⟩+⟨2⟩)×15%	⟨4⟩ Project Cost
(Case-1)				
Dam	44,200	6,600	7,600	58,400
Canals	76,300	11,400	13,200	100,900
TOTAL	120,500	18,000	20,800	159,300
(Case-2)				
Dam	37,500	56,000	6,500	49,600
Canals	56,400	8,500	9,700	74,600
TOTAL	93,900	14,100	16,200	124,200
(Case-3)				
Cam	33,300	5,000	5,700	44,000
Canals	51,500	7,700	8,900	68,100
TOTAL	84,800	12,700	14,600	112,100

Note 1) Operation and maintenance cost

[Case-1] ; 1,200 × 10^6 TL/Year

[Case-2] ; 800 × do

[Case-3] ; 700 × do

Note 2) Replacement cost

[Case-1] ; 2,000 × 10^6 TL

[Case-2] ; 0 TL

[Case-3] ; 0 TL

4. Rough Benefits Estimation

In each study case, benefits were calculated by subtracting present total production values from the projected production values after implementation of the project. Thus, the total benefits in each study case were calculated as follows:

Case-1	Case-2	Case-3
$54,187 \times 10^6$TL	$43,950 \times 10^6$TL	$36,943 \times 10^6$TL

* Note: In the above estimation, benefits were considered as below.

Benefits from the crops other than fruit will be borne just after completion of the project, and benefits from the fruit, 5 years after completion of the project as shown below.

	Year				
	7th	8th	9th	10th	11th
Crops other than fruit	20%	40%	60%	80%	100%

	Year				
	12th	13th	14th	15th	16th
Fruit	20%	40%	60%	80%	100%

5. Rough Economic Evaluation

Following assumptions were taken into account in the economic evaluation for each study case.

a) Project life : 50 years
b) Construction period : 7 years including detailed design

With the above-mentioned assumptions, the Internal Rate of Return (I.R.R.) for each case was calculated as follows: (See Tables-2 (1) to (3)).

	Case-1	Case-2	Case-3
I.R.R. (%)	16.19	16.85	16.02

6. Conclusions

Judging from the study results, each study case was found to be feasible and Case-2 was economically most feasible. However, if Case-2 were adopted, all the pumping irrigation area will be neglected and the area will remain as it is. Accordingly, it is recommended to adopt Case-1 considering the project background and social benefits of the whole Afsin-Elbistan plain since the differences in I.R.R. among the three cases are very small.

Table -2(1) Calculation of IRR (Case-1)

(10^6 TL)

Year	Cost	Benefit	B-C	Discount Factor 10.00%	Net Present Value	Discount Factor 16.19%	Net Present Value
1	23,000	0	-23,000	0.909091	-20,909	0.860665	-19,795
2	23,000	0	-23,000	0.826446	-19,008	0.740744	-17,037
3	23,000	0	-23,000	0.751315	-17,280	0.637532	-14,663
4	23,000	0	-23,000	0.683013	-15,709	0.548701	-12,620
5	23,000	0	-23,000	0.620921	-14,281	0.472248	-10,862
6	23,000	0	-23,000	0.564474	-12,983	0.406447	-9,348
7	21,300	9,200	-12,100	0.513158	-6,209	0.349814	-4,233
8	1,200	18,400	17,200	0.466507	8,024	0.301073	5,178
9	1,200	27,500	26,300	0.424098	11,154	0.259123	6,815
10	1,200	36,700	35,500	0.385543	13,687	0.223018	7,917
11	1,200	45,900	44,700	0.350494	15,667	0.191943	8,580
12	1,200	47,500	46,300	0.318631	14,753	0.165199	7,649
13	1,200	49,100	47,900	0.289664	13,875	0.142181	6,810
14	1,200	50,800	49,600	0.263331	13,061	0.122370	6,070
15	1,200	52,400	51,200	0.239392	12,257	0.105320	5,392
16	1,200	54,000	52,800	0.217629	11,491	0.090645	4,786
17	1,200	54,000	52,800	0.197845	10,446	0.078015	4,119
18	1,200	54,000	52,800	0.179859	9,497	0.067145	3,545
19	1,200	54,000	52,800	0.163508	8,633	0.057789	3,051
20	1,200	54,000	52,800	0.148644	7,848	0.049737	2,626
21	1,200	54,000	52,800	0.135131	7,135	0.042807	2,260
22	1,200	54,000	52,800	0.122846	6,486	0.036842	1,945
23	1,200	54,000	52,800	0.111678	5,897	0.031709	1,674
24	1,200	54,000	52,800	0.101526	5,361	0.027291	1,441
25	1,200	54,000	52,800	0.092296	4,873	0.023488	1,240
26	1,200	54,000	52,800	0.083905	4,430	0.020215	1,067
27	1,200	54,000	52,800	0.076278	4,027	0.017399	919
28	1,200	54,000	52,800	0.069343	3,661	0.014974	791
29	1,200	54,000	52,800	0.063039	3,328	0.012888	680
30	3,200	54,000	50,800	0.057309	2,911	0.011092	563
31	1,200	54,000	52,800	0.052099	2,751	0.009547	504
32	1,200	54,000	52,800	0.047362	2,501	0.008216	434
33	1,200	54,000	52,800	0.043057	2,273	0.007072	373
34	1,200	54,000	52,800	0.039143	2,067	0.006086	321
35	1,200	54,000	52,800	0.035584	1,879	0.005238	277
36	1,200	54,000	52,800	0.032349	1,708	0.004508	238
37	1,200	54,000	52,800	0.029408	1,553	0.003880	205
38	1,200	54,000	52,800	0.026735	1,412	0.003340	176
39	1,200	54,000	52,800	0.024304	1,283	0.002874	152
40	1,200	54,000	52,800	0.022095	1,167	0.002474	131
41	1,200	54,000	52,800	0.020086	1,061	0.002129	112
42	1,200	54,000	52,800	0.018260	964	0.001832	97
43	1,200	54,000	52,800	0.016600	876	0.001577	83
44	1,200	54,000	52,800	0.015091	797	0.001357	72
45	1,200	54,000	52,800	0.013719	724	0.001168	62
46	1,200	54,000	52,800	0.012472	659	0.001005	53
47	1,200	54,000	52,800	0.011338	599	0.000865	46
48	1,200	54,000	52,800	0.010307	544	0.000745	39
49	1,200	54,000	52,800	0.009370	495	0.000641	34
50	1,200	54,000	52,800	0.008519	450	0.000552	29
Total	212,900	2,227,500	2,014,600		117,884		-0

<IRR>= 16.19%

Table -2(2) Calculation of IRR (Case-2)

(10^6 TL)

Cost	Benefit	B-C	Discount Factor 10.00%	Net Present Value	Discount Factor 16.85%	Net Present Value
18,000	0	-18,000	0.909091	-16,364	0.855829	-15,405
18,000	0	-18,000	0.826446	-14,876	0.732443	-13,184
18,000	0	-18,000	0.751315	-13,524	0.626846	-11,283
18,000	0	-18,000	0.683013	-12,294	0.536472	-9,657
18,000	0	-18,000	0.620921	-11,177	0.459129	-8,264
18,000	0	-18,000	0.564474	-10,161	0.392935	-7,073
16,200	7,500	-8,700	0.513158	-4,464	0.336285	-2,926
800	15,000	14,200	0.466507	6,624	0.287803	4,087
800	27,500	26,700	0.424098	11,323	0.246310	6,576
800	29,900	29,100	0.385543	11,219	0.210799	6,134
800	37,400	36,600	0.350494	12,828	0.180408	6,603
800	38,700	37,900	0.318631	12,076	0.154398	5,852
800	40,000	39,200	0.289664	11,355	0.132138	5,180
800	41,400	40,600	0.263331	10,691	0.113088	4,591
800	42,700	41,900	0.239392	10,031	0.096784	4,055
800	44,000	43,200	0.217629	9,402	0.082830	3,578
800	44,000	43,200	0.197845	8,547	0.070889	3,062
800	44,000	43,200	0.179859	7,770	0.060669	2,621
800	44,000	43,200	0.163508	7,064	0.051922	2,243
800	44,000	43,200	0.148644	6,421	0.044436	1,920
800	44,000	43,200	0.135131	5,838	0.038030	1,643
800	44,000	43,200	0.122846	5,307	0.032547	1,406
800	44,000	43,200	0.111678	4,824	0.027855	1,203
800	44,000	43,200	0.101526	4,386	0.023839	1,030
800	44,000	43,200	0.092296	3,987	0.020402	881
800	44,000	43,200	0.083905	3,625	0.017461	754
800	44,000	43,200	0.076278	3,295	0.014943	646
800	44,000	43,200	0.069343	2,996	0.012789	552
800	44,000	43,200	0.063039	2,723	0.010945	473
800	44,000	43,200	0.057309	2,476	0.009367	405
800	44,000	43,200	0.052099	2,251	0.008017	346
800	44,000	43,200	0.047362	2,046	0.006861	296
800	44,000	43,200	0.043057	1,860	0.005872	254
800	44,000	43,200	0.039143	1,691	0.005025	217
800	44,000	43,200	0.035584	1,537	0.004301	186
800	44,000	43,200	0.032349	1,397	0.003681	159
800	44,000	43,200	0.029408	1,270	0.003150	136
800	44,000	43,200	0.026735	1,155	0.002696	116
800	44,000	43,200	0.024304	1,050	0.002307	100
800	44,000	43,200	0.022095	955	0.001975	85
800	44,000	43,200	0.020086	868	0.001690	73
800	44,000	43,200	0.018260	789	0.001446	62
800	44,000	43,200	0.016600	717	0.001238	53
800	44,000	43,200	0.015091	652	0.001059	46
800	44,000	43,200	0.013719	593	0.000907	39
800	44,000	43,200	0.012472	539	0.000776	34
800	44,000	43,200	0.011338	490	0.000664	29
800	44,000	43,200	0.010307	445	0.000568	25
800	44,000	43,200	0.009370	405	0.000486	21
800	44,000	43,200	0.008519	368	0.000416	18
158,600	1,820,100	1,661,500		103,026		-0

<IRR>= 16.85%

Table -2(3) Calculation of IRR (Case-3)

(10^6 TL)

Year	Cost	Benefit	B-C	Discount Factor 10.00%	Net Present Value	Discount Factor 16.02%	Net Present Value
1	16,000	0	-16,000	0.909091	-14,545	0.861901	-13,790
2	16,000	0	-16,000	0.826446	-13,223	0.742873	-11,886
3	16,000	0	-16,000	0.751315	-12,021	0.640283	-10,245
4	16,000	0	-16,000	0.683013	-10,928	0.551861	-8,830
5	16,000	0	-16,000	0.620921	-9,935	0.475649	-7,610
6	16,000	0	-16,000	0.564474	-9,032	0.409962	-6,559
7	16,100	6,300	-9,800	0.513158	-5,029	0.353347	-3,463
8	700	12,600	11,900	0.466507	5,551	0.304550	3,624
9	700	18,900	18,200	0.424098	7,719	0.262492	4,777
10	700	25,200	24,500	0.385543	9,446	0.226242	5,543
11	700	31,500	30,800	0.350494	10,795	0.194998	6,006
12	700	32,600	31,900	0.318631	10,164	0.168069	5,361
13	700	33,700	33,000	0.289664	9,559	0.144859	4,780
14	700	34,800	34,100	0.263331	8,980	0.124854	4,258
15	700	35,900	35,200	0.239392	8,427	0.107612	3,788
16	700	37,000	36,300	0.217629	7,900	0.092751	3,367
17	700	37,000	36,300	0.197845	7,182	0.079942	2,902
18	700	37,000	36,300	0.179859	6,529	0.068902	2,501
19	700	37,000	36,300	0.163508	5,935	0.059387	2,156
20	700	37,000	36,300	0.148644	5,396	0.051185	1,858
21	700	37,000	36,300	0.135131	4,905	0.044117	1,601
22	700	37,000	36,300	0.122846	4,459	0.038024	1,380
23	700	37,000	36,300	0.111678	4,054	0.032773	1,190
24	700	37,000	36,300	0.101526	3,685	0.028247	1,025
25	700	37,000	36,300	0.092296	3,350	0.024346	884
26	700	37,000	36,300	0.083905	3,046	0.020984	762
27	700	37,000	36,300	0.076278	2,769	0.018086	657
28	700	37,000	36,300	0.069343	2,517	0.015589	566
29	700	37,000	36,300	0.063039	2,288	0.013436	488
30	700	37,000	36,300	0.057309	2,080	0.011580	420
31	700	37,000	36,300	0.052099	1,891	0.009981	362
32	700	37,000	36,300	0.047362	1,719	0.008603	312
33	700	37,000	36,300	0.043057	1,563	0.007415	269
34	700	37,000	36,300	0.039143	1,421	0.006391	232
35	700	37,000	36,300	0.035584	1,292	0.005508	200
36	700	37,000	36,300	0.032349	1,174	0.004747	172
37	700	37,000	36,300	0.029408	1,068	0.004092	149
38	700	37,000	36,300	0.026735	970	0.003527	128
39	700	37,000	36,300	0.024304	882	0.003040	110
40	700	37,000	36,300	0.022095	802	0.002620	95
41	700	37,000	36,300	0.020086	729	0.002258	82
42	700	37,000	36,300	0.018260	663	0.001946	71
43	700	37,000	36,300	0.016600	603	0.001678	61
44	700	37,000	36,300	0.015091	548	0.001446	52
45	700	37,000	36,300	0.013719	498	0.001246	45
46	700	37,000	36,300	0.012472	453	0.001074	39
47	700	37,000	36,300	0.011338	412	0.000926	34
48	700	37,000	36,300	0.010307	374	0.000798	29
49	700	37,000	36,300	0.009370	340	0.000688	25
50	700	37,000	36,300	0.008519	309	0.000593	22
Total	142,200	1,526,500	1,384,300	--------	79,734	--------	-0

<IRR>= 16.02%

Calculation of Water Requirement

[PROPOSED CROPPING PATTERN]

Year> 1986

	Gravity Area	(ha)	Pumping Area	(ha)	Total	(ha)
Wheat	24.0%	8,582	30.0%	2,481	25.1%	11,063
Barley	4.0%	1,430	10.0%	827	5.1%	2,257
Dry Bean	25.0%	8,940	18.0%	1,489	23.7%	10,429
Sugar Beet	18.0%	6,437	13.0%	1,075	17.1%	7,512
Alfalfa	6.0%	2,146	10.0%	827	6.8%	2,973
Sunflower	5.0%	1,788	4.0%	331	4.8%	2,119
Vegetable	3.0%	1,073	2.0%	165	2.8%	1,238
Potato	4.0%	1,430	3.0%	248	3.8%	1,678
Fruit	6.0%	2,146	6.0%	496	6.0%	2,642
Vineyard	2.0%	715	2.0%	165	2.0%	880
Poplar	3.0%	1,073	2.0%	165	2.8%	1,238
TOTAL-------	100.0%	35,760	100.0%	8,270	100.0%	44,030
	Gravity-	81.2%	Pump-	18.8%	Total-	100.0%

Soil Depth	Available Water Capacity
0 - 30cm	45mm
0 - 60cm	90mm

CLIMATE DATA

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total/Avg
[t (c)]	-0.60	1.00	5.40	11.50	11.60	18.60	24.50	24.20	19.20	10.60	2.10	-0.40	10.64
{p (%)}	6.85	6.78	8.33	8.90	9.93	9.97	10.12	9.48	8.38	7.80	6.81	6.64	100.00
<f (mm)>	53.81	58.23	88.33	119.17	133.37	165.78	195.58	181.97	141.73	101.16	61.88	52.78	1,353.79
<kt>	0.22	0.27	0.41	0.60	0.60	0.82	1.00	0.99	0.84	0.57	0.31	0.23	---
[Rf (mm)]	36.00	37.40	11.20	18.60	85.10	27.50	0.00	1.00	7.00	57.40	61.20	80.20	422.60
[Er (mm)]	34.24	35.42	11.20	18.60	73.87	27.10	0.00	1.00	7.00	52.22	55.41	70.54	386.60
[K.A.R/30cm]	45.00	45.00	15.20	0.00	0.00	0.00	0.00	0.00	0.00	22.22	45.00	45.00	---
[K.A.R/60cm]	90.00	90.00	60.20	0.00	0.00	0.00	0.00	0.00	0.00	22.22	74.63	90.00	---

{ }:Fixed Data
[ ]:Climate Data
< >:Calculated Data

[WHEAT] Oct.15 - Jul.15 Year> 1986

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
f	53.81	58.23	88.33	119.17	133.37	165.78	94.64			88.11	61.88	52.78	916.09
Growth Ratio	0.08	0.23	0.38	0.54	0.69	0.85	0.96			0.10	0.40	0.79	---
Kc	0.85	0.83	0.80	0.99	1.36	0.95	0.34			0.56	0.68	0.81	---
Kt	0.22	0.27	0.41	0.60	0.60	0.82	1.00	0.00	0.00	0.57	0.31	0.23	---
K	0.19	0.22	0.33	0.59	0.82	0.77	0.34	0.00	0.00	0.32	0.21	0.18	---
U (mm)	10.13	13.02	28.79	70.52	108.76	128.06	32.44	0.00	0.00	27.85	12.88	9.69	442.14
Er (mm)	34.24	35.42	11.20	18.60	73.87	27.10	0.00	0.00	0.00	45.48	55.41	70.54	371.86
K.A.R <30>	45.00	45.00	45.00	27.41	0.00	0.00	0.00	0.00	0.00	2.87	20.49	45.00	---
U-Er-K.A.R(mm)	0.00	0.00	0.00	24.50	34.89	100.96	32.44	0.00	0.00	0.00	0.00	0.00	192.80

[BARLEY] Oct.5 - Jul.5 Year> 1986

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
f	53.81	58.23	88.33	119.17	133.37	165.78	31.55			88.11	61.88	52.78	853.00
Growth Ratio	0.08	0.25	0.40	0.56	0.73	0.89	0.99			0.10	0.40	0.79	---
Kc	0.85	0.82	0.80	1.19	1.30	0.73	0.21			0.56	0.68	0.81	---
Kt	0.22	0.27	0.41	0.60	0.60	0.82	1.00	0.00	0.00	0.57	0.31	0.23	---
K	0.19	0.22	0.32	0.71	0.78	0.60	0.21	0.00	0.00	0.32	0.21	0.18	---
U (mm)	10.13	12.99	28.64	84.80	104.20	98.69	6.59	0.00	0.00	27.85	12.88	9.69	396.46
Er (mm)	34.24	35.42	11.20	18.60	73.87	27.10	0.00	0.00	0.00	45.48	55.41	70.54	371.86
K.A.R <30>	45.00	45.00	45.00	27.56	0.00	0.00	0.00	0.00	0.00	2.87	20.49	45.00	---
U-Er-K.A.R(mm)	0.00	0.00	0.00	38.65	30.33	71.59	6.59	0.00	0.00	0.00	0.00	0.00	147.15

[DRY BEAN] May.15 - Sep.15 Year> 1986

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
f	0.00	0.00	0.00	0.00	73.14	165.78	195.58	181.97	70.87	0.00	0.00	0.00	687.33
Growth Ratio	0.00	0.00	0.00	0.00	0.07	0.25	0.49	0.74	0.94	0.00	0.00	0.00	---
Kc	0.00	0.00	0.00	0.00	0.54	0.58	0.80	0.86	0.70	0.00	0.00	0.00	---
Kt	0.00	0.00	0.00	0.00	0.60	0.82	1.00	0.99	0.84	0.00	0.00	0.00	---
K	0.00	0.00	0.00	0.00	0.32	0.47	0.80	0.85	0.59	0.00	0.00	0.00	---
U (mm)	0.00	0.00	0.00	0.00	23.68	78.11	156.39	154.78	41.49	0.00	0.00	0.00	454.45
Er (mm)	0.00	0.00	0.00	0.00	40.51	27.10	0.00	1.00	3.50	0.00	0.00	0.00	72.11
K.A.R <30>	0.00	0.00	0.00	0.00	0.00	16.83	0.00	0.00	0.00	0.00	0.00	0.00	---
U-Er-K.A.R(mm)	0.00	0.00	0.00	0.00	0.00	34.18	156.39	153.78	37.99	0.00	0.00	0.00	382.34

[SUGAR BEET] May.1 - Oct.5 Year> 1986

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
f	0.00	0.00	0.00	0.00	133.37	165.78	195.58	181.97	141.73	16.32	0.00	0.00	834.74
Growth Ratio	0.00	0.00	0.00	0.00	0.10	0.29	0.48	0.68	0.87	0.99	0.00	0.00	---
Kc	0.00	0.00	0.00	0.00	0.64	0.79	0.92	1.10	1.00	0.73	0.00	0.00	---
Kt	0.00	0.00	0.00	0.00	0.60	0.82	1.00	0.99	0.84	0.57	0.00	0.00	---
K	0.00	0.00	0.00	0.00	0.38	0.65	0.92	1.09	0.84	0.41	0.00	0.00	---
U (mm)	0.00	0.00	0.00	0.00	51.02	107.35	179.84	198.74	118.49	6.74	0.00	0.00	662.19
Er (mm)	0.00	0.00	0.00	0.00	73.87	27.10	0.00	1.00	7.00	8.42	0.00	0.00	117.39
K.A.R <30>	0.00	0.00	0.00	0.00	0.00	22.85	0.00	0.00	0.00	0.00	0.00	0.00	---
U-Er-K.A.R(mm)	0.00	0.00	0.00	0.00	0.00	57.40	179.84	197.74	111.49	0.00	0.00	0.00	546.48

[ALFALFA] Apr.25 - Oct.5 Year> 1986

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
f	0.00	0.00	0.00	23.83	133.37	165.78	195.58	181.97	141.73	16.32	0.00	0.00	858.58
Growth Ratio	0.00	0.00	0.00	0.02	0.12	0.31	0.50	0.69	0.88	0.99	0.00	0.00	---
Kc	0.00	0.00	0.00	0.87	0.94	1.03	1.07	1.06	0.87	0.66	0.00	0.00	---
Kt	0.00	0.00	0.00	0.60	0.60	0.82	1.00	0.99	0.84	0.57	0.00	0.00	---
K	0.00	0.00	0.00	0.52	0.56	0.84	1.07	1.05	0.73	0.37	0.00	0.00	---
U (mm)	0.00	0.00	0.00	12.40	75.25	138.89	209.95	190.46	103.22	6.09	0.00	0.00	736.25
Er (mm)	0.00	0.00	0.00	3.72	73.87	27.10	0.00	1.00	7.00	8.42	0.00	0.00	121.11
K.A.R <30>	0.00	0.00	0.00	3.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	---
U-Er-K.A.R(mm)	0.00	0.00	0.00	5.64	1.38	111.79	209.95	189.46	96.22	0.00	0.00	0.00	614.44

[SUNFLOWER] May.1 - Aug.20 Year> 1986

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
f	0.00	0.00	0.00	0.00	133.37	165.78	195.58	117.40	0.00	0.00	0.00	0.00	612.13
Growth Ratio	0.00	0.00	0.00	0.00	0.13	0.41	0.68	0.91	0.00	0.00	0.00	0.00	---
Kc	0.00	0.00	0.00	0.00	0.47	0.59	0.87	0.86	0.00	0.00	0.00	0.00	---
Kt	0.00	0.00	0.00	0.00	0.60	0.82	1.00	0.99	0.00	0.00	0.00	0.00	---
K	0.00	0.00	0.00	0.00	0.28	0.48	0.87	0.85	0.00	0.00	0.00	0.00	---
U (mm)	0.00	0.00	0.00	0.00	37.35	79.73	170.85	100.21	0.00	0.00	0.00	0.00	388.14
Er (mm)	0.00	0.00	0.00	0.00	73.87	27.10	0.00	0.65	0.00	0.00	0.00	0.00	101.62
K.A.R <30>	0.00	0.00	0.00	0.00	0.00	36.52	0.00	0.00	0.00	0.00	0.00	0.00	---
U-Er-K.A.R(mm)	0.00	0.00	0.00	0.00	0.00	16.11	170.85	99.56	0.00	0.00	0.00	0.00	286.52

[VEGITABLE] Apr.20 - Aug.31 Year> 1986

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
f	0.00	0.00	0.00	43.70	133.37	165.78	195.58	181.97	0.00	0.00	0.00	0.00	720.39
Growth Ratio	0.00	0.00	0.00	0.04	0.19	0.42	0.65	0.88	0.00	0.00	0.00	0.00	---
Kc	0.00	0.00	0.00	0.33	0.53	0.77	0.81	0.60	0.00	0.00	0.00	0.00	---
Kt	0.00	0.00	0.00	0.60	0.60	0.82	1.00	0.99	0.00	0.00	0.00	0.00	---
K	0.00	0.00	0.00	0.20	0.32	0.63	0.81	0.59	0.00	0.00	0.00	0.00	---
U (mm)	0.00	0.00	0.00	8.71	42.54	104.85	157.95	107.57	0.00	0.00	0.00	0.00	421.62
Er (mm)	0.00	0.00	0.00	6.82	73.87	27.10	0.00	1.00	0.00	0.00	0.00	0.00	108.79
K.A.R <30>	0.00	0.00	0.00	5.57	3.69	35.01	0.00	0.00	0.00	0.00	0.00	0.00	---
U-Er-K.A.R(mm)	0.00	0.00	0.00	0.00	0.00	42.73	157.95	106.57	0.00	0.00	0.00	0.00	307.25

[POTATO] Apr.1 - Aug.25 Year> 1986

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
f	0.00	0.00	0.00	119.17	133.37	165.78	195.58	146.75	0.00	0.00	0.00	0.00	760.65
Growth Ratio	0.00	0.00	0.00	0.10	0.31	0.52	0.72	0.92	0.00	0.00	0.00	0.00	---
Kc	0.00	0.00	0.00	0.29	0.61	0.88	0.91	0.91	0.00	0.00	0.00	0.00	---
Kt	0.00	0.00	0.00	0.60	0.60	0.82	1.00	0.99	0.00	0.00	0.00	0.00	---
K	0.00	0.00	0.00	0.17	0.37	0.72	0.90	0.91	0.00	0.00	0.00	0.00	---
U (mm)	0.00	0.00	0.00	20.76	49.10	118.99	176.91	132.89	0.00	0.00	0.00	0.00	498.65
Er (mm)	0.00	0.00	0.00	18.60	73.87	27.10	0.00	0.81	0.00	0.00	0.00	0.00	120.38
K.A.R <30>	0.00	0.00	0.00	15.20	13.04	37.81	0.00	0.00	0.00	0.00	0.00	0.00	---
U-Er-K.A.R(mm)	0.00	0.00	0.00	0.00	0.00	54.08	176.91	132.08	0.00	0.00	0.00	0.00	363.07

[FRUIT] Apr. 25 - Oct. 5 Year> 1986

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
f	0.00	0.00	0.00	23.83	133.37	165.78	195.58	181.97	141.73	16.32	0.00	0.00	858.58
Growth Ratio	0.00	0.00	0.00	0.02	0.12	0.31	0.50	0.69	0.88	0.99	0.00	0.00	---
Kc	0.00	0.00	0.00	0.56	0.75	0.94	0.95	0.71	0.38	0.31	0.00	0.00	---
Kt	0.00	0.00	0.00	0.60	0.60	0.82	1.00	0.99	0.84	0.57	0.00	0.00	---
K	0.00	0.00	0.00	0.34	0.45	0.77	0.95	0.71	0.32	0.17	0.00	0.00	---
U (mm)	0.00	0.00	0.00	8.00	60.22	126.84	185.12	128.74	45.34	2.83	0.00	0.00	557.10
Er (mm)	0.00	0.00	0.00	3.72	73.87	27.10	0.00	1.00	7.00	8.42	0.00	0.00	121.11
K.A.R <60>	0.00	0.00	0.00	12.04	7.76	21.41	0.00	0.00	0.00	0.00	0.00	0.00	---
U-Er-K.A.R(mm)	0.00	0.00	0.00	0.00	0.00	78.34	185.12	127.74	38.34	0.00	0.00	0.00	429.54

[GRAPE] Mar. 15 - Oct. 20 Year> 1986

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
f	0.00	0.00	48.44	119.17	133.37	165.78	195.58	181.97	141.73	65.27	0.00	0.00	1,051.30
Growth Ratio	0.00	0.00	0.04	0.14	0.28	0.42	0.56	0.70	0.84	0.95	0.00	0.00	---
Kc	0.00	0.00	0.65	0.67	0.70	0.71	0.79	0.97	0.45	0.41	0.00	0.00	---
Kt	0.00	0.00	0.41	0.60	0.60	0.82	1.00	0.99	0.84	0.57	0.00	0.00	---
K	0.00	0.00	0.27	0.40	0.42	0.58	0.79	0.96	0.38	0.23	0.00	0.00	---
U (mm)	0.00	0.00	12.91	47.41	55.66	95.98	154.04	174.60	53.27	15.33	0.00	0.00	609.19
Er (mm)	0.00	0.00	6.14	18.60	73.87	27.10	0.00	1.00	7.00	33.69	0.00	0.00	167.40
K.A.R <60>	0.00	0.00	76.54	69.78	40.97	59.18	0.00	0.00	0.00	0.00	0.00	0.00	---
U-Er-K.A.R(mm)	0.00	0.00	0.00	0.00	0.00	9.70	154.04	173.60	46.27	0.00	0.00	0.00	383.61

[POPLAR] Apr. 25 - Oct. 5 Year> 1986

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
f	0.00	0.00	0.00	23.83	133.37	165.78	195.58	181.97	141.73	16.32	0.00	0.00	858.58
Growth Ratio	0.00	0.00	0.00	0.02	0.12	0.31	0.50	0.69	0.88	0.99	0.00	0.00	---
Kc	0.00	0.00	0.00	0.56	0.75	0.94	0.95	0.71	0.38	0.31	0.00	0.00	---
Kt	0.00	0.00	0.00	0.60	0.60	0.82	1.00	0.99	0.84	0.57	0.00	0.00	---
K	0.00	0.00	0.00	0.34	0.45	0.77	0.95	0.71	0.32	0.17	0.00	0.00	---
U (mm)	0.00	0.00	0.00	8.00	60.22	126.84	185.12	128.74	45.34	2.83	0.00	0.00	557.10
Er (mm)	0.00	0.00	0.00	3.72	73.87	27.10	0.00	1.00	7.00	8.42	0.00	0.00	121.11
K.A.R <60>	0.00	0.00	0.00	12.04	7.76	21.41	0.00	0.00	0.00	0.00	0.00	0.00	---
U-Er-K.A.R(mm)	0.00	0.00	0.00	0.00	0.00	78.34	185.12	127.74	38.34	0.00	0.00	0.00	429.54

Wn (mm/month) <<< GROSS >>>

Year> 1986

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Wheat	0.00	0.00	0.00	24.50	34.89	100.96	32.44	0.00	0.00	0.00	0.00	0.00	192.80
Barley	0.00	0.00	0.00	38.65	30.33	71.59	6.59	0.00	0.00	0.00	0.00	0.00	147.15
Dry Bean	0.00	0.00	0.00	0.00	0.00	34.18	156.39	153.78	37.99	0.00	0.00	0.00	382.34
Sugar Beet	0.00	0.00	0.00	0.00	0.00	57.40	179.84	197.74	111.49	0.00	0.00	0.00	546.48
Alfalfa	0.00	0.00	0.00	5.64	1.38	111.79	209.95	189.46	96.22	0.00	0.00	0.00	614.44
Sunflower	0.00	0.00	0.00	0.00	0.00	16.11	170.85	99.56	0.00	0.00	0.00	0.00	286.52
Vegetable	0.00	0.00	0.00	0.00	0.00	42.73	157.95	106.57	0.00	0.00	0.00	0.00	307.25
Potato	0.00	0.00	0.00	0.00	0.00	54.08	176.91	132.08	0.00	0.00	0.00	0.00	363.07
Fruit	0.00	0.00	0.00	0.00	0.00	78.34	185.12	127.74	38.34	0.00	0.00	0.00	429.54
Vineyard	0.00	0.00	0.00	0.00	0.00	9.70	154.04	173.60	46.27	0.00	0.00	0.00	383.61
Poplar	0.00	0.00	0.00	0.00	0.00	78.34	185.12	127.74	38.34	0.00	0.00	0.00	429.54
													4,082.74

Wn (mm/month) [Whole Area] Year> 1986

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Wheat	0.00	0.00	0.00	6.16	8.77	25.37	8.15	0.00	0.00	0.00	0.00	0.00	48.44
Barley	0.00	0.00	0.00	1.98	1.55	3.67	0.34	0.00	0.00	0.00	0.00	0.00	7.54
Dry Bean	0.00	0.00	0.00	0.00	0.00	8.10	37.04	36.42	9.00	0.00	0.00	0.00	90.56
Sugar Beet	0.00	0.00	0.00	0.00	0.00	9.79	30.68	33.74	19.02	0.00	0.00	0.00	93.23
Alfalfa	0.00	0.00	0.00	0.38	0.09	7.55	14.17	12.79	6.50	0.00	0.00	0.00	41.48
Sunflower	0.00	0.00	0.00	0.00	0.00	0.78	8.22	4.79	0.00	0.00	0.00	0.00	13.79
Vegetable	0.00	0.00	0.00	0.00	0.00	1.20	4.44	3.00	0.00	0.00	0.00	0.00	8.64
Potato	0.00	0.00	0.00	0.00	0.00	2.06	6.74	5.04	0.00	0.00	0.00	0.00	13.84
Fruit	0.00	0.00	0.00	0.00	0.00	4.70	11.11	7.66	2.30	0.00	0.00	0.00	25.77
Vineyard	0.00	0.00	0.00	0.00	0.00	0.19	3.08	3.47	0.93	0.00	0.00	0.00	7.67
Poplar	0.00	0.00	0.00	0.00	0.00	2.20	5.21	3.59	1.08	0.00	0.00	0.00	12.08
Total	0.00	0.00	0.00	8.52	10.41	65.61	129.19	110.50	38.82	0.00	0.00	0.00	363.06

Wn (mm/month) [Gravity Area] Year> 1986

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Wheat	0.00	0.00	0.00	5.88	8.37	24.23	7.79	0.00	0.00	0.00	0.00	0.00	46.27
Barley	0.00	0.00	0.00	1.55	1.21	2.86	0.26	0.00	0.00	0.00	0.00	0.00	5.89
Dry Bean	0.00	0.00	0.00	0.00	0.00	8.55	39.10	38.44	9.50	0.00	0.00	0.00	95.58
Sugar Beet	0.00	0.00	0.00	0.00	0.00	10.33	32.37	35.59	20.07	0.00	0.00	0.00	98.37
Alfalfa	0.00	0.00	0.00	0.34	0.08	6.71	12.60	11.37	5.77	0.00	0.00	0.00	36.87
Sunflower	0.00	0.00	0.00	0.00	0.00	0.81	8.54	4.98	0.00	0.00	0.00	0.00	14.33
Vegetable	0.00	0.00	0.00	0.00	0.00	1.28	4.74	3.20	0.00	0.00	0.00	0.00	9.22
Potato	0.00	0.00	0.00	0.00	0.00	2.16	7.08	5.28	0.00	0.00	0.00	0.00	14.52
Fruit	0.00	0.00	0.00	0.00	0.00	4.70	11.11	7.66	2.30	0.00	0.00	0.00	25.77
Vineyard	0.00	0.00	0.00	0.00	0.00	0.19	3.08	3.47	0.93	0.00	0.00	0.00	7.67
Poplar	0.00	0.00	0.00	0.00	0.00	2.35	5.55	3.83	1.15	0.00	0.00	0.00	12.89
Total	0.00	0.00	0.00	7.76	9.67	64.17	132.22	113.83	39.72	0.00	0.00	0.00	367.37

Wn (mm/month) [Pumping Area] Year> 1986

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Wheat	0.00	0.00	0.00	7.35	10.47	30.29	9.73	0.00	0.00	0.00	0.00	0.00	57.84
Barley	0.00	0.00	0.00	3.86	3.03	7.16	0.66	0.00	0.00	0.00	0.00	0.00	14.72
Dry Bean	0.00	0.00	0.00	0.00	0.00	6.15	28.15	27.68	6.84	0.00	0.00	0.00	68.82
Sugar Beet	0.00	0.00	0.00	0.00	0.00	7.46	23.38	25.71	14.49	0.00	0.00	0.00	71.04
Alfalfa	0.00	0.00	0.00	0.56	0.14	11.18	20.99	18.95	9.62	0.00	0.00	0.00	61.44
Sunflower	0.00	0.00	0.00	0.00	0.00	0.64	6.83	3.98	0.00	0.00	0.00	0.00	11.46
Vegetable	0.00	0.00	0.00	0.00	0.00	0.85	3.16	2.13	0.00	0.00	0.00	0.00	6.15
Potato	0.00	0.00	0.00	0.00	0.00	1.62	5.31	3.96	0.00	0.00	0.00	0.00	10.89
Fruit	0.00	0.00	0.00	0.00	0.00	4.70	11.11	7.66	2.30	0.00	0.00	0.00	25.77
Vineyard	0.00	0.00	0.00	0.00	0.00	0.19	3.08	3.47	0.93	0.00	0.00	0.00	7.67
Poplar	0.00	0.00	0.00	0.00	0.00	1.57	3.70	2.55	0.77	0.00	0.00	0.00	8.59
Total	0.00	0.00	0.00	11.78	13.64	71.82	116.11	96.10	34.95	0.00	0.00	0.00	344.40

Water Requirement [Whole Area] Year> 1986

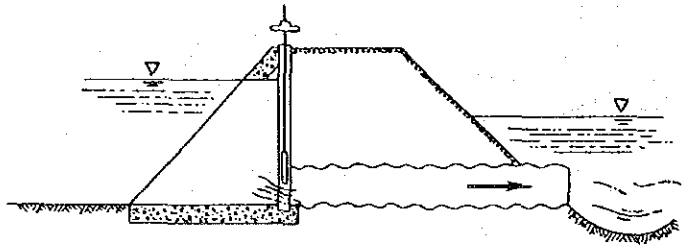
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Crop Req. (mm/Month)	0.00	0.00	0.00	8.52	10.41	65.61	129.19	110.50	38.82	0.00	0.00	0.00	363.06
On Farm Req. (mm/Month)	0.00	0.00	0.00	14.20	17.36	109.35	215.32	184.17	64.70	0.00	0.00	0.00	605.09
(M3/H)	0.00	0.00	0.00	141.98	173.57	1,093.53	2,153.16	1,841.71	646.99	0.00	0.00	0.00	6,050.94
On Cannal Req. (mm/Month)	0.00	0.00	0.00	14.95	18.27	115.11	226.65	193.86	68.10	0.00	0.00	0.00	636.94
(M3/H)	0.00	0.00	0.00	149.45	182.71	1,151.08	2,266.49	1,938.64	681.04	0.00	0.00	0.00	6,369.41
Module (l/sec./h)	0.0000	0.0000	0.0000	0.0577	0.0682	0.4441	0.8462	0.7238	0.2627	0.0000	0.0000	0.0000	

Water Requirement [Gravity Area] Year> 1986

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Crop Req. (mm/Month)	0.00	0.00	0.00	7.76	9.67	64.17	132.22	113.83	39.72	0.00	0.00	0.00	367.37
On Farm Req. (mm/Month)	0.00	0.00	0.00	12.94	16.12	106.96	220.36	189.72	66.19	0.00	0.00	0.00	612.29
(M3/H)	0.00	0.00	0.00	129.41	161.15	1,069.58	2,203.59	1,897.22	661.92	0.00	0.00	0.00	6,122.87
On Cannal Req. (mm/Month)	0.00	0.00	0.00	13.62	16.96	112.59	231.96	199.71	69.68	0.00	0.00	0.00	644.51
(M3/H)	0.00	0.00	0.00	136.22	169.63	1,125.88	2,319.56	1,997.07	696.75	0.00	0.00	0.00	6,445.13
Module (l/sec./h)	0.0000	0.0000	0.0000	0.0526	0.0633	0.4344	0.8660	0.7456	0.2688	0.0000	0.0000	0.0000	

Water Requirement [Pumping Area] Year> 1986

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Crop Req. (mm/Month)	0.00	0.00	0.00	11.78	13.64	71.82	116.11	96.10	34.95	0.00	0.00	0.00	344.40
On Farm Req. (mm/Month)	0.00	0.00	0.00	19.63	22.73	119.71	193.51	160.17	58.24	0.00	0.00	0.00	573.99
(M3/H)	0.00	0.00	0.00	196.32	227.29	1,197.07	1,935.12	1,601.67	582.44	0.00	0.00	0.00	5,739.92
On Cannal Req. (mm/Month)	0.00	0.00	0.00	20.67	23.93	126.01	203.70	168.60	61.31	0.00	0.00	0.00	604.20
(M3/H)	0.00	0.00	0.00	206.65	239.25	1,260.08	2,036.97	1,685.97	613.10	0.00	0.00	0.00	6,042.02
Module (l/sec./h)	0.0000	0.0000	0.0000	0.0797	0.0893	0.4861	0.7605	0.6295	0.2365	0.0000	0.0000	0.0000	



Appendix-VII

Cost Estimation

SUMMARY OF FINANCIAL CONSTRUCTION COST

(UNIT:1000 TL)

No.	DESCRIPTION ITEM	QUANTITY	TOTAL	FOREIGN CURRENCY	LOCAL CURRENCY	REMARKS
1	CIVIL WORKS					
A	DIRECT COST					
(1)	DAM WORK	1	23,440,000	7,500,767	15,939,233	
(2)	INTAKE WORK	1	2,971,238	2,205,964	765,274	
(3)	DIVERSION WORK	1	159,837	51,148	108,689	
(4)	PUMPING WORK	1	572,140	366,170	205,970	
(5)	MAIN CANAL WORK	1	45,712,355	16,502,678	29,209,677	
(6)	SECONDARY CANAL WORK	1	9,053,442	3,168,694	5,884,748	
(7)	TERTIARY CANAL WORK	1	23,916,457	10,044,921	13,871,536	
(8)	DRAINAGE WORK	1	2,550,329	1,657,714	892,615	
(9)	LAND IMPROVEMENT WORK	1	622,110	0	622,110	
	SUB TOTAL (A)		108,997,912	41,498,056	67,499,856	
B	INDIRECT COST	1	16,349,687	6,224,708	10,124,978	15% of A
	SUB TOTAL (A+B)		125,347,599	47,722,764	77,624,834	
2	LAND ACQUISITION	1	17,529,658	0	17,529,658	
3	O/M FACILITIES	1	1,116,736	279,184	837,552	*
4	ADMINISTRATION AND ENGINEERING FEE((A+B)x15%)	1	18,802,140	1,880,214	16,921,926	
	SUB TOTAL		162,796,133	49,882,162	112,913,970	
5	CONTINGENCY	1	24,419,420	7,482,324	16,937,096	15%
	TOTAL ESTIMATED COST		187,215,553	57,364,487	129,851,066	
		%	100	31	69	

Note *: Including trainning center,
O/M office and its equipment.
Engineering fee is 15% of Civil works.

COST BREAKDOWN OF CIVIL WORKS (1)

ITEM No.	DESCRIPTION OF WORKS	UNIT	QUANTITY	RATE TL	AMOUNT TL ,000	F/C RA %	F/C AMOUNT TL ,000	L/C RA %	L/C AMOUNT TL ,000	NOTE
1,000	Part 1: Adatepe Dam Works	L.S	1		23,440,000		7,500,800		15,939,200	Data from DSI
	Sub-total				23,440,000	32	7,500,800		15,939,200	
1,100	PART 2:Intake tunnel works									
1,101	Intake facilities	L.S	1		58,126	50	29,063		29,063	
1,102	Pressure Tunnel	M	475		562,607	65	365,695		196,912	
1,103	Water Control Area	L.S	1		1,797,124	86	1,545,527		251,597	
1,104	Open canal area	M	770		552,225	48	265,068		287,157	
1,105	Diversion Tunnel	M	245		1,156	53	613		543	
	Sub-total				2,971,238	74	2,205,965		765,273	
1,200	PART 3:Diversion Works									
1,201	Kargabuku diversion Work	L.S	1		62,199	32	19,904		42,295	
1,202	Nurman diversion Work	L.S	1		97,637	32	31,244		66,393	
	Sub-total				159,837	32	51,148		108,689	
1,300	Part 4: Pumping Facilities									
1,301	Pumping Facilities	L.S	1		572,140	64	366,170		205,970	
	Sub-total				572,140	64	366,170		205,970	
1,400	Part 5: Main Canal Works									
1,401	Open Canal Works	L.S	1		38,334,201	32	12,266,944		26,067,257	
1,402	Syphons	L.S	1		2,721,502	55	1,496,826		1,224,676	
1,403	Tunnels	L.S	1		117,468	40	46,987		70,481	
1,404	Bridges	L.S	1		242,200	52	125,948		116,260	
1,405	Turnouts	L.S	1		2,623,702	60	1,574,221		1,049,481	
1,406	Spillways	L.S	1		1,174,789	69	810,604		364,185	
1,407	Drops	L.S	1		185,895	47	87,371		98,524	
1,400	Cross drainages	L.S	1		312,587	30	93,776		218,811	
	Sub-total				45,712,355	36	16,502,678		29,209,674	
1,500	Part 6: Secondary Canal Works									

COST BREAKDOWN OF CIVIL WORKS (2)

ITEM	DESCRIPTION OF WORKS	UNIT	QUANTITY	RATE	AMOUNT	F/C RA	F/C AMOUNT	L/C RA	L/C AMOUNT	NOTE
1,501	Open Canal Works	L.S	1		8,763,551	35	3,067,243		5,696,308	
1,502	Syphons	L.S	1		55,682	36	20,046		35,636	
1,503	Bridges	L.S	1		129,318	33	42,675		86,643	
1,504	Turnouts	L.S	1		27,669	53	14,665		13,004	
1,505	Cross drainages	L.S	1		80,221	30	24,066		56,155	
	Sub-total				9,053,442	35	3,168,694		5,887,747	
1,600	Part 7: Tertiary Canal Works									
1,601	Tertiary Canal Works	Ha	44,030	543,106	23,916,457	42	10,044,912		13,871,545	
	Sub-total				23,916,457	42	10,044,912		13,871,545	
1,700	Part 8: Drainage Works									
1,701	Drainage Type 1	M	210,200		197,167	65	128,159		69,008	
1,702	Drainage Type 2	M	18,500		210,678	65	136,941		73,737	
1,703	Drainage Type 3	M	14,700		253,428	65	164,728		88,700	
1,704	Drainage Type 4	M	9,200		284,114	65	184,674		99,440	
1,705	Drainage Type 5	M	10,500		416,419	65	270,672		145,747	
1,706	Drainage Type 6	M	16,000		1,012,720	65	658,268		354,452	
1,707	Drainage Type 7	M	2,000		167,628	65	108,958		58,670	
1,708	Small Bridges Structures	L.S	5		8,174	45	3,678		4,496	
									27	
	Sub-total				2,550,329	65	1,657,714		892,615	
1,800	Part 9: Land Improvement Works									
1,801	Gravel Dumping	M3	466,650		349,987				349,987	
1,802	Filling	M3	762,250		272,123				272,123	
	Sub-total				622,110				622,110	
	Direct Cost				100,997,912		41,498,080		67,502,824	
2,000	Part 10: Indirect Cost									
2,001	Indirect Cost				16,349,687		6,224,712		10,125,424	15% of above
	Total of Civil Works				125,347,599	38	47,722,792		77,628,247	

Table Ⅶ- 3

RATE OF FOREIGN AND LOCAL PORTION IN CONSTRUCTION

Rate is composed of materials, equipment and labour fee.

Description	Spec.	Total(%)	Foreign(%)	Local(%)	Remarks
(1)Excavation work for:					
	nomal soil	100	38	62	All const. facilities
	soft rock	100	35	65	All const. facilities
	hard rock	100	76	24	Tunnel and others
(2)Filling work for:					
	nomal soil	100	53	47	All const. facilities
	soft rock	100	53	47	All const. facilities
	hard rock	100	53	47	Tunnel and others
(3)Compaction of foundation for:					
		100	40	60	All const. facilities
	soft rock	100	40	60	All const. facilities
	hard rock	100	40	60	Tunnel and others
(4)Concrete work for:					
	reinforced	100	20	80	Tunnel and others
	plain	100	1	99	All const. facilities
(5)Form work for:					
	Steel	100	20	80	All const. facilities
	Wooden	100	51	49	All const. facilities
(6)Flume pipe					
	foundation, other				
	Over 2.0m	100	27	73	Main canal and others
	Less 2.0m	100	24	76	Main canal and others
	flume	100	16	84	Main canal and others
(7)Maintenance road for:					
	road	100	35	65	
	embankment	100	90	10	
(8)Pumping facility					
	set	100	67	23	Main canal and others
(9)Other works					
	set	100	40	60	
(10)Steel, Iron bar, Steel pipe					
	set	100	98	2	Imported material
(11)Transportation for material					
	set	100	39	61	
(12)Transportation for equipment					
	set	100	40	60	

RATE OF FOREIGN PORTION IN MAJOR CONSTRUCTION MATERIAL

Material cost is composed of law material fee, transportation fee and lobour fee.

Material Rate
The following material rate is adopted dividing into foreign and local currency based on the DSI supplements.

Description	Unit	Total	F/C	L/C	%
-P.Cement (A)	ton	46,000	44,620	1,380	97
-P.Cement (B)	ton	45,000	44,550	450	99
-Wall bricks	each	80	79	1	99
-Gasoline	KG	432	423	9	98
-kelosine	L	310	304	6	98
-Light oil	KG	1,000	980	20	98
-Water	m3	700	0	700	0
-Sand	m3	1,500	0	1,500	0
-Ston	m3	1,300	0	1,300	0
-Timber(soft)	m3	185,000	111,000	74,000	60
-Timber(hard)	m3	341,000	204,600	136,400	60
-Dynamite (qom 2 AL)	KG	2,350	1,880	470	80
-Compressor(210 cfm)	set	127,000	121,920	5,080	96
-Motor Pump(20ps)	set	1,500,000	1,440,000	60,000	96
-Electric Charge	Kw/H	72	14	58	20

MATERIAL TRANSPORTATION FEE

Transportation fee of equipments and materials is estimated based on DSI price list, as follows;

Code number 7.006/1	distance	unit	price(TL)	remarks
1	10 m	ton	41	
2	15 m	ton	50	
3	20 m	ton	58	
4	30 m	ton	71	
5	50 m	ton	92	
6	70 m	ton	109	
7	100 m	ton	130	
8	200 m	ton	184	
9	300 m	ton	225	
10	400 m	ton	260	
11	500 m	ton	291	
12	1,000 m	ton	412	
22	10 km	ton	1,302	
28	20 km	ton	1,837	
30	30 km	ton	2,373	
32	40 km	ton	2,909	
34	50 km	ton	3,445	
35	60 km	ton	3,980	
36	70 km	ton	4,517	
37	80 km	ton	5,053	
38	90 km	ton	5,589	
39	100 km	ton	6,125	
45	200 km	ton	1,148	
47	300 km	ton	16,844	
48	400 km	ton	22,203	

DEPRECIATION COST FOR MAJOR CONSTRUCTION EQUIPMENT

Description	Unit	Total (TL)	F/C	L/C	
-Bulldozer 32 ton	h	115,313	86,485	28,828	75
-Bulldozer 32 ton with Ripper	h	135,326	101,495	33,832	75
-Bulldozer 15 ton	h	41,074	30,806	10,269	75
-Bulldozer 15 ton with Ripper	h	57,752	43,314	14,438	75
-Compressor 5m3/min	day	63,851	47,888	15,963	75
-Bulldozer 11 ton	h	35,642	26,732	8,911	75
-Wheel cylinder 2.2m3	h	59,753	44,815	14,938	75
-Wheel cylinder 1.8m3	h	55,560	41,670	13,890	75
-Bulldozer 11 ton	h	19,632	14,724	4,908	75
-Backhoe Excavator 1.0h		80,910	60,683	20,228	75
-Backhoe Excavator 0.6h		43,743	32,807	10,936	75
-Dragline 2.0m3	h	26,208	19,656	6,552	75
-Tructor Shovel 0.8m3	h	26,208	0	26,208	
-Dumptruck 11 ton	h	23,063	17,297	5,766	75
-Dumptruck 8 ton	h	18,107	13,580	4,527	75
-Vibrator	day	14,962	10,473	4,489	70
-Tamper 60 to 100kg	day	9,530	6,671	2,859	70
-Compressor 10.6 m3/m	day	123,890	86,723	37,167	70
-Crowler Drill 15 m3/mh		38,597	28,948	9,649	75
-Concrete Pump Car 40-h		49,270	36,953	12,318	75
-Truckcrane 4.8to 4.9	h	22,396	16,797	5,599	75
-Truckcrane 15ton to 1h		49,365	0	49,365	
-Breaker 200kg	day	84,341	59,039	25,302	70
-Handhammer 20kg	day	8,101	5,671	2,430	70
-Generator 200kVa	day	114,360	80,052	34,308	70
-Concrete plant 0.75m3h		134,373	94,061	40,312	70
-Water pump d-150 40M	day	41,741	29,219	12,522	70
-Mini pump d-80 10M	day	4,260	2,982	1,278	70
-Mini pump d-50 5M	day	1,391	974	417	70
-Micro Bus 26persons	h	12,389	7,433	4,956	60
-Agitator 1.6m3	h	15,915	11,141	4,775	70

Table Ⅶ- 4
Sheet 2

LIST OF LABOUR FEE

Labour Rate Per Day
The labour rate is considered as the local currency portion and the following rate is adopted:-

	Total(TL)	F/C	L/C(TL)	%
-Foreman Class 1	4,320	0	4,320	0
-Foreman Class 2	8,760	0	8,760	0
-Operator of Equipment	6,960	0	6,960	0
-Assistant of Operator	5,640	0	5,640	0
-Driver	6,080	0	6,080	0
-Steel Worker	6,080	0	6,080	0
-Mechanician	6,080	0	6,080	0
-Electrician	6,080	0	6,080	0
-Driller	7,440	0	7,440	0
-Mason	6,080	0	6,080	0
-Skilled Labour	4,320	0	4,320	0
-Common Labour	4,000	0	4,000	0

UNIT ADMINISTRATION COST FOR
IMPLEMENTATION ORGANIZATION

Position	Month	Year
DSI Branch Office Direc.	581,818	6,981,818
Dupty Direc.	581,818	6,981,818
Technican	272,727	3,272,727
Chief Surveyor	606,061	7,272,727
Operator	202,020	2,424,242
Leveling Staff	272,727	3,272,727
Worker	202,020	2,424,242
Civilwork Foreman	272,727	3,272,727
Assistant	202,020	2,424,242
Counting Staff	202,020	2,424,242
Laboratory Worker	202,020	2,424,242
Assistant worker	202,020	2,424,242
Design Engineer	606,061	7,272,727
Calculation Staff	272,727	3,272,727
Adminstration Officer	202,020	2,424,242
Stockkeeper	202,020	2,424,242
Cleaner	202,020	2,424,242

UNIT ADMINISTRATION COST FOR
OPERATION AND MAINTENANCE

Position	Month(TL)	Year(TL)
Office Director	581,818	6,981,818
Section Chief Enginner	606,061	7,272,727
Technican	272,727	3,272,727
Foreman	272,727	3,272,727
Operator	272,727	3,272,727
Worker	272,727	3,272,727
Surveyor	272,727	3,272,727
Secretary(Typist)	202,020	2,424,242
Driver	202,020	2,424,242
Watchman	202,020	2,424,242
Gatekeeper	202,020	2,424,242

Land Acquisition Cost

Discount Factor= 5%

Year	Discount Factor	Model-A Net Income	Model-A Present V.	Model-B Net Income	Model-B Present V.	Model-C Net Income	Model-C Present V.
1	0.952381	0	0	0	0	0	0
2	0.907029	0	0	0	0	0	0
3	0.863838	519,513	448,775	575,469	497,112	746,549	644,897
4	0.822702	1,039,027	854,810	1,150,938	946,880	1,493,098	1,228,375
5	0.783526	1,558,540	1,221,157	1,726,407	1,352,685	2,239,646	1,754,822
6	0.746215	2,078,054	1,550,676	2,301,876	1,717,695	2,986,195	2,228,345
7	0.710681	2,597,567	1,846,042	2,877,345	2,044,875	3,732,744	2,652,791
8	0.676839	2,597,567	1,758,136	2,877,345	1,947,500	3,732,744	2,526,468
9	0.644609	2,597,567	1,674,415	2,877,345	1,854,762	3,732,744	2,406,160
10	0.613913	2,597,567	1,594,681	2,877,345	1,766,440	3,732,744	2,291,581
11	0.584679	2,597,567	1,518,744	2,877,345	1,682,324	3,732,744	2,182,458
12	0.556837	2,597,567	1,446,423	2,877,345	1,602,213	3,732,744	2,078,532
13	0.530321	2,597,567	1,377,545	2,877,345	1,525,917	3,732,744	1,979,554
14	0.505068	2,597,567	1,311,948	2,877,345	1,453,255	3,732,744	1,885,289
15	0.481017	2,597,567	1,249,474	2,877,345	1,384,052	3,732,744	1,795,514
16	0.458112	2,597,567	1,189,975	2,877,345	1,318,145	3,732,744	1,710,013
17	0.436297	2,597,567	1,133,310	2,877,345	1,255,376	3,732,744	1,628,584
18	0.415521	2,597,567	1,079,343	2,877,345	1,195,596	3,732,744	1,551,032
19	0.395734	2,597,567	1,027,945	2,877,345	1,138,663	3,732,744	1,477,174
20	0.376889	2,597,567	978,996	2,877,345	1,084,441	3,732,744	1,406,832
21	0.358942	2,597,567	932,377	2,877,345	1,032,801	3,732,744	1,339,840
22	0.341850	2,597,567	887,978	2,877,345	983,620	3,732,744	1,276,038
23	0.325571	2,597,567	845,693	2,877,345	936,781	3,732,744	1,215,274
24	0.310068	2,597,567	805,422	2,877,345	892,172	3,732,744	1,157,404
25	0.295303	2,597,567	767,069	2,877,345	849,688	3,732,744	1,102,290
26	0.281241	2,597,567	730,542	2,877,345	809,227	3,732,744	1,049,800
27	0.267848	2,597,567	695,754	2,877,345	770,692	3,732,744	999,809
28	0.255094	2,597,567	662,623	2,877,345	733,992	3,732,744	952,199
29	0.242946	2,597,567	631,069	2,877,345	699,040	3,732,744	906,856
30	0.231377	2,597,567	601,018	2,877,345	665,753	3,732,744	863,673
31	0.220359	2,597,567	572,399	2,877,345	634,050	3,732,744	822,546
32	0.209866	2,597,567	545,141	2,877,345	603,857	3,732,744	783,377
33	0.199873	2,597,567	519,182	2,877,345	575,102	3,732,744	746,073
34	0.190355	2,597,567	494,459	2,877,345	547,716	3,732,744	710,546
35	0.181290	2,597,567	470,914	2,877,345	521,635	3,732,744	676,710
36	0.172657	2,597,567	448,489	2,877,345	496,795	3,732,744	644,486
37	0.164436	2,597,567	427,133	2,877,345	473,138	3,732,744	613,796
38	0.156605	2,597,567	406,793	2,877,345	450,608	3,732,744	584,568
39	0.149148	2,597,567	387,422	2,877,345	429,150	3,732,744	556,731
40	0.142046	2,597,567	368,973	2,877,345	408,714	3,732,744	530,220
41	0.135282	2,597,567	351,403	2,877,345	389,252	3,732,744	504,972
42	0.128840	2,597,567	334,670	2,877,345	370,716	3,732,744	480,925
43	0.122704	2,597,567	318,733	2,877,345	353,063	3,732,744	458,024
44	0.116861	2,597,567	303,555	2,877,345	336,250	3,732,744	436,213
45	0.111297	2,597,567	289,100	2,877,345	320,238	3,732,744	415,441
46	0.105997	2,597,567	275,333	2,877,345	304,989	3,732,744	395,658
47	0.100949	2,597,567	262,222	2,877,345	290,466	3,732,744	376,818
48	0.096142	2,597,567	249,736	2,877,345	276,634	3,732,744	358,874
49	0.091564	2,597,567	237,843	2,877,345	263,461	3,732,744	341,785
50	0.087204	2,597,567	226,518	2,877,345	250,915	3,732,744	325,509
51	0.083051	2,597,567	215,731	2,877,345	238,967	3,732,744	310,009
52	0.079096	2,597,567	205,458	2,877,345	227,587	3,732,744	295,246
53	0.075330	2,597,567	195,674	2,877,345	216,750	3,732,744	281,187
54	0.071743	2,597,567	186,357	2,877,345	206,429	3,732,744	267,797
55	0.068326	2,597,567	177,482	2,877,345	196,599	3,732,744	255,045
56	0.065073	2,597,567	169,031	2,877,345	187,237	3,732,744	242,900
57	0.061974	2,597,567	160,982	2,877,345	178,321	3,732,744	231,333
58	0.059023	2,597,567	153,316	2,877,345	169,829	3,732,744	220,317
Total			39,461,690		43,712,019		56,707,060
Land Tenure(ha)			6		4.5		10
Per hectare			6,576,948		9,713,782		5,670,706
Area(ha)	44,030		35,760		1,620		6,650

Land Acquisition Cost 6,555,489 TL/ha (Weighted Average)

Table VII- 5

CONVERSION FACTORS FOR 1989 PRICES (by DSI)

Years	Gross Prices Index	Conversion Factors For 1989	General Construction Prices Index for DSI	Conversion Factors For 1989
1963	100.0	474.81	100.0	518.46
1964	101.2	469.18	101.2	512.31
1965	109.4	434.01	109.4	473.91
1964	114.7	413.95	114.7	452.02
1967	123.4	384.77	123.4	420.15
1968	127.3	372.98	127.3	407.28
1969	136.5	347.84	136.5	379.85
1970	145.7	325.88	145.7	355.84
1971	168.9	281.12	168.9	306.96
1972	199.3	238.24	199.3	260.14
1973	240.1	197.75	240.1	215.94
1974	311.8	152.28	340.9	152.09
1975	343.2	138.35	436.3	118.83
1976	396.6	119.72	545.4	95.06
1977	492.1	96.49	659.9	78.57
1978	750.8	63.24	1,036.0	50.04
1979	1,230.7	38.58	1,595.4	32.50
1980	2,550.6	18.62	3,398.2	15.26
1981	3,488.4	13.61	4,859.4	10.67
1982	4,369.1	10.87	6,171.4	8.40
1983	5,708.0	8.32	7,467.4	6.94
1984	8,677.5	5.47	9,334.3	5.55
1985	12,144.7	3.91	13,628.1	3.80
1986	15,387.6	3.09	18,534.2	2.80
1987	21,386.7	2.22	23,353.1	2.22
1988	31,866.2	1.49	34,796.1	1.49
1989	47,480.6	1.00	51,846.2	1.00

Notes:
1) Gross prices index is issued by The Ministry of Industry,Technology and Trade based on 1963=100.
2) 1989 index was prepared on 28 March 1988 and values up to end of 1987 are real ones,escalation for 1988,1989 prices increased by 49% respectively.
3) Gross prices index will be used for the operation and maintenance prices.
4) Increases in DSI General Construction prices with respect to DSI construction prices for the period of 1974-1987 were calculated as 42%,28%,25%,21%,57%,54%,113%,43%,27%,21%,25%,46%,36% and 26%. The expected escalated prices for 1988,1989 were caluculated as 49%, and 49% respectively.
5) For the projects under construction, DSI General Construction prices Index will be used.

Appendix-VIII

Project Evaluation

VIII-1 General

This chapter presents the results of economic and financial analyses of the project and basic data used in the below-mentioned respective studies.

1. EIRR and FIRR under Scheduled Condition

2. Sensitivity Analyses under Following Conditions

   (a) 30% rise in construction cost.
   (b) 20% decrease in crop production
   (c) 20% rise in production cost
   (d) Combined cases of (a)~(c)

3. Alternative Studies

   (a) Alternative-1

   In this case, construction of irrigation canal networks will be divided into 3 units and each unit will be in operation year by year following the completion of Adatepe dam.

   (b) Alternative-2

   In this case, it has been assumed that pump irrigation will not be implemented within the period of economic analysis, but gravity irrigation will be in full operation following the completion of Adatepe dam.

   (c) Alternative-3

   In this case, study has been made according to the proposed implementation schedule considering transition of the cropping pattern until it reaches projected one.

In these alternative studies, the following have been taken into account.

(1) Cost required for the detail design is not considered.

(2) Period required for the detail design (2 years) is not included in the period of economic analysis, and the economic analysis will start at the first construction year of Adatepe dam.

Table VII- 1
Sheet 1

Economic Internal Rate of Return

Economic Internal Rate of Return (EIRR)
[Under Scheduled Condition]

(10^6 TL)

Year	Cost	Benefit	B-C	Discount Factor 5.0%	Net Present Value	Discount Factor 15.0%	Net Present Value
1	3,604	0	-3,604	0.952381	-3,432	0.869889	-3,135
2	3,604	0	-3,604	0.907029	-3,269	0.756707	-2,727
3	16,076	-138	-16,213	0.863838	-14,005	0.658251	-10,672
4	26,533	-272	-26,805	0.822702	-22,053	0.572606	-15,349
5	23,222	-393	-23,616	0.783526	-18,504	0.498104	-11,763
6	27,541	-543	-28,084	0.746215	-20,956	0.433295	-12,168
7	26,499	-652	-27,151	0.710681	-19,296	0.376919	-10,234
8	26,799	-813	-27,612	0.676839	-18,689	0.327877	-9,053
9	901	18,532	17,631	0.644609	11,365	0.285217	5,029
10	901	26,255	25,354	0.613913	15,565	0.248107	6,291
11	901	34,129	33,228	0.584679	19,428	0.215826	7,171
12	901	34,211	33,310	0.556837	18,548	0.187745	6,254
13	901	34,293	33,392	0.530321	17,708	0.163317	5,453
14	901	36,137	35,236	0.505068	17,796	0.142068	5,006
15	901	39,923	39,022	0.481017	18,770	0.123583	4,822
16	901	41,059	40,158	0.458112	18,397	0.107504	4,317
17	901	42,573	41,672	0.436297	18,181	0.093516	3,897
18	901	44,087	43,186	0.415521	17,945	0.081349	3,513
19	901	44,087	43,186	0.395734	17,090	0.070764	3,056
20	901	44,087	43,186	0.376889	16,276	0.061557	2,658
21	901	44,087	43,186	0.358942	15,501	0.053548	2,313
22	901	44,087	43,186	0.341850	14,763	0.046581	2,012
23	901	44,087	43,186	0.325571	14,060	0.040520	1,750
24	901	44,087	43,186	0.310068	13,391	0.035248	1,522
25	901	44,087	43,186	0.295303	12,753	0.030662	1,324
26	901	44,087	43,186	0.281241	12,146	0.026672	1,152
27	901	44,087	43,186	0.267848	11,567	0.023202	1,002
28	901	44,087	43,186	0.255094	11,017	0.020183	872
29	901	44,087	43,186	0.242946	10,492	0.017557	758
30	901	44,087	43,186	0.231377	9,992	0.015273	660
31	901	44,087	43,186	0.220359	9,517	0.013286	574
32	901	44,087	43,186	0.209866	9,063	0.011557	499
33	5,962	44,087	38,125	0.199873	7,620	0.010053	383
34	901	44,087	43,186	0.190355	8,221	0.008745	378
35	901	44,087	43,186	0.181290	7,829	0.007607	329
36	901	44,087	43,186	0.172657	7,456	0.006618	286
37	901	44,087	43,186	0.164436	7,101	0.005757	249
38	901	44,087	43,186	0.156605	6,763	0.005008	216
39	901	44,087	43,186	0.149148	6,441	0.004356	188
40	901	44,087	43,186	0.142046	6,134	0.003789	164
41	901	44,087	43,186	0.135282	5,842	0.003296	142
42	901	44,087	43,186	0.128840	5,564	0.002867	124
43	901	44,087	43,186	0.122704	5,299	0.002494	108
44	901	44,087	43,186	0.116861	5,047	0.002170	94
45	901	44,087	43,186	0.111297	4,806	0.001887	82
46	901	44,087	43,186	0.105997	4,578	0.001642	71
47	901	44,087	43,186	0.100949	4,360	0.001428	62
48	901	44,087	43,186	0.096142	4,152	0.001242	54
49	901	44,087	43,186	0.091564	3,954	0.001081	47
50	901	44,087	43,186	0.087204	3,766	0.000940	41
51	901	44,087	43,186	0.083051	3,587	0.000818	35
52	901	44,087	43,186	0.079096	3,416	0.000711	31
53	901	44,087	43,186	0.075330	3,253	0.000619	27
54	901	44,087	43,186	0.071743	3,098	0.000538	23
55	901	44,087	43,186	0.068326	2,951	0.000468	20
56	901	44,087	43,186	0.065073	2,810	0.000407	18
57	901	44,087	43,186	0.061974	2,676	0.000354	15
58	901	44,087	43,186	0.059023	2,549	0.000308	13
Total	203,989	2,111,881	1,907,892		360,405		-0

<IRR> 15.0%

Discount Factor 5% : NPV= 360,405 , B/C= 3.8
Discount Factor 10% : NPV= 74,223 , B/C= 1.8
Discount Factor 12% : NPV= 33,299 , B/C= 1.4

Financial Internal Rate of Return (FIRR)

(10^6 TL)

Year	Cost	Benefit	B-C	Discount Factor 5.0%	Net Present Value	Discount Factor 12.4%	Net Present Value
1	3,604	0	-3,604	0.952381	-3,432	0.889470	-3,205
2	3,604	0	-3,604	0.907029	-3,269	0.791157	-2,851
3	18,893	-95	-18,988	0.863838	-16,402	0.703710	-13,362
4	32,526	-187	-32,713	0.822702	-26,913	0.625929	-20,476
5	28,423	-271	-28,694	0.783526	-22,483	0.556745	-15,975
6	33,836	-374	-34,210	0.746215	-25,528	0.495208	-16,941
7	32,391	-449	-32,840	0.710681	-23,339	0.440473	-14,465
8	33,939	-560	-34,499	0.676839	-23,350	0.391787	-13,516
9	1,126	15,839	14,713	0.644609	9,484	0.348483	5,127
10	1,126	23,265	22,139	0.613913	13,591	0.309965	6,862
11	1,126	31,059	29,933	0.584679	17,501	0.275705	8,253
12	1,126	31,141	30,015	0.556837	16,713	0.245231	7,361
13	1,126	31,223	30,097	0.530321	15,961	0.218126	6,565
14	1,126	33,067	31,941	0.505068	16,132	0.194016	6,197
15	1,126	36,853	35,727	0.481017	17,185	0.172572	6,165
16	1,126	37,989	36,863	0.458112	16,887	0.153497	5,658
17	1,126	39,503	38,377	0.436297	16,744	0.136531	5,240
18	1,126	41,018	39,892	0.415521	16,576	0.121440	4,845
19	1,126	41,018	39,892	0.395734	15,787	0.108018	4,309
20	1,126	41,018	39,892	0.376889	15,035	0.096078	3,833
21	1,126	41,018	39,892	0.358942	14,319	0.085459	3,409
22	1,126	41,018	39,892	0.341850	13,637	0.076013	3,032
23	1,126	41,018	39,892	0.325571	12,988	0.067611	2,697
24	1,126	41,018	39,892	0.310068	12,369	0.060138	2,399
25	1,126	41,018	39,892	0.295303	11,780	0.053491	2,134
26	1,126	41,018	39,892	0.281241	11,219	0.047579	1,898
27	1,126	41,018	39,892	0.267848	10,685	0.042320	1,688
28	1,126	41,018	39,892	0.255094	10,176	0.037642	1,502
29	1,126	41,018	39,892	0.242946	9,692	0.033482	1,336
30	1,126	41,018	39,892	0.231377	9,230	0.029781	1,188
31	1,126	41,018	39,892	0.220359	8,791	0.026489	1,057
32	1,126	41,018	39,892	0.209866	8,372	0.023561	940
33	6,187	41,018	34,831	0.199873	6,962	0.020957	730
34	1,126	41,018	39,892	0.190355	7,594	0.018641	744
35	1,126	41,018	39,892	0.181290	7,232	0.016580	661
36	1,126	41,018	39,892	0.172657	6,888	0.014748	588
37	1,126	41,018	39,892	0.164436	6,560	0.013118	523
38	1,126	41,018	39,892	0.156605	6,247	0.011668	465
39	1,126	41,018	39,892	0.149148	5,950	0.010378	414
40	1,126	41,018	39,892	0.142046	5,666	0.009231	368
41	1,126	41,018	39,892	0.135282	5,397	0.008211	328
42	1,126	41,018	39,892	0.128840	5,140	0.007303	291
43	1,126	41,018	39,892	0.122704	4,895	0.006496	259
44	1,126	41,018	39,892	0.116861	4,662	0.005778	230
45	1,126	41,018	39,892	0.111297	4,440	0.005139	205
46	1,126	41,018	39,892	0.105997	4,228	0.004571	182
47	1,126	41,018	39,892	0.100949	4,027	0.004066	162
48	1,126	41,018	39,892	0.096142	3,835	0.003617	144
49	1,126	41,018	39,892	0.091564	3,653	0.003217	128
50	1,126	41,018	39,892	0.087204	3,479	0.002861	114
51	1,126	41,018	39,892	0.083051	3,313	0.002545	102
52	1,126	41,018	39,892	0.079096	3,155	0.002264	90
53	1,126	41,018	39,892	0.075330	3,005	0.002014	80
54	1,126	41,018	39,892	0.071743	2,862	0.001791	71
55	1,126	41,018	39,892	0.068326	2,726	0.001593	64
56	1,126	41,018	39,892	0.065073	2,596	0.001417	57
57	1,126	41,018	39,892	0.061974	2,472	0.001260	50
58	1,126	41,018	39,892	0.059023	2,355	0.001121	45
Total	248,577	1,959,741	1,711,165		295,477		-0

<IRR> 12.4%

Discount Factor 5% : NPV= 295,477 , B/C= 2.9
Discount Factor 10% : NPV= 40,311 , B/C= 1.3
Discount Factor 12% : NPV= 5,341 , B/C= 1.1

Table VII - 1
Sheet 3

Economic Internal Rate of Return (EIRR)
[Construction Cost +30%]

(10^6 TL)

Year	Cost	Benefit	B-C	Discount Factor 5.0%	Net Present Value	Discount Factor 12.7%	Net Present Value
1	4,685	0	-4,685	0.952381	-4,462	0.886959	-4,155
2	4,685	0	-4,685	0.907029	-4,249	0.786696	-3,686
3	20,898	-138	-21,036	0.863838	-18,171	0.697767	-14,678
4	34,493	-272	-34,765	0.822702	-28,601	0.618891	-21,516
5	30,192	-393	-30,585	0.783526	-23,964	0.548931	-16,789
6	35,803	-543	-36,346	0.746215	-27,122	0.486879	-17,696
7	34,449	-652	-35,101	0.710681	-24,945	0.431842	-15,158
8	34,839	-813	-35,652	0.676839	-24,131	0.383026	-13,656
9	901	18,532	17,631	0.644609	11,365	0.339729	5,990
10	901	26,255	25,354	0.613913	15,565	0.301325	7,640
11	901	34,129	33,228	0.584679	19,428	0.267263	8,881
12	901	34,211	33,310	0.556837	18,548	0.237052	7,896
13	901	43,293	42,392	0.530321	22,481	0.210255	8,913
14	901	36,137	35,236	0.505068	17,796	0.186488	6,571
15	901	39,923	39,022	0.481017	18,770	0.165407	6,454
16	901	41,059	40,158	0.458112	18,397	0.146709	5,891
17	901	42,573	41,672	0.436297	18,181	0.130125	5,423
18	901	44,087	43,186	0.415521	17,945	0.115416	4,984
19	901	44,087	43,186	0.395734	17,090	0.102369	4,421
20	901	44,087	43,186	0.376889	16,276	0.090797	3,921
21	901	44,087	43,186	0.358942	15,501	0.080533	3,478
22	901	44,087	43,186	0.341850	14,763	0.071430	3,085
23	901	44,087	43,186	0.325571	14,060	0.063355	2,736
24	901	44,087	43,186	0.310068	13,391	0.056193	2,427
25	901	44,087	43,186	0.295303	12,753	0.049841	2,152
26	901	44,087	43,186	0.281241	12,146	0.044207	1,909
27	901	44,087	43,186	0.267848	11,567	0.039210	1,693
28	901	44,087	43,186	0.255094	11,017	0.034778	1,502
29	901	44,087	43,186	0.242946	10,492	0.030846	1,332
30	901	44,087	43,186	0.231377	9,992	0.027359	1,182
31	901	44,087	43,186	0.220359	9,517	0.024267	1,048
32	901	44,087	43,186	0.209866	9,063	0.021524	930
33	5,962	44,087	38,125	0.199873	7,620	0.019091	728
34	901	44,087	43,186	0.190355	8,221	0.016933	731
35	901	44,087	43,186	0.181290	7,829	0.015018	649
36	901	44,087	43,186	0.172657	7,456	0.013321	575
37	901	44,087	43,186	0.164436	7,101	0.011815	510
38	901	44,087	43,186	0.156605	6,763	0.010479	453
39	901	44,087	43,186	0.149148	6,441	0.009295	401
40	901	44,087	43,186	0.142046	6,134	0.008244	356
41	901	44,087	43,186	0.135282	5,842	0.007312	316
42	901	44,087	43,186	0.128840	5,564	0.006486	280
43	901	44,087	43,186	0.122704	5,299	0.005752	248
44	901	44,087	43,186	0.116861	5,047	0.005102	220
45	901	44,087	43,186	0.111297	4,806	0.004525	195
46	901	44,087	43,186	0.105997	4,578	0.004014	173
47	901	44,087	43,186	0.100949	4,360	0.003560	154
48	901	44,087	43,186	0.096142	4,152	0.003158	136
49	901	44,087	43,186	0.091564	3,954	0.002801	121
50	901	44,087	43,186	0.087204	3,766	0.002484	107
51	901	44,087	43,186	0.083051	3,587	0.002203	95
52	901	44,087	43,186	0.079096	3,416	0.001954	84
53	901	44,087	43,186	0.075330	3,253	0.001733	75
54	901	44,087	43,186	0.071743	3,098	0.001537	66
55	901	44,087	43,186	0.068326	2,951	0.001364	59
56	901	44,087	43,186	0.065073	2,810	0.001209	52
57	901	44,087	43,186	0.061974	2,676	0.001073	46
58	901	44,087	43,186	0.059023	2,549	0.000951	41
Total	250,155	2,120,881	1,870,726		329,736		-0

<IRR> 12.7%

Discount Factor 5% : NPV= 329,736 , B/C= 3.0
Discount Factor 10% : NPV= 49,072 , B/C= 1.4
Discount Factor 12% : NPV= 10,059 , B/C= 1.1

Economic Internal Rate of Return (EIRR)
[Yield -20%]

(10^6 TL)

Year	Cost	Benefit	B-C	Discount Factor 5.0%	Net Present Value	Discount Factor 11.2%	Net Present Value
1	3,604	0	-3,604	0.952381	-3,432	0.899590	-3,242
2	3,604	0	-3,604	0.907029	-3,269	0.809263	-2,916
3	16,076	-138	-16,213	0.863838	-14,005	0.728005	-11,803
4	26,533	-272	-26,805	0.822702	-22,053	0.654906	-17,555
5	23,222	-393	-23,616	0.783526	-18,504	0.589147	-13,913
6	27,541	-543	-28,084	0.746215	-20,956	0.529991	-14,884
7	26,499	-652	-27,151	0.710681	-19,296	0.476775	-12,945
8	26,799	-813	-27,612	0.676839	-18,689	0.428902	-11,843
9	901	9,613	8,712	0.644609	5,616	0.385836	3,361
10	901	15,816	14,915	0.613913	9,156	0.347094	5,177
11	901	22,115	21,214	0.584679	12,403	0.312243	6,624
12	901	22,180	21,279	0.556837	11,849	0.280890	5,977
13	901	22,246	21,345	0.530321	11,320	0.252686	5,394
14	901	23,721	22,820	0.505068	11,526	0.227314	5,187
15	901	26,750	25,849	0.481017	12,434	0.204489	5,286
16	901	27,659	26,758	0.458112	12,258	0.183957	4,922
17	901	28,870	27,969	0.436297	12,203	0.165486	4,628
18	901	30,082	29,181	0.415521	12,125	0.148869	4,344
19	901	30,082	29,181	0.395734	11,548	0.133921	3,908
20	901	30,082	29,181	0.376889	10,998	0.120474	3,516
21	901	30,082	29,181	0.358942	10,474	0.108378	3,163
22	901	30,082	29,181	0.341850	9,975	0.097495	2,845
23	901	30,082	29,181	0.325571	9,500	0.087706	2,559
24	901	30,082	29,181	0.310068	9,048	0.078899	2,302
25	901	30,082	29,181	0.295303	8,617	0.070977	2,071
26	901	30,082	29,181	0.281241	8,207	0.063850	1,863
27	901	30,082	29,181	0.267848	7,816	0.057439	1,676
28	901	30,082	29,181	0.255094	7,444	0.051672	1,508
29	901	30,082	29,181	0.242946	7,089	0.046483	1,356
30	901	30,082	29,181	0.231377	6,752	0.041816	1,220
31	901	30,082	29,181	0.220359	6,430	0.037617	1,098
32	901	30,082	29,181	0.209866	6,124	0.033840	987
33	5,962	30,082	24,120	0.199873	4,821	0.030442	734
34	901	30,082	29,181	0.190355	5,555	0.027386	799
35	901	30,082	29,181	0.181290	5,290	0.024636	719
36	901	30,082	29,181	0.172657	5,038	0.022162	647
37	901	30,082	29,181	0.164436	4,798	0.019937	582
38	901	30,082	29,181	0.156605	4,570	0.017935	523
39	901	30,082	29,181	0.149148	4,352	0.016134	471
40	901	30,082	29,181	0.142046	4,145	0.014514	424
41	901	30,082	29,181	0.135282	3,948	0.013057	381
42	901	30,082	29,181	0.128840	3,760	0.011746	343
43	901	30,082	29,181	0.122704	3,581	0.010566	308
44	901	30,082	29,181	0.116861	3,410	0.009505	277
45	901	30,082	29,181	0.111297	3,248	0.008551	250
46	901	30,082	29,181	0.105997	3,093	0.007692	224
47	901	30,082	29,181	0.100949	2,946	0.006920	202
48	901	30,082	29,181	0.096142	2,805	0.006225	182
49	901	30,082	29,181	0.091564	2,672	0.005600	163
50	901	30,082	29,181	0.087204	2,545	0.005038	147
51	901	30,082	29,181	0.083051	2,423	0.004532	132
52	901	30,082	29,181	0.079096	2,308	0.004077	119
53	901	30,082	29,181	0.075330	2,198	0.003668	107
54	901	30,082	29,181	0.071743	2,093	0.003299	96
55	901	30,082	29,181	0.068326	1,994	0.002968	87
56	901	30,082	29,181	0.065073	1,899	0.002670	78
57	901	30,082	29,181	0.061974	1,808	0.002402	70
58	901	30,082	29,181	0.059023	1,722	0.002161	63
Total	203,989	1,429,503	1,225,514		197,731		-0

<IRR> 11.2%

Discount Factor 5% : NPV= 197,731 , B/C= 2.5
Discount Factor 10% : NPV= 15,678 , B/C= 1.2
Discount Factor 12% : NPV= -8,545 , B/C= 0.9

Table VII- 1
Sheet 5

Economic Internal Rate of Return (EIRR)
(Production Cost +20%)

(10^6 TL)

Year	Cost	Benefit	B-C	Discount Factor 5.0%	Net Present Value	Discount Factor 13.7%	Net Present Value
1	3,604	0	-3,604	0.952381	-3,432	0.879329	-3,169
2	3,604	0	-3,604	0.907029	-3,269	0.773220	-2,786
3	16,076	-138	-16,213	0.863838	-14,005	0.679915	-11,024
4	26,533	-272	-26,805	0.822702	-22,053	0.597869	-16,026
5	23,222	-393	-23,616	0.783526	-18,504	0.525723	-12,415
6	27,541	-543	-28,084	0.746215	-20,956	0.462284	-12,983
7	26,499	-652	-27,151	0.710681	-19,296	0.406500	-11,037
8	26,799	-813	-27,612	0.676839	-18,689	0.357447	-9,870
9	901	14,236	13,335	0.644609	8,596	0.314314	4,191
10	901	21,983	21,082	0.613913	12,943	0.276385	5,827
11	901	29,857	28,956	0.584679	16,930	0.243033	7,037
12	901	29,939	29,038	0.556837	16,170	0.213706	6,206
13	901	30,021	29,120	0.530321	15,443	0.187918	5,472
14	901	31,865	30,964	0.505068	15,639	0.165242	5,117
15	901	35,651	34,750	0.481017	16,715	0.145302	5,049
16	901	36,787	35,886	0.458112	16,440	0.127768	4,585
17	901	38,301	37,400	0.436297	16,318	0.112350	4,202
18	901	39,816	38,915	0.415521	16,170	0.098793	3,844
19	901	39,816	38,915	0.395734	15,400	0.086872	3,381
20	901	39,816	38,915	0.376889	14,667	0.076389	2,973
21	901	39,816	38,915	0.358942	13,968	0.067171	2,614
22	901	39,816	38,915	0.341850	13,303	0.059065	2,299
23	901	39,816	38,915	0.325571	12,670	0.051938	2,021
24	901	39,816	38,915	0.310068	12,066	0.045670	1,777
25	901	39,816	38,915	0.295303	11,492	0.040159	1,563
26	901	39,816	38,915	0.281241	10,944	0.035313	1,374
27	901	39,816	38,915	0.267848	10,423	0.031052	1,208
28	901	39,816	38,915	0.255094	9,927	0.027305	1,063
29	901	39,816	38,915	0.242946	9,454	0.024010	934
30	901	39,816	38,915	0.231377	9,004	0.021113	822
31	901	39,816	38,915	0.220359	8,575	0.018565	722
32	901	39,816	38,915	0.209866	8,167	0.016325	635
33	5,962	39,816	33,854	0.199873	6,766	0.014355	486
34	901	39,816	38,915	0.190355	7,408	0.012623	491
35	901	39,816	38,915	0.181290	7,055	0.011099	432
36	901	39,816	38,915	0.172657	6,719	0.009760	380
37	901	39,816	38,915	0.164436	6,399	0.008582	334
38	901	39,816	38,915	0.156605	6,094	0.007547	294
39	901	39,816	38,915	0.149148	5,804	0.006636	258
40	901	39,816	38,915	0.142046	5,528	0.005835	227
41	901	39,816	38,915	0.135282	5,264	0.005131	200
42	901	39,816	38,915	0.128840	5,014	0.004512	176
43	901	39,816	38,915	0.122704	4,775	0.003967	154
44	901	39,816	38,915	0.116861	4,548	0.003489	136
45	901	39,816	38,915	0.111297	4,331	0.003068	119
46	901	39,816	38,915	0.105997	4,125	0.002698	105
47	901	39,816	38,915	0.100949	3,928	0.002372	92
48	901	39,816	38,915	0.096142	3,741	0.002086	81
49	901	39,816	38,915	0.091564	3,563	0.001834	71
50	901	39,816	38,915	0.087204	3,394	0.001613	63
51	901	39,816	38,915	0.083051	3,232	0.001418	55
52	901	39,816	38,915	0.079096	3,078	0.001247	49
53	901	39,816	38,915	0.075330	2,931	0.001097	43
54	901	39,816	38,915	0.071743	2,792	0.000964	38
55	901	39,816	38,915	0.068326	2,659	0.000848	33
56	901	39,816	38,915	0.065073	2,532	0.000746	29
57	901	39,816	38,915	0.061974	2,412	0.000656	26
58	901	39,816	38,915	0.059023	2,297	0.000576	22
Total	203,989	1,898,275	1,694,286		307,608		-0

<IRR> 13.7%

Discount Factor 5% : NPV= 307,608 , B/C= 3.4
Discount Factor 10% : NPV= 54,454 , B/C= 1.6
Discount Factor 12% : NPV= 18,963 , B/C= 1.2

Economic Internal Rate of Return (EIRR)
[Combination of A,B,C]

(10^6 TL)

Year	Cost	Benefit	B-C	Discount Factor 5.0%	Net Present Value	Discount Factor 9.7%	Net Present Value
1	3,604	0	-3,604	0.952381	-3,432	0.911682	-3,285
2	3,604	0	-3,604	0.907029	-3,269	0.831164	-2,995
3	16,076	-138	-16,213	0.863838	-14,005	0.757758	-12,286
4	26,533	-272	-26,805	0.822702	-22,053	0.690834	-18,518
5	23,222	-393	-23,616	0.783526	-18,504	0.629821	-14,874
6	27,541	-543	-28,084	0.746215	-20,956	0.574196	-16,125
7	26,499	-652	-27,151	0.710681	-19,296	0.523485	-14,213
8	26,799	-813	-27,612	0.676839	-18,689	0.477252	-13,178
9	901	5,317	4,416	0.644609	2,847	0.435102	1,921
10	901	11,544	10,643	0.613913	6,534	0.396674	4,222
11	901	17,843	16,942	0.584679	9,906	0.361641	6,127
12	901	17,909	17,008	0.556837	9,471	0.329702	5,607
13	901	17,974	17,073	0.530321	9,054	0.300583	5,132
14	901	19,449	18,548	0.505068	9,368	0.274036	5,083
15	901	22,478	21,577	0.481017	10,379	0.249834	5,391
16	901	23,387	22,486	0.458112	10,301	0.227769	5,122
17	901	24,598	23,697	0.436297	10,339	0.207653	4,921
18	901	25,810	24,909	0.415521	10,350	0.189314	4,716
19	901	25,810	24,909	0.395734	9,857	0.172594	4,299
20	901	25,810	24,909	0.376889	9,388	0.157351	3,919
21	901	25,810	24,909	0.358942	8,941	0.143454	3,573
22	901	25,810	24,909	0.341850	8,515	0.130784	3,258
23	901	25,810	24,909	0.325571	8,110	0.119234	2,970
24	901	25,810	24,909	0.310068	7,723	0.108703	2,708
25	901	25,810	24,909	0.295303	7,356	0.099103	2,469
26	901	25,810	24,909	0.281241	7,005	0.090350	2,251
27	901	25,810	24,909	0.267848	6,672	0.082371	2,052
28	901	25,810	24,909	0.255094	6,354	0.075096	1,871
29	901	25,810	24,909	0.242946	6,052	0.068464	1,705
30	901	25,810	24,909	0.231377	5,763	0.062417	1,555
31	901	25,810	24,909	0.220359	5,489	0.056904	1,417
32	901	25,810	24,909	0.209866	5,228	0.051879	1,292
33	5,962	25,810	19,848	0.199873	3,967	0.047297	939
34	901	25,810	24,909	0.190355	4,742	0.043120	1,074
35	901	25,810	24,909	0.181290	4,516	0.039312	979
36	901	25,810	24,909	0.172657	4,301	0.035840	893
37	901	25,810	24,909	0.164436	4,096	0.032674	814
38	901	25,810	24,909	0.156605	3,901	0.029789	742
39	901	25,810	24,909	0.149148	3,715	0.027158	676
40	901	25,810	24,909	0.142046	3,538	0.024759	617
41	901	25,810	24,909	0.135282	3,370	0.022573	562
42	901	25,810	24,909	0.128840	3,209	0.020579	513
43	901	25,810	24,909	0.122704	3,056	0.018761	467
44	901	25,810	24,909	0.116861	2,911	0.017105	426
45	901	25,810	24,909	0.111297	2,772	0.015594	388
46	901	25,810	24,909	0.105997	2,640	0.014217	354
47	901	25,810	24,909	0.100949	2,515	0.012961	323
48	901	25,810	24,909	0.096142	2,395	0.011816	294
49	901	25,810	24,909	0.091564	2,281	0.010773	268
50	901	25,810	24,909	0.087204	2,172	0.009821	245
51	901	25,810	24,909	0.083051	2,069	0.008954	223
52	901	25,810	24,909	0.079096	1,970	0.008163	203
53	901	25,810	24,909	0.075330	1,876	0.007442	185
54	901	25,810	24,909	0.071743	1,787	0.006785	169
55	901	25,810	24,909	0.068326	1,702	0.006186	154
56	901	25,810	24,909	0.065073	1,621	0.005639	140
57	901	25,810	24,909	0.061974	1,544	0.005141	128
58	901	25,810	24,909	0.059023	1,470	0.004687	117
Total	203,989	1,215,897	1,011,908		144,933		-0

<IRR> 9.7%

Discount Factor 5% : NPV= 144,933 , B/C= 2.1
Discount Factor 10% : NPV= -4,090 , B/C= 1.0
Discount Factor 12% : NPV= -22,881 , B/C= 0.7

Table VII- 1
Sheet 7

Economic Internal Rate of Return (EIRR)
[Delay in Construction : 2 years]

(10^6 TL)

Year	Cost	Benefit	B-C	Discount Factor 5.0%	Net Present Value	Discount Factor 12.7%	Net Present Value
1	3,604	0	-3,604	0.952381	-3,432	0.887275	-3,198
2	3,604	0	-3,604	0.907029	-3,269	0.787257	-2,837
3	16,076	-138	-16,213	0.863838	-14,005	0.698514	-11,325
4	26,533	-272	-26,805	0.822702	-22,053	0.619774	-16,613
5	23,222	-393	-23,616	0.783526	-18,504	0.549910	-12,987
6	27,541	-543	-28,084	0.746215	-20,956	0.487921	-13,703
7	26,499	-652	-27,151	0.710681	-19,296	0.432920	-11,754
8	26,799	-813	-27,612	0.676839	-18,689	0.384119	-10,606
9	0	-813	-813	0.644609	-524	0.340820	-277
10	0	-813	-813	0.613913	-499	0.302401	-246
11	901	18,532	17,631	0.584679	10,309	0.268313	4,731
12	901	26,255	25,354	0.556837	14,118	0.238067	6,036
13	901	34,129	33,228	0.530321	17,621	0.211231	7,019
14	901	34,211	33,310	0.505068	16,824	0.187420	6,243
15	901	34,293	33,392	0.481017	16,062	0.166293	5,553
16	901	36,137	35,236	0.458112	16,142	0.147548	5,199
17	901	39,923	39,022	0.436297	17,025	0.130915	5,109
18	901	41,059	40,158	0.415521	16,686	0.116158	4,665
19	901	42,573	41,672	0.395734	16,491	0.103064	4,295
20	901	44,087	43,186	0.376889	16,276	0.091446	3,949
21	901	44,087	43,186	0.358942	15,501	0.081138	3,504
22	901	44,087	43,186	0.341850	14,763	0.071992	3,109
23	901	44,087	43,186	0.325571	14,060	0.063876	2,759
24	901	44,087	43,186	0.310068	13,391	0.056676	2,448
25	901	44,087	43,186	0.295303	12,753	0.050287	2,172
26	901	44,087	43,186	0.281241	12,146	0.044619	1,927
27	901	44,087	43,186	0.267848	11,567	0.039589	1,710
28	901	44,087	43,186	0.255094	11,017	0.035126	1,517
29	901	44,087	43,186	0.242946	10,492	0.031167	1,346
30	901	44,087	43,186	0.231377	9,992	0.027653	1,194
31	901	44,087	43,186	0.220359	9,517	0.024536	1,060
32	901	44,087	43,186	0.209866	9,063	0.021770	940
33	901	44,087	43,186	0.199873	8,632	0.019316	834
34	901	44,087	43,186	0.190355	8,221	0.017139	740
35	5,962	44,087	38,125	0.181290	6,912	0.015207	580
36	901	44,087	43,186	0.172657	7,456	0.013493	583
37	901	44,087	43,186	0.164436	7,101	0.011972	517
38	901	44,087	43,186	0.156605	6,763	0.010622	459
39	901	44,087	43,186	0.149148	6,441	0.009425	407
40	901	44,087	43,186	0.142046	6,134	0.008362	361
41	901	44,087	43,186	0.135282	5,842	0.007420	320
42	901	44,087	43,186	0.128840	5,564	0.006583	284
43	901	44,087	43,186	0.122704	5,299	0.005841	252
44	901	44,087	43,186	0.116861	5,047	0.005183	224
45	901	44,087	43,186	0.111297	4,806	0.004599	199
46	901	44,087	43,186	0.105997	4,578	0.004080	176
47	901	44,087	43,186	0.100949	4,360	0.003620	156
48	901	44,087	43,186	0.096142	4,152	0.003212	139
49	901	44,087	43,186	0.091564	3,954	0.002850	123
50	901	44,087	43,186	0.087204	3,766	0.002529	109
51	901	44,087	43,186	0.083051	3,587	0.002244	97
52	901	44,087	43,186	0.079096	3,416	0.001991	86
53	901	44,087	43,186	0.075330	3,253	0.001766	76
54	901	44,087	43,186	0.071743	3,098	0.001567	68
55	901	44,087	43,186	0.068326	2,951	0.001391	60
56	901	44,087	43,186	0.065073	2,810	0.001234	53
57	901	44,087	43,186	0.061974	2,676	0.001095	47
58	901	44,087	43,186	0.059023	2,549	0.000971	42
59	901	44,087	43,186	0.056212	2,428	0.000862	37
60	901	44,087	43,186	0.053536	2,312	0.000765	33
Total	203,989	2,110,255	1,906,266		314,700		-0

<IRR> 12.7%

Discount Factor 5% : NPV= 314,700 , B/C= 3.4
Discount Factor 10% : NPV= 44,356 , B/C= 1.5
Discount Factor 12% : NPV= 8,605 , B/C= 1.1