ANNEX L

ENVIRONMENT

ANNEX L

ENVIRONMENT

Contents

List of Table

List of Figure

ANNEX L

ENVIRONMENT

1. Legal Framework on Environment in Turkey

1.1 Lows and Responsible Ministries on Environment

Based on the principle of "Polluter-Pays" and "Richness of Future Generation", Environmental Low was published in 1983 in Turkey in order to prevent and eliminate environmental pollution and to manage the natural and historical values. In line with the Environmental Low, several regulations have been published since 1983; control of air quality, water pollution, noise, solid waste and chemical substances, etc.

Based on Article 10 of the Environmental Low, Environment Impact Assessment (EIA) Regulation was issued in February 1993. According to the EIA Regulation, the purpose of EIA is as follows:

- To identify and evaluate the environmental impacts of proposed and private activities which may cause environmental problems,
- To prevent or mitigate adverse impacts, and
- To assess alternative to the activities.

Since 1978, Prime Ministry Undersecretariant for Environment under the Ministry of State has been responsible for the coordination of all national and environment activities for the environment in Turkey. In 1991, the Undersecretariant for Environment was promoted to the rank of Ministry of Environment (MOE). The MOE is responsible for not only the above coordination but also intervention and implementation of policies concerned with environment. In addition, 23 provincial and local environmental foundations were established as an important channel to regional and local governments or agencies.

1.2 Environmental Impact Assessment System

According to the EIA regulation, the following DSİ projects are required to prepare checklists of Initial Environmental Examination (IEE) or Environmental Impact Statements (EISs).

Projects which require IEE
- Irrigation
- Land reclamation
- Flood control
- Waste water treatment plants
- Resettlement of 200 - 1,000 dwellings
- Small dams (surface area of the reservoir is less than 15 km^2 or reservoir volume is less than 100 MCM)

Projects which require EIS
- Ports (entry of vessels is over 1,350 tons)
- Dams (surface area of the reservoir is more than 15 km^2 or reservoir volume is more than 100 MCM)
- Resettlement of more than 1,000 dwellings
- Land reclamation from sea and dredging
- Groundwater development (volumetric capacity is more than 10 MCM per year)

For the project which falls under the above definitions, DSİ must submit a checklist of IEE or EIS to the provincial office of MOE. The checklist of IEE is a brief and conclusive

description of the project and its environmental impacts. On the other hand, EIS is more comprehensive and includes the checklist of IEE, the detailed description of the project, and the prediction and the assessment of the project impact. The process of IEE and EIS are shown in Figure - L.1 and L.2, respectively.

2. Initial Environmental Examination (IEE)

2.1 Objective of IEE

The objective of Initial Environmental Examination (IEE) is preliminary environmental review to assess whether Environmental Impact Assessment (EIA) is necessary or not for the Project. Major study components of IEE include present environmental condition, preliminary assessment of environmental impacts, scooping of significant impacts and evaluation of whether EIA is necessary or not for the Project.

2.2 Environmental Items and Ecological Regions

Based on the "Environmental Impact Assessment Guidelines for Water Development Projects in Turkey" prepared by USBR in cooperation with DSİ in 1994, 20 environmental items are selected considering the major components of the Project such as the construction of Beydağ dam, canals and drains, and agricultural development in the Project Area. The selected environmental items are as shown in Table - L.1.

Considering major components of the Project, the area to be affected by the Project is broadly divided into the following four ecological regions taking the locations of impact into account:

Region I : Catchment area of Küçük Menderes river at the dam site except the Region II mentioned below

Region II : Reservoir area of Beydağ dam including dam site

Region III : Irrigation Area

Region IV : Area extending along the downstream reaches of the Küçük Menderes river from Beydağ dam site

2.3 Result of the IEE

(1) Dislocation of People

According to the DSİ-II plan, most of dwellers in Çiftlikköy and Karaman and a part of people in Bakırköy and Yenişehir need to be resettled in the other places because of construction of the Beydağ dam, while people in Kurudere, Karaoba and Yağlar do not need to be shifted. Based on the present population and the location of village confirmed by topographical maps on a scale of 1:25,000, the people to be dislocated is estimated at around 1,500 persons. The dislocation of people in the reservoir area of Beydağ dam is one of the principal issues to be caused by the Project taking the sociological impact to 1,500 persons into account. Therefore, the detailed assessment is required in order to check the sociological impact to be caused by the Project.

(2) Land Use Changes

According to the information from DSİ-II, the present land use in the reservoir area of Beydağ dam is as follows:

Present Land Use	Area (ha)	Proportion (%)
Agricultural Land		
- Annual Crop	1,010	68
- Tree Crop	230	15
Forest and Public land	250	17
Total	1,490	100

The above data indicates that 1,240 ha of the agricultural land will be submerged in the reservoir area. Although the construction of dam would submerge the existing agricultural land in the reservoir area, the Project will improve the agricultural lands of around 15,400 ha by providing them with sufficient irrigation water. In addition, the project economic evaluation is carried out taking into account the loss of land productivity in the submerged area. From the above studies, it is judged that the negative impact caused by the change of landuse is considered to be small from the viewpoint of economical aspects.

(3) Impairment of Transportation

Beydağ dam will affect and submerge a provincial road running from Beydağ through Kiraz. However, a national road has already completed from Beydağ to Kiraz via Cayli, and most of cars move through this national road. On the other hand, the road condition in the proposed irrigation area will be improved by the construction of the canal service roads. As a result, the negative impact to the transportation will be almost nil.

(4) Inundation of Mineral Resources

According to the existing geological map, there are no mineral resources in the project area including the area to be submerged in the Beydağ reservoir, and therefore no negative impact to mineral resources will be caused by the Project.

(5) Historical and Recreational Disturbance

According to the information from the General Directorate for Preservation of the Cultural and National Heritage, the seven cultural and historical assets exist around the Project Area. They are Kaymakçı (Ancient City), Kızılcaavlu (Ancient City and Ancient Castle), Emiril (Ancient Castle), Ovakent (Ancient Village), Konaklı (Ancient Village) and Balabanlı (Ancient Castle). Those cultural assets exist in the built-up area of villages located in hilly areas or at higher elevations than the alluvial plain. Moreover, no cultural and historical assets are reported in the proposed Beydağ reservoir area also according to the information from the General Directorate for Preservation of the Cultural and National Heritage. No negative impact to historical and recreational disturbance will therefore be caused by the Project.

(6) Ecological Disturbance

For the maintenance of the present ecosystem in the Küçük Menderes river basin, the main concerns are endangered flora and fauna. In the Project Area, however, most of these flora and fauna mainly exist out of the potential land taken for irrigation development according to the information of Dokuz Eylül University, and therefore no major damage of the present ecosystem is expected even after the completion of the envisaged irrigation projects, except in the Eleman wetland area.

The Eleman wetland with a total area 1,500 ha is located in the lower most reaches of the Küçük Menderes river. Out of this total area, about 500 ha consisting of two lakes, wetland and hilly area is considered to be more important for the birdlife and fishery than the remaining 1,000 ha which has been used as the agricultural land mainly in the dry season. This ecologically important area is directly receiving water from springs but not from the Küçük Menderes river. Therefore, any remarkable negative impact will not be caused on the ecosystem in this area even after the project implementation which will cause the environmental changes mainly on the downstream reaches of the Küçük Menderes river: decrease of river flow due to construction of the four dams and deterioration of water quality due to use of chemical fertilizers and agro-chemicals.

(7) Degradation of Forest Resources

According to the result of the present land use survey, there is no forest area in the Project Area. In addition to the above area, 17% or 250 ha of forest and grassland areas exist

in the proposed Beydağ reservoir area. On the basis of field observation, most of the above forest and grassland areas are occupied by scrubs and grasses. No serious impact to the forest will, therefore, be caused by the Project.

(8) Erosion and Sedimentation

Annual sedimentation yield at the Beydağ dam site is estimated at 112 tons/km^2 by the JICA Study Team. According to the Irrigation Master Plan prepared by the World Bank, the average annual sedimentation yield of the watershed in Turkey is estimated at around 600 tons/km^2. Comparing to the national average, it is understood that the sedimentation of Beydağ reservoir is not so serious. In addition, two watershed management projects are still being implemented and three projects are waiting for the implementation in the watershed of Beydağ dam. The impact to the Project caused by the erosion and sedimentation is considered to be low.

(9) Fisheries Losses

There is no fishery production in the upstream and downstream of the Beydağ dam site in the Küçük Menderes river except two lakes in Eleman wetland. The fresh water source to those two lakes are from springs not from the Küçük Menderes river. Therefore, no negative impact to the fisheries would not be caused after the complementation of the Project.

(10) Groundwater Deterioration

The quantity of groundwater will be improved in the proposed irrigation area after the implementation of the Project, because the use of groundwater for the irrigation purpose will be limited to 64% of the present one.

The quality of groundwater might be affected due to the additional pollution loads of chemical fertilizer and agro-chemicals from the irrigation area. Therefore, the detailed assessment is required in order to clarify the magnitude of the impact caused by the Project.

(11) Change of River Flow Regime

According to the result of water balance study, the quantity of surface water will be decreased to 311 MCM from 362 MCM at the river mouth of the Küçük Menderes after the construction of the Beydağ dam. This means that only 14 % of the total flow of the Küçük Menderes river will be controlled and used for the irrigation and therefore, any particular consideration of the river maintenance flow from reservoir may not be needed. In addition, the decrease of surface water dose not cause any remarkable impact on the ecosystem in the wetland described above.

(12) Surface Water Deterioration

The quality of surface water in the Project Area and the downstream of Project area might be affected by the increase of the pollution loads of chemical fertilizer and agro-chemicals from the cultivation area. Therefore, the detailed assessment is required in order to clarify the magnitude of the impact caused by the Project.

(13) Eutrophication of Dam Reservoirs

In the upstream area of Beydağ dam reservoir, the main source of water pollution is waste water from livestock and household in Kiraz district, which is flown to the river without any treatment. According to the estimation by JICA Study Team, 30,000 persons and 10,000 heads of cattle will live in the watershed of Beydağ dam in the Kiraz district in the year of 2000. Under this condition, the inflow of nutrients from the upstream area of the dam site would affect the water quality in the proposed reservoir. The possibility and magnitude of the

impacts will be studied on the basis of the projection of water quality deterioration considering the characteristics of the reservoir.

(14) Public Health Issues

According to the Master Plan prepared by IBRD (1991), the following four diseases are reported as water born diseases related to the water resource development in Turkey.

Name of Water Borne Disease	Distribution
Malaria	Lowlands of Southeast Anatolia
Schistosomiasis (bilharzia)	Rivers of Southeast Anatolia
Lymphatic filariasis (elephantiasis)	Whole Turkey
Japanese encephalitis	Mountains and lowlands of South East of Turkey

According to the Provincial Office of the Ministry of Health, however, the above diseases are not reported in the river basin. Therefore, no negative impact would be caused by the complementation of the Project.

(15) Climatic Change

In general, change of micro-climate usually occurs when a reservoir has a large surface area, particularly in the arid or semi-arid regions. The reservoir area of Beydağ dam is only 14.9 km2, which is too small to cause substantial impacts related to the micro-climate changes around the reservoir area.

(16) Water Rights Conflicts

Some water rights for the irrigation are set in the Küçük Menderes river. However, these water rights are not used due to the degradation of the surface water quality at present. As a result, no serious impact will be expected by the Project.

(17) Soil Degradation

Under the proposed farming practice, the soil fertility will be improved from the present condition due to the introduction of the proper rotation system of crops and the proper application of manure. Thus, positive effect will be expected to be brought about by the Project.

(18) Change of Farming Practice

Under the "future with project" condition, the farm income will be increased to a great extent. In addition, the agricultural extension work to farmers will be strengthened in order to attain the improved farming practices including the promotion of scheduled and collective crop production, proper application of farm inputs promotion, promotion of co-use of farm machinery and introduction of new irrigation method.

(19) Earthquake Hazards

The facilities of the Project is not so large that the earthquake cause the damage to life of local people except for the Beydağ dam. The present dam design has an enough safety factor against the earthquake. The impact by the earthquake is deemed to be almost nil.

2.4 Summary of the IEE

A preliminary evaluation of magnitude of impacts has been conducted on the selected 19 environmental items and its result is summarized in Table - L.1. The following

environmental items are expected to have the significant impacts caused by the Project and assessed in the further EIA study.

Environmental Items	Region I	Region II	Region III	Region IV
Sociological Impact to Dislocated People	-	o	-	-
Eutrophication of Dam Reservoir	-	o	-	-
Downstream Water Quality Deterioration	-	-	o	o
Groundwater Quality Deterioration	-	-	o	o

3. Environmental Impact Assessment (EIA)

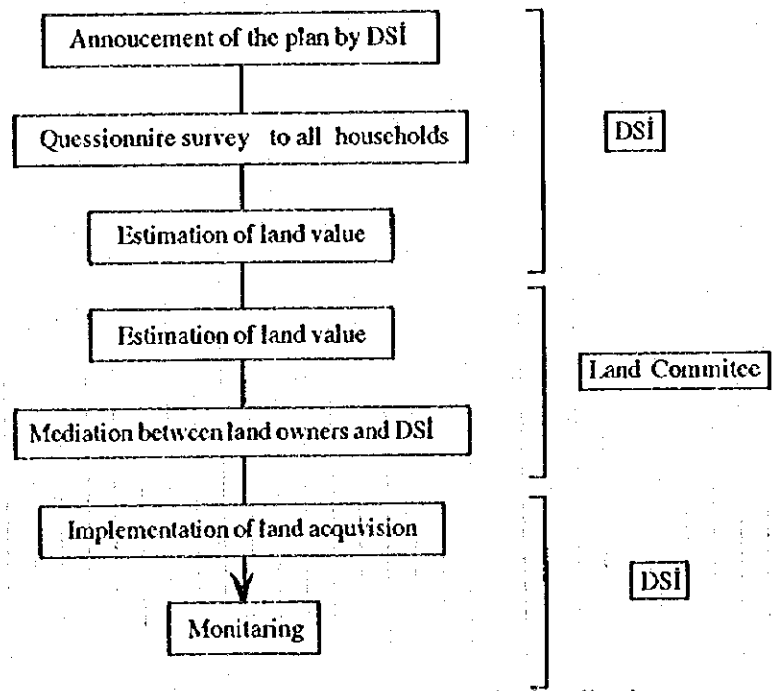
3.1 Sociological Impact to People to Be Dislocated from Beydağ Reservoir Area

3.1.1 General

Due to construction of the Beydağ dam, around 1,500 persons living in the reservoir area have to be dislocated to other area. For the preparation of plan and procedure for the land acquisition in the reservoir, the case of the Tahtalı Dam Project, which is located 80-km southwest of İzmir and under the construction by DSİ-II, was examined in the EIA study.

3.1.2 Land Acquisition Procedure of Tahtalı Dam

The Tahtalı dam is a water supply dam to İzmir city and still under construction under the supervision of DSİ-II. Around 900 households have been dislocated from the 2,352 ha of the reservoir area. The procedure of land acquisition applied for this dam project is summarized as follows:



After the announcement of the plan through the district government office, the questionnaire survey of all households to be submerged was made in order to clarify their present economical and sociological condition. Questionnaire sheets are composed of 65 items including general information of family, living condition, agricultural activity, property situation, intention to land acquisition, income and living expenses, and health condition. The survey was conducted by DSİ-II under the support of the World Bank. According to the result of survey, the compensation method of dislocated people depended on their choice by land or money. Most of people preferred money to land. In addition to this compensation method, the support services of new house, job and agricultural land for dislocated people was requested by DSİ-II to the district government office on the basis of the result of the questionnaire survey. After the questionnaire survey, DSİ-II estimated their land and property value.

After DSİ-II finished the cost estimate of land value , the land committee, which was composted of five officers of the district government office, Ministry of Finance, district office of MARA and DSİ, was organized in order to examine the land value and to play as a mediator between land owners and DSİ before the implementation of the land acquisition. If the owner or DSİ had complaint about the mediation by the land committee, the case could be brought to

the court under the "Land Acquisition Law" revised in 1983. The land value judged in the court was the final. After the fix of land value, the land acquisition was implemented by DSİ-II.

DSİ-II has a plan to conduct the questionnaire survey in order to clarify the economical and social conditions of dislocated people within three or five years after land acquisition. The scope of the survey is around 30 % of the whole dislocated households. The content of questionnaire is still under planning with the support of the World Bank at present. Although collection and analysis of data have been conducted, the actual action has not been taken by DSİ-II.

3.1.3 Evaluation

The above procedure and measures in the Tahtalı dam taken by DSİ-II for the dislocation of the people and compensation to them were judged to be properly done from the following viewpoints.

- To conduct the questionnaire survey to all households in the submerged area by the dam construction in order to clarify their present economical and sociological conditions,
- To organize a land committee to decide the compensation amount from the neutral standpoint,
- To request the local government to conduct the support service to the dislocated people, and
- To make a plan the monitoring of socio-economic condition of the dislocated people (still on-going).

In addition to the above procedure and measures taken for the Tahtalı dam project, the following matters should be noted for the Project.

- To conduct the public consultation meeting before the implementation of the land acquisition in the proposed reservoir area, and
- To make the action plan for the support and improvement of the dislocated people, if required, on the basis of the result of monitoring their living conditions in the new area.

3.2 Eutrophication of the Beydağ Dam Reservoir

3.2.1 Projection of Eutrophication

The inflow of nutrients from the upstream area of the dam into the Küçük Menderes river would affect the water quality in the Beydağ reservoir. The main source of water pollution is waste water from livestock and household in the watershed of the Beydağ dam in Kiraz district, which is flown to the river without any treatment. In addition to the above pollution source, there is some natural pollution source from rainfall. The possibility and the magnitude of the eutrophication is assessed following the Vollenweider Mode on the basis of the following data and assumption.

Annual flow

Based on the hydrological data shown in Annex A, annual average flow at Beydağ dam is set to be 76,000,000 m^3 per year.

Phosphorus supply

Phosphorus supply from the upstream area of the dam reservoir is estimated as shown below :

Pollution Source	Present	Future (Year 2000)	Unit Load (kg/year/unit)	Pollution Load (kg/year)
Person	27,000 persons	30,000 persons	0.33	9,900
Cattle	10,000 heads	10,000 heads	2.04	20,400
Runoff	51,500 ha	51,500 ha	0.30	15,500
Total				45,800

According to the above estimation, the average phosphorus concentration of the inflow is 0.60 mg/l.

Dam characteristic

The characteristic of Beydağ dam and water flow in the reservoir area are estimated below :

Reservoir area : 14,860,000 m^2
Reservoir capacity : 241,000,000 m^3
The retention time of inflow in the dam reservoir (reservoir volume / annual average flow): 3.17 years.

Chlorophyll concentration

Based on the Vollenweider Model, the concentration of chlorophyll is estimated, for which the following formula was employed.

$Chl = 0.37 \times \{P / (1 + \sqrt{Tw})\}^{0.79}$
Chl : Concentration of chlorophyll-a in the reservoir
P : average phosphorus concentration in the inflow
Tw : Retention time of the inflow

As a result , the concentration of chlorophyll-a (a indicator of eutrophication) in the reservoir is estimated at 25.9 mg/m^3.

3.2.2 Evaluation

According to the OECD Guidelines for eutrophication in a lake or reservoir, the relationship between eutrophication and concentration of chlorophyll-a is defined as shown below :

Eutrophication	Chlorophyll - a Concentration (mg/m3)
Very Low Possibility	less than 1.0
Low Possibility	1.0 - 2.5
Normal Possibility	2.5 - 8.0
High Possibility	8.0 - 25.0
Very High Possibility	More than 25.0

According to the above-mentioned guidelines, the calculated result of the concentration of the chlorophyll-a in the Beydağ reservoir water belongs to the category of "very high possibility". Therefore, the countermeasures should be taken in order to mitigate the magnitude of the eutrophication in the reservoir based on the result of monitoring to be started after completion of the dam construction.

3.3 Deterioration of Water Quality

3.3.1 Projection of Increase of Farm Inputs

The deterioration of the water quality in the surface and the groundwater in the Project Area would be caused by the increased application of chemical fertilizer and agro-chemicals. The possibility and the degree of the deterioration are examined on the basis of the calculated

result of the mass balance of farm inputs between present condition and "future with project" condition. Based on the present and proposed farm input application shown in Annex E, the total quantities of the farm inputs were estimated as shown in Table - L.2 and L.3 and summarized below:

(Unit: tons)

	Present	With Project	Balance
Nitrogen	1,390	2,590	1,200
Phosphorous	210	380	170
Agro-chemicals	70	110	40

The above-calculated result shows the increase of the load by 86% for nitrogen, 80% for phosphorus and 51% for agro-chemicals in future as compared with the present level in the Project Area.

3.3.2 Projection on the Surface Water Quality

The possibility of the deterioration of surface water quality was examined by the above calculated result of mass balance and the following assumption.

River flow change

According to the result of the water balance study, the annual river flow will decrease from 76.1 MCM to 25.1 MCM at the Beydağ dam site.

Runoff of farm input

There is no data concerning the runoff rate of chemical fertilizer and agro-chemicals in Turkey. Therefore, the research result in Japan was applied to the estimation of the runoff rate of the nitrogen and phosphorous in this study. Referring to this result, the runoff rate is set to be 1% for nitrogen and 0.2% for phosphorous. In case of agro-chemicals, the runoff rate is assumed to be 0.2% which is the same rate of phosphorous taking into account the same disintegration rate. The estimated amounts of the runoff of farm inputs are as show below.

(tons)

	Present	With Project	Balance
Nitrogen	13.9	25.9	12.0
Phosphorous	0.42	0.76	0.34
Agro-chemicals	0.14	0.22	0.08

On the basis of the above assumption and data, the pollution load in the surface water was calculated as follows:

(ppm)

	Present	With Project	Balance
Nitrogen	0.18	1.03	0.85
Phosphorous	0.01	0.03	0.02
Agro-chemicals	0.002	0.009	0.007

Based on the present water quality data of Beydağ dam site, the future surface water quality was evaluated as follows:

	Present (ppm)	With Project (ppm)	Water Quality Class
Nitrogen	1.15	2.00	Class I
Phosphorous	0.05	0.07	Class I
Agro-chemicals	No data	>0.009	Class II

The above table shows that only small impact is expected to the surface water quality in the downstream part of the Project Area under the "future with project" condition.

3.3.3 Projection on the Groundwater Quality

As for the groundwater, it is difficult to assess the change of these concentrations in the water due to lack of the data concerning the present water quality and the dispersion of nitrogen, phosphorous and agro-chemicals in the groundwater. Mobility of nitrogen is much higher than phosphorous and agro-chemicals in the soils. In addition, leaching rate for total input nitrogen is more than 20 times of the runoff rate. Judging from the result of the mass balance calculation and the mobility of nitrogen, it is cautioned that a careful attention should be paid to the concentration of nitrogen in the groundwater. On the other hand, the impact of phosphorous and agro-chemicals to groundwater may be small as compared with nitrogen.

4. Environmental Conservation and Monitoring Plan

4.1 Environmental Conservation Plan

4.1.1 General

Based on the result of the EIA, the plans for the environmental conservation and the monitoring are prepared for the future reference. In addition to the environmental items evaluated in EIA, the plan for the watershed management of the Küçük Menderes river is also prepared taking into account the present problems faced in the watershed management projects being carried out by the government agencies of DSİ, MOF GDRS and MARA. The environmental conservation plans thus prepared are as shown in Table L.4 and summarized in the following sections.

4.1.2 Sociological Impact to People to Be Dislocated from Beydağ Reservoir Area

As evaluated in the EIA, the procedure and measures taken by DSİ-II for the dislocation of the people and compensation to them were judged to be properly done. However, the following matters should additionally be taken into consideration for the land acquisition in the Beydağ reservoir area:

Before implementation of compensation

- To conduct the public consultation meeting with dwellers in the reservoir area,
- To conduct the questionnaire survey to all dwellers in the reservoir area,
- To request the local government to conduct support service, and
- To decide the compensation amount in the proper method.

After implementation of compensation

- To monitor the socio-economic condition of the dislocated people,
- To make a supporting plan, and
- To request the local government to conduct the support service.

4.1.3 Eutrophication of Beydağ Dam Reservoir

Reduction of the nutrient loading, especially phosphorus, is the most effective measures to mitigate the eutrophication in the Beydağ reservoir. The method of the reduction is summarized below:

- To remove the nutrients from domestic waste water by municipal sewage system,
- To decrease the nutrient runoff from agricultural lands by the proper farming system,
- To control the direct intrusion of the waste from livestock into the river, and
- To avoid fish culture or recreational use in the reservoir.

4.1.4 Degradation of Water Quality

Control of chemical fertilizer and agro-chemicals is the most effective measures to mitigate the degradation of water quality for both surface and groundwater. The method of control is summarized below:

- To maintain the proposed crop rotation system,
- To apply chemical fertilizer at the proper timing and quantity,
- To check runoff of the chemical fertilizer from agricultural lands,
- To use manure or organic fertilizer instead of chemical fertilizer,
- To conduct Integrated Pest Management (IPM), which utilizes all kind of pest control under proper pest forecasting system, and

- To establish the proper pest forecasting system.

4.1.5 Watershed Management

At present, four government agencies of DSİ, MOF, GDRS and MARA are responsible for the watershed management. However, the current institutional arrangements are less effective for an integrated approach towards the watershed management due to the shortage of the communication among the above agencies. Furthermore, there is no mechanism for agricultural extension work in the sloped area. Therefore, the progress of the watershed management project is checked and discussed in the joint committee which should be organized among the said government agencies. In addition, the joint committee should request MARA to conduct the extension or demonstration program for soil conservation in the sloped area. These efforts would contribute to the extension of the useful life of Beydağ dam due to the reduction of the sedimentation load.

4.2 Environmental Monitoring Plan

4.2.1 Institutional Aspects

The Monitoring and Evaluation (M&E) Unit is proposed to be established in the Project Office as mentioned in Section 3.4.1 of the Main Report. The main duties concerning environmental monitoring of the M&E Unit are as follows:

- To prepare concrete monitoring plan,
- To conduct and supervise the actual monitoring programs,
- To analyze the data obtained through the monitoring,
- To propose and evaluate the mitigation program, and
- To conduct a special study for the environment, if necessary.

4.2.2 Technical Aspects

The monitoring items include groundwater table, water quality of surface water and groundwater, the condition of farm input, socio-economic condition of dislocated people and progress of watershed management project. In addition, it is necessary to monitor the ecosystem condition including the wetland, local disease and complaint of the local people once a year at least in order to check the unexpected environmental change to be caused by the Project. The summary of the environmental monitoring plan is as shown in Table - L.5.

(1) Sociological Impact to People to Be Dislocated from Beydağ Reservoir Area

(a) Monitoring Items

(i) Actual progress of the land acquisition and compensation
(ii) Socio-economical condition of the dislocated people
(iii) Requirements of the dislocated people related to resettlement

(b) Monitoring area

The monitoring area is resettlement area.

(c) Monitoring Period and Frequency

(i) During the land acquisition period, the progress of the land acquisition and compensation should be checked by the M&E Unit of the proposed Project Office.
(ii) After the land acquisition period, questionnaire and interview survey should be conducted by the said M&E Unit immediately and within 3 years.

(2) Eutrophication of Beydağ Dam Reservoir

(a) Monitoring items

(i) Condition of waste water source such as farm land, grazing land and domestic waste water
(ii) Water quality of reservoir (see the detailed information in paragraph 4.2.2-(3))

(b) Monitoring area

The monitoring area is the watershed of Beydağ dam for monitoring item a) and Beydağ dam reservoir for monitoring item b).

(c) Monitoring period and frequency

(i) During the construction period, the water quality of Beydağ dam site should be collected by the M&E Unit of the proposed Project Office and analyzed by the DSİ Laboratory at least bimonthly.
(ii) After the construction period, the water quality of Beydağ dam reservoir should be collected by the M&E Unit and analyzed by the DSİ Laboratory at least monthly. The condition of waste water source should be checked by the M&E Unit on the basis of field observation and interview to related agencies and local people at least once a year.

(3) Degradation of Water Quality

(a) Monitoring items

(i) Phisico-chemical substance (Color, pH, EC, Cation , Anion, Boron, SS, DO)
(ii) Organo-chemical substance (COD, NH4-N, NO2-N, NO3-N, T-N, T-P)
(iii) Agro-chemicals
(iv) Groundwater table
(v) Farming practice such as usage of farm inputs

(b) Monitoring area

For groundwater table and quality, the monitoring will be made at the wells in and around Project Area. For the surface water quality, the monitoring area is the downstream reaches (Kizilcaavlu and Selçuk) of the Küçük Menders river and Beydağ dam reservoir. For the conditions of farming practices, the monitoring area is the whole Project Area.

(c) Monitoring period and frequency

(i) During the construction period, the groundwater should be sampled by the M&E Unit of the proposed Project Office at least two times per year. The groundwater table should be checked by the M&E Unit at least two times per year. The surface water should be sampled by the M&E Unit at least bimonthly. Phisico and organo chemical substance of both surface water and groundwater should be analyzed by the DSİ Laboratory at sampling time. The agro-chemicals should be analyzed by the DSİ Laboratory at least once a year. The framing practices should be checked by the M&E Unit through the interview to local farmers and the district office of MARA.
(ii) After the construction period, the above monitoring period and frequency during the construction period should be kept except for sampling of surface water quality. The surface water should be sampled by the M&E Unit at least monthly.

(4) Watershed Management

(a) Monitoring items

(i) Progress of watershed management project conducted by DSİ
(ii) Progress of watershed management project conducted by GDRS
(iii) Progress of reforestation project conducted by MOF
(iv) Condition of agricultural extension works conducted by MARA

(b) Monitoring area

The monitoring area is the watershed of Beydağ dam.

(c) Monitoring period and frequency

(i) During and after the construction period, the progress of watershed projects and condition of agricultural extension works should be checked by the Joint Committee at least once a year and the Joint Committee should be reported to the Project Office.

(5) Others

(a) Monitoring items

(i) Condition of ecological condition
(ii) Condition of local disease
(iii) Constraint of local people
(iv) Others

(b) Monitoring area

For the condition of ecological condition, monitoring area is the Küçük Menderes river basin area. For the other items, the monitoring area is in and around the Project Area

(c) Monitoring period and frequency

(i) During and after the construction period, the all items should be checked by the M&E Unit on the basis of direct observation, interview and data collection from local people and the related agencies at least once a year.

TABLES

Table - L.1 Result of IEE of Beydağ Dam Irrigation Project

Environmental Items	Ecological Regions				Remarks
	Region I Catchment Area of Dam	Region II Reservoir Area including Dam Site	Region III Irrigation Area	Region IV Downstream River Channel from Dam Site	
1. Dislocation of people	-	-/A	-/C	-	EIA is necessary.
2. Land use changes	-	-/C	-/C	-	
3. Impairment of transportation	-	-/C	x	-	
4. Inundation of mineral resource	-	x	x	-	
5. Historical and recreational disturbance					
- Histrical and cultural disturbance	-	x	x	-	
- Recretional disturbance	-	x	x	-	
6. Ecological disturbance					
- Terrestrial fauna and flora	x	x	x	x	
- Aquatic fauna and flora	x	x	x	x	
- Marsh area	-	-	-	-/C	
7. Degradation of forest resources	x	-/C	-/C	-	
8. Erosion and sedimentation	x	-/C	-/C	-	
9. Fisheries losses	x	x	x	x	
10. Groundwater deteriorations					
- Groundwater depth	-	-	+/B	+/C	
- Groundwater quality	-	-	-/B	-/A	EIA is necessary.
11. Change of river flow regime	-	-	-/C	-/C	
12. Surface water deterioration	-	-	-/B	-/A	EIA is necessary.
13. Eutrophication of Dam Reservoir	-	-/A	-	-	EIA is necessary.
14. Public health issues	-	x	x	x	
15. Climatic change	-	x	-	-	
16. Water rights conflicts	-	-	x	x	
17. Soil degradation	-	-	x	-	
18. Change of farming practices	-	-	+/B	-	
19. Earthquake hazards	-	x	-	-	

A : Relative high magnitude of impact is expected
B : Relative medium magnitude of impact is expected
C : Relative low magnitude of impact is expected
x : No effect is expected
- : There is no relation
+ : Possitive effect is expected
- : Negative effect is expected

Table - L.2 The Total Farm Input under the Present Condition in the Project Area

Item		Unit	Cereals		Cotton		Water Melon		Tobacco		Vegetables		Potatos		Olive		II. Vegetables		II. Potatoes		Fruit		Other Fruits		Fodders		Total Input in the Project Area
			Quantity (unit/ha)	Total (Unit)	Quantity (unit/ha)	Total (Unit)	Quantity (unit/ha)	Total (Unit)	Quantity (unit/ha)	Total (Unit)	Quantity (unit/ha)	Total (Unit)	Quantity (unit/ha)	Total (Unit)	Quantity (unit/ha)	Total (Unit)	Quantity (unit/ha)	Total (Unit)	Quantity (unit/ha)	Total (Unit)	Quantity (unit/ha)	Total (Unit)	Quantity (unit/ha)	Total (Unit)	Quantity (unit/ha)	Total (Unit)	
Area (ha)		ha		970		4,260		1,740		1,110		1,550		2,850		370		560		1,410		420		320		540	16,100
Chemicals																											
Malathion		kg	-		3		1		-		4		-		-		4		-		1		-		-		
Curlytyl		kg	-		2		-		3		-		-		-		-		-		-		-		-		
Rapor		kg	-		1		-		-		-		-		-		-		-		0		-		-		
Pelsinil		kg			-		-		-		2		-		-		1		-		-		-		-		
Imperator		kg	-		-		-		-		-		-		-		-		-		-		-		-		
Dacter		kg	-		-		-		-		-		-		-		-		-		-		-		-		
Benedin		kg	-		-		2		-		-		-		-		-		-		1		-		-		
M-22		kg	-		-		-		-		2		1		-		2		-		-		-		-		
Marobe 80		kg	-		-		-		-		-		-		-		-		-		-		-		-		
Zombe 80		kg	-		-		-		-		-		-		-		-		-		-		-		-		
Captan 20		kg	-		-		-		-		-		-		4		-		-		-		4		-		
Cuprin-5		kg	-		-		-		-		-		3		-		-		3		-		-		-		
Sub-total		kg	0		6		3		3		8		4		4		7		3		2		4		0		
				0		26,625		5,220		2,775		12,400		9,975		1,480		3,808		3,525		840		1,280		0	68,000
Manure		kg	5,000		5,000		3,000		0		3,000		5,000		3,000		0		5,000		3,000		3,000		0		
		ton		4,850		21,300		5,220		0		4,650		14,250		1,110	3,000	0		7,050		1,260		960		0	61,000
Fertilizer(N)																											
20-20-20	20	kg	300	60	300	60	0	0	150	30	250	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
15-15-15	15	kg	0	0	0	0	400	60	0	0	0	0	500	75	200	30	0	0	0	0	250	38	400	60	0	0	
Ure	42	kg	100	42	50	21	50	21	0	0	0	0	120	50	0	0	0	0	200	84	0	0	0	0	0	0	
A. Nitrate	20.5	kg	0	0	0	0	0	0	0	0	180	37	0	0	0	0	360	74	0	0	0	0	0	0	120	25	
A. Sulfate	20.5	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	200	41	0	0	0	0	0	0	
P. Sulfate	0	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	180	0	0	0	0	0	0	0	
T. S. P.	0	kg	0	0	0	0	0	0	0	0	30	0	0	0	0	0	150	0	180	0	0	0	0	0	0	0	
Sub-total		kg		102		81		81		30		87		125		30		74		125		38		60		25	
Fertilizer N Total				98,940		345,060		140,940		33,300		134,695		357,390		11,100		41,328		176,250		15,750		19,200		13,284	1,387,000
Fertilizer(P)																											
20-20-20	20	kg	300	60	300	60	0	0	150	30	250	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
15-15-15	15	kg	0	0	0	0	400	60	0	0	0	0	500	75	200	30	0	0	0	0	250	38	400	60	0	0	
Ure	0	kg	100	0	50	0	50	0	0	0	0	0	120	0	0	0	0	0	200	0	0	0	0	0	0	0	
A. Nitrate	0	kg	0	0	0	0	0	0	0	0	180	0	0	0	0	0	360	0	0	0	0	0	0	0	120	0	
A. Sulfate	0	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	200	0	0	0	0	0	0	0	
P. Sulfate	0	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	180	0	0	0	0	0	0	0	
T. S. P.	44	kg	0	0	0	0	0	0	0	0	30	13	0	0	0	0	150	66	180	79	0	0	0	0	0	0	
Sub-total		kg		60		60		60		30		63		75		30		66		79		38		60		0	
Fertilizer P2O5 Total				58,200		255,600		104,400		33,300		97,960		213,750		11,100		36,960		111,672		15,750		19,200		0	958,000
Fertilizer P Total				12,700		55,775		22,781		7,266		21,376		46,643		2,422		8,065		24,368		3,437		4,190		0	209,000

Table - L.3 The Total Farm Input under the "With Project" Condition in the Project Area

Item		Unit	Cereals		Cotton		Water Melon		Vegetables		Potatoes		II. Vegetables		II. Potatoes		Green Legumes		Fodders		Other Fruits		Total Input in the Project Area
			Quantity (unit/ha)	Total (Unit)	Quantity (unit/ha)	Total (Unit)	Quantity (unit/ha)	Total (Unit)	Quantity (unit/ha)	Total (Unit)	Quantity (unit/ha)	Total (Unit)	Quantity (unit/ha)	Total (Unit)	Quantity (unit/ha)	Total (Unit)	Quantity (unit/ha)	Total (Unit)	Quantity (unit/ha)	Total (Unit)	Quantity (unit/ha)	Total (Unit)	
Area (ha)				770		4,620		1,540		3,080		3,080		3,080		1,540		1,540		770		1,540	21,560
Chemicals																							
Malathion		kg	-		3		1		4		-		4		-		1		-		3		
Carbaryl		kg			-		-		-		-		-		-		-		-		-		
Rapor		kg	-		2		-		-		-		-		-		-		-		-		
Falimat		kg			-		-		2		-		1		-		-		-		-		
Imparator		kg	-		2		-		-		-		-		-		-		-		-		
Ilaqlar		kg			-		-		-		-		-		-		-		-		-		
Basudin		kg	-		-		2		-		-		-		-		-		-		1		
M-22		kg	-		-		-		2		1		2		1		-		-		-		
Marebe 80		kg	1		-		-		-		-		-		-		1		1		-		
Zirebe 80		kg	1		-		-		-		-		-		-		-		-		-		
Captan 20		kg	-		-		-		-		-		-		-		-		-		1		
Caretta-5		kg	-		-		-		-		3		-		2		-		-		-		
Sub-total		kg	2	1,540	7	30,030	3	4,620	8	24,640	4	10,780	7	21,560	3	3,850	2	3,080	1	770	5	6,930	108,000
Manure		kg	10,000		15,000		20,000		15,000		15,000		10,000		10,000		10,000		10,000		15,000		
		ton		7,700		69,300		30,800		46,200		46,200		30,800		15,400		15,400		7,700		23,100	293,000
Fertilizer(N)																							
20-20-20	20	kg	350	70	400	80	0	0	400	80	0	0	0	0	0	0	0	0	0	0	0	0	
15-15-15	15	kg	0	0	0	0	520	78	0	0	600	90	0	0	0	0	100	15	0	0	250	38	
Ure	42	kg	140	59	70	29	100	42	0	0	160	67	0	0	90	38	0	0	0	0	200	84	
A. Nitrate	20.5	kg	0	0	0	0	0	0	180	37	0	0	370	76	0	0	300	62	250	51	0	0	
A. Sulfate	20.5	kg	0	0	0	0	0	0	0	0	0	0	200	41	500	103	0	0	0	0	100	21	
P. Sulfate	0	kg	0	0	0	0	0	0	0	0	0	0	120	0	150	0	0	0	0	0	0	0	
T. S. P.	0	kg	0	0	0	0	0	0	0	0	0	0	180	0	200	0	150	0	350	0	100	0	
Sub-total		kg		129		109		120		117		157		117		140		77		51		142	
				99,176		505,428		184,800		360,052		484,176		359,898		216,062		117,810		39,463		218,680	2,586,000
Fertilizer(P)																							
20-20-20	20	kg	350	70	400	80	0	0	400	80	0	0	0	0	0	0	0	0	0	0	0	0	
15-15-15	15	kg	0	0	0	0	520	78	0	0	600	90	0	0	0	0	100	15	0	0	250	38	
Ure	0	kg	140	0	70	0	100	0	0	0	160	0	0	0	90	0	0	0	0	0	200	0	
A. Nitrate	0	kg	0	0	0	0	0	0	180	0	0	0	370	0	0	0	300	0	250	0	0	0	
A. Sulfate	0	kg	0	0	0	0	0	0	0	0	0	0	200	0	500	0	0	0	0	0	100	0	
P. Sulfate	0	kg	0	0	0	0	0	0	0	0	0	0	120	0	150	0	0	0	0	0	0	0	
T. S. P.	44	kg	0	0	0	0	0	0	0	0	0	0	160	70	140	62	120	53	350	154	100	44	
Sub-total		kg		70		80		78		80		90		70		62		68		154		82	
Fertilizer P2O5 Total				53,900		369,600		120,120		246,400		277,200		216,832		94,864		104,412		118,580		125,510	1,727,000
Fertilizer P Total				11,762		80,651		26,211		53,767		60,488		47,315		20,700		22,784		25,875		27,388	377,000

Table - L.4 Environmental Conservation Plan (1/2)

Description of Impact	Source of Impact	Environmental Conservation Plan	Location	Timing	Executor of the Conservation	Supervision Institution	Related Institution
1. People To Be Dislocated from Beydağ Reservoir Area							
1.1 Unsatisfactory of resettlement							
	Shortage of explanation for the dislocation	Implementation of public consultation meeting	Dam reservoir area	Before land acquisition	Project Office	DSI	Local government
	Shortage of the survey of present condition of dislocated people	Implementation of questionnaire survey	Dam reservoir area	Before land acquisition	Project Office	DSI	Local government
	Constraint on new resettlement area	Preparation of support service	Dam reservoir area	During and after land acquisition	Project Office	DSI	Local government
		Implementation of support service	Dam reservoir area	During and after land acquisition	Local government	Local government	DSI
1.2 Unsatisfactory of the amount of compensation							
	Unproper method to decide the compensation amount	Decision of compensation amount at proper method	Dam reservoir area	During and after land acquisition	Land committee	Land committee	DSI
	Constraint on the finance for new life	Monitoring of socio-economical condition of dislocated people	New resettlement area	After land acquisition	Project Office	DSI	Local government
		Preparation of supporting plan	New resettlement area	After land acquisition	Project Office	DSI	Local government
		Implementation of support service	New resettlement area	After land acquisition	Land committee	Local government	DSI
2. Eutrophication of Beydağ dam reservoir							
2.1 Increment of pollution load on the watershed of the Beydağ dam							
	Domestic waste water	Establishment of the municipal sewage system	Watershed of Beydağ dam	During and after the construction	Local government	Local government	DSI
	Runoff of fertilizer in agricultural land	Introduction of proper farming system	Watershed of Beydağ dam	During and after the construction	Project Office	MARA	DSI, MOF
		Improvement of landuse such as introduce of grassland	Watershed of Beydağ dam	During and after the construction	Project Office	MARA	DSI, MOF
	Waste from livestock	Control of the direct intrusion to river	Watershed of Beydağ dam	During and after the construction	Project Office	MARA	DSI, MOF
		Usage of the waste as manure	Watershed of Beydağ dam	During and after the construction	Project Office	MARA	DSI, MOF

Table - L.4 Environmental Conservation Plan (2/2)

Description of Impact	Source of Impact	Environmental Conservation Plan	Location	Timing	Executor of the Conservation	Supervision Institution	Related Institution
2.2 Increment of solid waste in reservoir							
	Fish culture	Prohibition of Fish culture	Dam reservoir	After the construction	Project Office	DSI	Local government
	Tourism	Limitation of recreational use	Dam reservoir	After the construction	Project Office	DSI	Local government
		Monitoring of water quality of the reservoir	Dam reservoir	After the construction	Project Office	DSI	
		Monitoring of farming practice	Dam reservoir	After the construction	Project Office	DSI	
3. Deterioration of water quality							
	Increment of crop intensity	Introduction of the proposed crop rotation system	Project Area	During and after the construction	Project Office	MARA	DSI
	Increment of utilization of farm inputs : chemical fertilizer and agro-chemicals	Usage of manure or organic fertilizer instead of chemical fertilizer	Project Area	During and after the construction	Project Office	MARA	DSI
		Introduction of IPM system	Project Area	During and after the construction	Project Office	MARA	DSI
		Establishment of proper pest forecasting system	Project Area	During and after the construction	Project Office	MARA	DSI
	Improper use of farm inputs : chemical fertilizer and agro-chemicals	Application of farm inputs at proper timing and volume	Project Area	During and after the construction	Project Office	MARA	DSI
		Limitation of high toxicant agro-chemicals	Project Area	During and after the construction	Project Office	MARA	DSI
4. Watershed management							
Increment of soil erosion							
	Shortage of the integrated approach among related agencies	Monitor and discussion of progress of the watershed management project in the joint committee	Watershed of Beydağ dam	During and after the construction	Joint Committee	DSI	MARA, MOF, GDRS
	Shortage of extension work in sloped area	Implementation of extension work in sloped area by MARA	Watershed of Beydağ dam	During and after the construction	MARA	MARA	DSI

Table - L.5 Environmental Monitoring Plan

Description of Impact	Environmental Monitoring Plan	Monitoring Methodology	Analysis Methodology	Location	Timing	Frequency	Monitoring Execution Agency	Related Institution
1. People To Be Dislocated from Beydağ Reservoir Area								
	Progress of land acquisition and compensation	Data collection	Tabulation of data	Dam reservoir area	During land acquisition	Upon on a require	Project Office	DSI
	Socio-economical condition and requirement of dislocated people	Interview	Tabulation of interview result	Resettlement area	After land acquisition	Two times	Project Office	DSI
2. Eutrophication of Beydağ dam reservoir								
	Waste water source in the watershed	Direct Observation and interview	Tabulation of the result	Watershed area	After the construction	Once a year	Project Office	DSI, Local government
	Water quality of the reservoir	Direct Observation and sampling	Laboratory analysis	Dam reservoir	During and after the construction	Bimonthly or monthly	Project Office	DSI
3. Deterioration of water quality								
	Water quality of surface water	Direct Observation and sampling	Laboratory analysis	Kucuk Menders river	During and after the construction	Bimonthly or monthly	Project Office	DSI
	Water quality of groundwater	Direct Observation and sampling	Laboratory analysis	Project Area	During and after the construction	Two time per year	Project Office	DSI
	Farming practice	Interview	Tabulation of interview result	Project Area	During and after the construction	Once a year	Project Office	MARA, DSI
	Groundwater table	Direct Observation	Tabulation of the result	Project Area	During and after the construction	Two time per year	Project Office	DSI
4. Watershed management								
	Progress of watershed management project	Meeting among related agencies	Tabulation of the progress	Watershed area	During and after the construction	Once a year	DSI	MARA, MOF, GDRS
	Sedimentation of the reservoir	Sampling	Laboratory analysis	Dam reservoir	After the construction	Two times per year	Project Office	DSI
5. Others								
- Ecological condition	Condition of ecological condition	Direct Observation and interview	Data analysis and reporting	River basin area	During and after the construction	Once a year	Project Office	MOE, MOF, DSI
- Local disease	Condition of local disease	Data collection	Data analysis and reporting	Project Area	During and after the construction	Once a year	Project Office	MOH, Local government
- Complain of local people	Constraint of local people	Interview	Tabulation of interview result	Project Area	During and after the construction	Once a year	Project Office	DSI
- Others	Upon on a require	Direct Observation and interview	Data analysis and reporting	Project Area	Upon on a require	Upon on a require	Project Office	DSI,etc.

Table - L.6 Quality Criteria of Inland Water Resources by Class

Water Quality Parameter	Unit	Water Quality Class			
		I	II	III	IV
A) Physical and inorganic -chemical					
1. Temperature	(°C)	25	25	30	>30
2. pH	-	6.5-8.5	6.5-8.5	6.0-9.0	outside III
3. Dissolved oxygen	(mg/l)	8	4	3	<3
4. Oxygen Saturation	(%)	90	70	40	<40
5. Chlorine irons	(mg/l)	25	200	400	>400
6. Sulfate ions	(mg/l)	200	200	400	>400
7. Nitrogen as ammonia	(mg/l)	0.2	1	2	>2
8. Nitrogen as nitrite	(mg/l)	0.002	0.01	0.05	>0.05
9. Nitrogen as nitrate	(mg/l)	5	10	20	>20
10. Total phosphorus	(mg/l)	0.02	0.16	0.65	>0.65
11. Total dissolved matter	(mg/l)	500	1500	5000	5000
12. Color	(pt-Co units)	5	50	300	>300
13. Sodium	(mg/l)	125	125	250	>250
B) Organic					
1. COD	(mg/l)	25	50	70	>70
2. BOD	(mg/l)	4	8	20	>20
3. Organic carbon	(mg/l)	5	8	12	>12
4. Total Kjeldah nitrogen	(mg/l)	0.5	1.5	5	>5
5. Emulsified oil and grease	(mg/l)	0.02	0.03	0.5	>0.5
6. MBAS	(mg/l)	0.05	0.2	1	>1.5
7. Phenolic substances	(mg/l)	0.002	0.01	0.1	>0.1
8. Mineral oils and derivatives	(mg/l)	0.02	0.1	0.5	>0.5
9. Total pesticides	(mg/l)	0.001	0.01	0.1	>0.1
C) Inorganic pollution					
1. Mercury	(ug/l)	0.1	0.5	2	>2
2. Cadmium	(ug/l)	3	5	10	>10
3. Lead	(ug/l)	10	10	50	>50
4. Arsenic	(ug/l)	20	50	100	>100
5. Copper	(ug/l)	20	50	200	>200
6. Chromium (total)	(ug/l)	20	20	200	>200
7. Chromium	(ug/l)	-	20	50	>50
8. Cobalt	(ug/l)	10	20	200	>200
9. Nickel	(ug/l)	20	50	200	>200
10. Zinc	(ug/l)	200	500	2000	>2000
11. Cyanide (total)	(ug/l)	10	50	100	>100
12. Fluorine	(ug/l)	1000	1500	2000	>2000
13. Free chlorine	(ug/l)	10	10	50	50
14. Sulfur	(ug/l)	2	2	10	>10
15. Iron	(ug/l)	300	1000	5000	>5000
16. Manganese	(ug/l)	100	500	3000	>3000
17. Boron	(ug/l)	1000	1000	1000	>1000
18. Selenium	(ug/l)	10	10	20	>20
19. Barium	(ug/l)	1000	2000	2000	>2000
20. Aluminium	(mg/l)	0.3	0.3	1	>1
21. Radioactivity	(pCi/l)				
- alpha-activity		1	10	10	>10
- beta-activity		10	100	100	>100
D) Bacteriological parameters					
1. Fecal chloroform	(MPN/100ml)	10	200	2000	<2000
2. Total chloroform	(MPN/100ml)	100	2000	10000	<10000

Table - L.7 The Classification of Water Quality on Inland Surface Waters

	Definition	Drinking	Recreation	Irrigation	Livestock	Fishery	Industry
Class I	High Quality	OK*	OK	OK	OK	OK	OK
Class II	Slight Polluted	OK**	OK	OK	OK	OK***	OK
Class III	Polluted	N.A.	N.A.	N.A.	N.A.	N.A.	OK****
Class IV	Extremely Polluted	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

* : Necessary to make disinfection
** : Necessary to make appropriate purification
*** : Excluding trout
**** : Necessary to make appropriate treatment
N.A. : Not acceptable

Table - L.8 Result of Water Quality Analysis on the Proposed Dam Site

Item	Unit	Sampling Point of Dam Site					
		Beydağ	Aktaş	Burgaz	Ergenli	Uladi	Yenişehir
Sampling Date		9.3.1995	9.3.1995	9.3.1995	9.3.1995	9.3.1995	9.3.1995
pH	-	7.2	7.5	7.3	7.4	7.6	7.5
EC	mS/cm	0.23	0.20	0.23	0.21	0.16	0.24
Cation							
Na+	mg/l	24.61	23.90	12.65	3.91	9.66	12.19
K+	mg/l	0.78	0.78	0.39	0.39	0.39	0.39
Ca++	mg/l	17.20	15.60	27.20	27.00	15.80	18.40
Mg++	mg/l	9.50	8.70	4.80	6.40	7.20	13.80
Total	mg/l	52.09	48.98	45.04	37.70	33.05	44.78
SAR	-	1.67	1.70	0.83	0.25	0.72	0.74
Anion							
CO3- -	mg/l	0.00	0.00	0.00	0.00	0.00	0.00
HCO3-	mg/l	64.50	78.00	60.50	58.50	64.00	84.00
Cl-	mg/l	34.70	13.40	18.40	19.80	9.90	22.60
SO4- -	mg/l	22.90	29.60	28.60	16.20	16.20	28.20
Total	mg/l	122.10	121.00	107.50	94.50	90.10	134.80
Permanganate Value	mgO2/l	1.49	2.76	4.72	5.01	2.60	1.30
Boron	mg/l	0.00	0.00	0.00	0.00	0.00	0.00

Source : DSI II

Table - L.9 Existing Water Quality Data in Beydağ Dam Site

Item	Unit	Sampling Month						
		Feb.1994	Apr.1994	Dec.1994	Feb.1995	Apr.1995	June.1995	Average
pH	-	8.5	8.2	7.0	7.1	7.9	7.8	7.8
EC	mS/cm	0.25	0.24	0.26	0.19	0.18	0.49	0.27
Suspended solids	mg/l	1	1	2	1	12	18	6
Cation								
Na+	mg/l	13.57	17.02	37.72	11.27	21.39	30.13	21.85
K+	mg/l	0.39	0.39	0.78	0.39	0.39	0.78	0.52
Ca++	mg/l	35.40	32.60	80.00	20.00	32.80	55.00	42.63
Mg++	mg/l	4.00	7.00	2.67	6.80	3.40	23.90	7.96
Total	mg/l	53.36	57.01	121.17	38.46	57.98	109.81	72.97
SAR	-	0.82	1.00	1.60	0.79	1.34	1.21	1.12
Anion								
CO3- -	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HCO3-	mg/l	68.50	90.50	157.50	36.00	76.00	187.00	102.58
Cl-	mg/l	21.60	32.20	18.40	31.90	11.30	29.00	24.07
SO4- -	mg/l	34.80	11.90	40.60	21.30	49.00	71.80	38.23
Total	mg/l	124.90	134.60	216.50	89.20	136.30	287.80	164.88
BOD	mg/l	2.40	2.80	2.20	5.03	3.77	3.47	3.28
COD	mg/l	-	0.00	5.60	4.00	-	-	3
Permanganate Value	mgO2/l	0.82	2.46	4.56	0.00	1.54	0.44	
Total dissolved matter	mg/l	136	45	265	-	200	434	216
Nitrogen as ammonia	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nitrogen as nitrite	mg/l	0.14	0.00	0.00	0.70	0.03	0.17	0.17
Nitrogen as nitrate	mg/l	1.01	0.00	0.00	0.29	0.64	4.98	1.15
Phosphorous as phosphate	mg/l	0.05	0.04	0.06	0.06	0.11	0.00	0.05
Dissolved oxygen	mg/l	10.50	7.90	10.30	9.61	6.66	8.79	8.96
Boron	mg/l	0.00	0.00	0.00	0.87	0.00	2.07	0.49

Source : DSI II Laboratory

Table - L.10 Existing Water Quality Data in Selçuk

Item	Unit	Sampling Month							
		Jan.1992	Apr.1994	Jan.1992	Apr.1994	Feb.1994	Apr.1994	May.1994	Average
pH	-	9.2	8.3	7.5	8.0	7.3	8.2	7.7	8.0
EC	mS/cm	0.58	0.47	1.08	0.31	0.79	0.43	0.76	0.63
Cation									
Na+	mg/l	51.52	45.31	127.88	29.21	92.69	31.05	94.76	67.49
K+	mg/l	1.56	1.56	3.90	0.78	3.12	0.78	3.12	2.12
Ca++	mg/l	24.40	26.60	62.40	26.00	41.00	52.60	58.40	41.63
Mg++	mg/l	19.90	17.00	18.70	10.50	21.50	8.80	6.60	14.71
Total	mg/l	97.38	90.47	212.88	66.49	158.31	93.23	162.88	125.95
SAR	-	2.65	2.39	5.16	1.73	4.13	1.48	4.43	3.14
Anion									
CO3- -	mg/l	52.00	20.00	0.00	0.00	0.00	0.00	0.00	10.29
HCO3-	mg/l	64.00	105.00	321.50	117.50	244.00	139.00	239.50	175.79
Cl-	mg/l	76.90	47.50	104.50	16.60	60.90	50.60	63.40	60.06
SO4- -	mg/l	31.20	43.40	45.20	30.90	64.10	25.40	57.20	42.49
Total	mg/l	224.10	215.90	471.20	165.00	369.00	215.00	360.10	288.61
BOD	mg/l	3.00	-	15.60	1.00	20.70	13.40	7.70	10.23
Total dissolved matter	mg/l	298	200	300	300	500	105	123	261
Nitrogen as ammonia	mg/l	0.18	0.00	0.12	0.00	0.03	0.00	0.00	0.05
Nitrogen as nitrite	mg/l	0.04	0.00	0.04	0.05	0.00	0.00	0.00	0.02
Nitrogen as nitrate	mg/l	1.58	0.00	0.00	2.05	0.62	2.58	0.90	1.10
Phosphorous as phosphate	mg/l	0.06	0.00	0.12	0.10	0.11	0.17	0.26	0.12
Dissolved oxygen	mg/l	5.30	-	3.00	6.70	6.30	3.08	1.09	4.25
Boron	mg/l	0.00	0.00	2.07	0.34	0.59	0.00	0.00	0.43

Source : DSI II Laboratory

Table - L.11 Water Quality on the Observation Wells at Construction Time

	Well No.	District	Village	Date of Sampling	pH	EC (μS/cm)	Cations (me/l) Na^{+}	K^{+}	Ca^{++}	Mg^{++}	Anions (me/l) CO_3^{--}	HCO_3^{-}	Cl^{-}	SO_4^{--}	Total (me/l)	Sodium %	SAR	Category of Water	R.S.C.	Hardness F.S.	Nitrogen	Ammonium	Organic mg/l
1	15(22)	KIRAZ	Hasyikoy	11/1958	7,5	480	1,30	0,25	4,70		0,00	3,90	0,50	1,00	5,4	21,00	0,8	C2S1	-	21,0	-	-	-
2	10065/A	"	Yaglar	4/1968	7,3	392	0,40	0,06	1,20	0,80	0,00	1,68	0,40	0,45	2,5	16,86	0,6	C1S1	-	10,0	0	0	1,00
	46234	ODEMIS	Kaymakci	5/1993	6,7	692	0,45	0,01	3,50	3,00	0,00	3,84	1,63	1,49	6,96	6,40	0,2	C2S1	-	32,5	0,24	0	0,98
3	27460	"	"	7/1990	7,6	681	1,78	0,07	3,00	2,40	0,00	1,50	1,50	4,25	7,25	24,40	1,1	C2S1	rather hard	27,0	0	0	0,80
4	(18643)-35611	"	K.Avulcak	3/1987	7,3	259	0,61	0,07	1,21	0,86	0,00	2,07	0,37	0,26	2,70	22,60	0,6	C2S1	soft	10,4	0	0	0,88
	43351	"	B.Avulcak	7/1992	7,4	282	0,19	0,01	2,29	0,57	0,00	2,47	0,34	0,24	3,1	6,20	0,1	C2S1	-	14,2	0	0	0,84
	30323	"	"	3/1976	7,3	308	0,60	0,17	2,30		0,00	1,85	0,20	1,02	3,07	19,50	0,3	C2S1	-	11,5	0	0	0,48
5	(20923)-47352	"	"	6/1992	7,7	320	0,64	0,07	1,40	1,24	0,00	2,38	0,51	0,41	3,3	19,40	0,6	C2S1	-	13,2	0	0	0,72
	43353	"	"	7/1992	7,2	304	0,28	0,01	2,08	0,77	0,00	2,04	0,71	0,39	3,1	8,90	0,2	C2S1	-	14,3	0	0	0,40
6	27327	"	Yolustu	9/1980	7,6	576	0,86	0,04	2,50	2,60	0,00	3,65	0,80	1,55	6,00	14,30	0,5	C2S1	rather hard	25,5	0	0	0,00
	44184	"	"	1/1993	6,9	492	0,55	0,02	2,56	1,95	0,00	3,29	0,66	1,13	5,1	10,80	0,4	C2S1	-	22,3	0	0	0,48
7	25526	"	"	5/1979	7,1	593	1,00	0,10	2,10	2,60	0,00	4,30	1,20	0,20	5,80	17,20	0,7	C2S1	rather hard	23,5	0	0	1,20
	13426/A	"	Adagide	9/1969	7,0	614	2,34		3,80		0,00	4,60	1,12	0,42	6,1	-	-	C2S1	-	19,0	-	-	-
8	13426/B	"	"	10/1969	7,0	587	2,07		3,80		0,00	3,40	1,40	1,07	5,9	-	-	C2S1	-	19,0	-	-	-
9	25327	"	Yeniceköy	5/1979	6,9	586	1,22	0,10	1,60	3,00	0,00	4,20	1,80	0,12	6,22	24,40	1,0	C2S1	rather hard	23,0	-	-	1,04
	10571	"	Demirelli	6/1968	7,0	432	0,92		3,60		0,00	3,20	0,84	0,48	4,5	-	-	C2S1	-	18,0	-	-	-
10	(20971)-39073	"	"	5/1989	7,2	335	0,63	0,02	2,44	2,40	0,00	4,62	0,68	0,19	5,49	11,50	0,4	C2S1	-	24,2	0	0	1,68
	44189	"	Yenikoy	4/1993	7,5	482	0,18	0,01	3,52	1,16	0,00	2,70	1,72	0,43	4,85	3,70	0,1	C2S1	-	23,3	0	0	3,24
11	21930	"	"	4/1978	7,0	428	0,66	0,03	3,40	-	0,00	3,20	0,50	0,39	4,09	16,10	0,5	C2S1	middle soft	17,0	0	existing	-
12	10(12)	"	"	5/1959	7,8	375	1,20	0,25	2,90		0,00	2,00	0,60	0,50	4,2	29,00	1,1	C2S1	-	15,0	-	-	-
13	10066	TIRE	Kabrat	4/1968	7,2	216	0,30	0,08	1,00	1,90	0,00	1,95	0,34	0,68	3,2	9,15	0,4	C2S1	-	11,0	0	0	0,70
14	30296	"	Gokcen	4/1973	7,2	280	0,30	0,06	1,55	0,89	0,00	1,92	0,39	0,49	2,80	10,70	0,3	C1S1	-	10,0	0	0	0,30
15	14335	"	"	12/1982	7,2	291	0,90	0,02	2,00	0,40	0,00	2,15	0,90	0,27	3,32	27,10	0,9	C2S1	soft	12,0	0	0	2,60
16	30301	"	"	12/1982	7,9	439	0,82	0,03	2,80	1,40	0,00	4,00	0,80	0,25	5,05	16,20	0,6	C2S1	rather hard	21,0	0	0	0,64
	7266	"	Oveli	2/1966	7,2	578	0,65	-	5,20		0,00	3,25	0,87	1,73	5,85	11,11	0,4	C2S1	-	-	0	0	0,88
17	29453	BAYINDIR	Zeytinova	7/1990	7,3	391	0,39	0,06	3,80	1,55	0,00	3,55	0,86	1,59	6,00	9,80	0,3	C2S1	-	26,7	0	0	1,60
18	30303	"	Yakacik	5/1983	7,3	310	0,66	0,02	1,90	0,70	0,00	2,20	0,60	0,48	3,28	20,10	0,6	C2S1	soft	13,0	0	0	2,80
19	27362	"	Yesilin	9/1980	7,4	422	0,90	0,08	2,00	1,40	0,00	3,05	0,90	0,43	4,38	20,50	0,7	C2S1	middle soft	17,0	0	0	3,40
20	28425	"	Tursa	4/1983	7,4	380	0,82	0,04	2,00	1,10	0,00	3,15	0,60	0,21	3,96	20,70	0,7	C2S1	middle soft	15,5	0	0	2,24
21	30663	"	Pirinli	3/1984	-	479	1,36	0,04	2,80	0,60	0,00	3,35	1,00	0,45	4,80	28,30	1,0	C2S1	middle soft	28,0	0	0	0,24
22	30665	"	"	2/1984	7,7	358	3,08	0,03	2,20	0,30	0,00	4,00	0,40	1,21	5,61	51,90	2,8	C2S1	middle soft	12,5	0	0	0,96
23	39794	"	Elifli	1/1990	6,8	754	1,74	0,05	3,48	2,42	0,00	6,02	1,53	0,14	7,69	22,60	1,0	C2S1	-	29,5	0	0	0,40
	39398	"	"	2/1990	7,6	600	0,32	0,01	2,50	3,21	0,00	4,14	0,86	1,04	6,0	5,29	0,2	C2S1	-	28,6	0	0	0,16
24	7262(3)	"	Ciplakkoy	2/1966	7,0	288	0,70	0,10	2,40		0,00	2,30	0,40	-	3,2	21,00	0,6	C2S1	-	-	-	-	-
25	21917	"	Yakapinar	2/1978	7,2	329	0,52	0,03	2,50	0,90	0,00	2,55	0,90	0,50	3,95	13,20	0,4	C2S1	middle soft	17,0	0	0	0,68
	44186	"	"	3/1993	7,6	449	0,48	0,01	2,56	1,49	0,00	2,60	0,65	1,29	4,54	10,50	0,3	C2S1	-	20,2	0,003	0	0,80
26	19145	"	Kizilcaova	4/1975	6,8	378	1,14	0,06	3,20	1,40	0,00	3,40	1,00	1,40	5,80	19,70	0,8	C2S1	-	23,0	0	0	0,40
27	24962	"	Ciftcigedigi	9/1978	7,6	978	1,20	0,01	6,00	-	0,00	4,45	1,20	1,56	7,21	16,60	0,7	C3S1	rather hard	30,0	-	-	-
	14493	"	Arikbasi	8/1970	7,1	390	0,95	0,05	2,95	1,85	0,00	4,02	0,60	1,33	5,80	16,30	0,6	C2S1	-	-	0	0	0,40
28	(14492)-47333	"	"	3/1992	7,3	531	0,89	0,01	2,95	1,55	0,00	4,15	0,91	0,34	5,40	16,40	0,6	C2S1	-	22,5	0,001	0,01	0,80
29	24679	"	Cirpi	8/1978	7,5	593	1,82	0,03	2,20	2,30	0,00	4,45	1,30	0,60	6,35	28,60	1,2	C2S1	rather hard	25,0	0	0	0,80
30	24868	"	Haskoy	5/1978	-	272	0,76	0,03	2,20	-	0,00	1,25	0,70	1,00	2,99	25,40	0,7	C2S1	soft	11,0	0	0	1,00
31	24877	TIRE	Yeniciftlik	7/1978	7,6	421	1,19	0,03	2,00	0,90	0,00	2,75	0,60	0,76	4,11	2,87	1,0	C2S1	-	-	0	0	1,12
	40932	"	"	4/1990	7,1	305	0,94	0,01	1,10	1,05	0,00	2,22	0,53	0,35	3,10	30,30	0,9	C2S1	-	10,7	0	0	0,07
32	26802	TORBALI	Atalan	6/1979	7,5	366	1,04	0,05	1,10	1,60	0,00	2,90	0,80	0,09	3,70	27,40	0,9	C2S1	soft	13,5	0	existing	0,88
33	26907	"	Aslanlar	10/1979	-	864	3,72	0,19	2,10	2,50	0,00	6,55	1,60	0,36	8,51	43,70	2,4	C3S1	rather hard	23,0	0	0	0,48
34	33270	"	Sehitler	6/1987	7,8	484	0,53	0,01	2,98	1,46	0,00	4,17	0,70	0,10	4,98	10,60	0,4	C2S1	rather hard	22,2	0	0	0,72
35	30307	"	Pamukyazi	9/1983	7,9	482	1,04	0,03	1,90	1,90	0,00	4,20	0,50	0,17	4,87	21,40	0,8	C2S1	-	19,0	0	0	1,60
	28556	"	DSI Kavakligi	6/1981	7,8	701	2,58	0,09	2,20	2,20	0,00	5,55	0,90	0,82	7,17	36,00	1,7	C2S1	rather hard	22,5	-	-	0,48
36	(22231)-46051	"	Caybasi	7/1997	7,2	625	0,81	0,02	3,15	2,27	0,00	5,38	0,46	0,54	6,4	12,70	0,5	C2S1	-	27,1	0	0	0,60
37	10068/A	"	Yenikoy	3/1968	7,1	540	0,70	0,05	3,50	2,40	0,00	5,43	0,88	0,28	6,60	10,53	0,6	C2S1	-	26,0	0	0	2,80
38	10063	"	Mapdra	3/1968	7,2	432	0,70	0,04	1,90	3,20	0,00	4,90	0,80	0,20	5,8	12,00	0,6	C2S1	-	26,0	-	-	-
39	27414	"	Merkez I	5/1980	7,5	1065	1,84	0,13	5,00	3,30	0,00	9,15	0,90	0,12	10,17	18,10	0,9	C3S1	very hard	41,0	0	0	3,44
40	29963	"	Merkez II	6/1982	7,4	600	0,88	0,04	3,00	2,60	0,00	5,00	0,80	0,72	6,52	13,50	0,5	C2S1	-	-	existing	0	3,36
41	31482	"	Pancar	6/1984	7,5	604	2,00	0,03	2,50	1,60	0,00	4,15	1,90	0,08	6,13	32,60	1,4	C2S1	-	20,5	0	0	3,60
42	39495	"	"	10/1991	7,1	1073	3,64	0,06	4,60	2,60	0,00	5,26	4,24	1,40	10,90	33,40	1,9	C3S1	-	36,0	0	0	0,40
43	18495	SELCUK	Merkez II	8/1973	7,5	948	1,70	0,09	7,00	-	0,00	3,60	2,90	0,59	8,79	19,30	0,9	C3S1	-	-	-	-	-
44	21381	"	"	10/1976	7,4	1958	10,00	0,28	9,00	-	0,00	5,45	13,10	2,73	19,28	51,80	4,7	C3S2	very hard	45,0	-	-	-

Table - L.12 Result of New Survey for Water Quality on the Observation Wells

Sample No.	Location	Date of Sampling	pH	EC (mmho/cm)	Cations (meq/l) Na+	K+	Ca++	Mg++	Anions (meq/l) CO3- -	HCO3-	Cl-	SO4- -	Total (meq/l)	Sodium %	SAR	Category of Water	Boron (ppm)
1	Kiraz Bel. i. a. k.	15/6/1995	7.2	626	1.93	0.04	4.54		0.00	4.04	2.16	0.31	6.51	29.65	1.28	C2S1	0.53
2	Haliller Koyu . i. a. k.	15/6/1995	7.3	526	1.67	0.03	3.67		0.00	3.81	0.88	0.68	5.37	31.10	1.23	C2S1	0.20
3	Cerifler Koyu . i. a. k.	15/6/1995	7.3	461	0.62	0.01	4.16		0.00	3.65	0.60	0.54	4.79	12.94	0.43	C2S1	0.32
4	Karaburn Koyu . i. a. k.	15/6/1995	7.3	582	2.38	0.05	4.62		0.00	4.30	1.28	1.47	7.05	33.76	1.57	C2S1	0.04
5		15/6/1995	7.3	452	0.84	0.02	3.84		0.00	3.96	0.50	0.24	4.70	17.87	0.61	C2S1	0.00
6	Yenisehir K. i. a. k.	15/6/1995	7.3	623	1.44	0.03	5.00		0.00	4.91	1.00	0.56	6.47	22.20	0.91	C2S1	0.06
7	Beydag i. a. k.	15/6/1995	7.5	742	1.96	0.04	5.71		0.00	4.56	1.26	1.89	7.71	25.42	1.16	C2S1	0.00
8	Sarikaya KH	15/6/1995	7.4	735	1.83	0.04	5.77		0.00	4.85	1.02	1.77	7.64	23.95	1.08	C2S1	0.16
9	Kaymakci Koop	15/6/1995	7.2	740	2.70	0.05	4.94		0.00	4.72	1.66	1.31	7.69	35.11	1.72	C2S1	0.56
10	Kurucova	15/6/1995	7.6	613	2.38	0.05	3.94		0.00	4.92	0.85	0.60	6.37	37.36	1.70	C2S1	0.00
11	Yolusu 39107	15/6/1995	7.4	519	2.09	0.04	3.26		0.00	4.20	0.92	0.27	5.39	38.78	1.64	C2S1	0.29
12	K. Avlicak 32514-32517	15/6/1995	7.7	425	1.31	0.03	3.08		0.00	3.21	0.94	0.27	4.42	29.64	1.06	C2S1	0.72
13	Odemis iB	15/6/1995	7.6	410	0.70	0.01	3.55		0.00	2.86	0.78	0.62	4.26	16.43	0.53	C2S1	0.69
14	Mehmet Badakci	15/6/1995	7.5	508	0.76	0.02	5.43		0.00	4.92	0.96	0.33	6.21	12.24	0.46	C2S1	0.00
15	Demircili 39073	15/6/1995	7.5	529	0.64	0.01	4.85		0.00	4.41	0.78	0.31	5.50	11.64	0.41	C2S1	0.00
16	Yenikoy 21923	15/6/1995	7.9	456	1.31	0.03	3.40		0.00	3.65	0.86	0.23	4.74	27.64	1.01	C2S1	0.00
17	Karakova Kahvesi	15/6/1995	7.6	607	1.94	0.04	4.33		0.00	4.74	1.18	0.39	6.31	30.74	1.32	C2S1	0.18
18	Kahrat 30304	15/6/1995	7.6	297	0.25	0.01	2.82		0.00	2.28	0.30	0.50	3.08	8.12	0.21	C2S1	0.23
19	Emirli KH. i a k.	15/6/1995	7.2	504	0.96	0.02	4.26		0.00	3.66	1.06	0.32	5.24	18.32	0.66	C2S1	0.18
20	Mescitli KH. i a k.	15/6/1995	7.4	281	0.39	0.01	2.52		0.00	2.12	0.62	0.18	2.92	13.36	0.35	C2S1	0.19
21	Bademli DSI/B	15/6/1995	7.1	774	0.69	0.01	7.34		0.00	6.30	1.34	0.40	8.04	8.04	8.58	C3S1	0.86
22	Adagide iB	15/6/1995	7.3	501	1.71	0.03	3.52		0.00	4.15	0.80	0.31	5.26	32.51	1.29	C2S1	0.10
23	Kreakli JIAC	15/6/1995	7.1	715	1.93	0.04	5.46		0.00	5.54	1.50	0.39	7.43	25.98	1.17	C2S1	0.35
24	Kizilcaudu KH	15/6/1995	7.1	572	1.86	0.04	4.04		0.00	4.22	1.26	0.46	5.94	31.31	1.31	C2S1	0.11
25	Kizilcaudu KH	15/6/1995	7.4	365	0.62	0.01	3.16		0.00	3.00	0.54	0.25	3.79	16.36	0.49	C2S1	0.05
26	Gokcen Koop 30301	15/6/1995	7.4	417	0.52	0.01	3.80		0.00	3.42	0.70	0.21	4.33	12.01	0.38	C2S1	0.22
27	Ciniyeri KH	15/6/1995	7.2	740	1.70	0.03	5.96		0.00	4.12	2.84	0.73	7.69	22.11	0.99	C2S1	0.25
28	Tire iB	15/6/1995	7.4	541	1.15	0.02	4.51		0.00	3.51	0.64	1.53	5.68	20.25	0.77	C2S1	0.48
29	Tire iB	15/6/1995	7.2	310	0.42	0.01	2.82		0.00	2.73	0.27	0.25	3.25	12.92	0.35	C2S1	0.20
30	Tire iB	15/6/1995	7.3	798	2.28	0.05	5.91		0.00	4.83	1.14	2.27	8.24	27.67	1.33	C3S1	0.20
31	Kayakom iB	15/6/1995	7.5	439	0.99	0.02	3.55		0.00	3.52	0.76	0.28	4.56	21.71	0.74	C2S1	0.42
32	Dorebasi KH	15/6/1995	7.4	592	1.43	0.03	4.07		0.00	3.91	1.30	0.32	5.53	25.86	1.00	C2S1	0.61
33	Zeytinova 39083	15/6/1995	7.2	553	1.67	0.03	3.94		0.00	4.25	1.18	0.21	5.64	29.61	1.19	C2S1	0.22
34	Yusuflu 27361 (27362)	15/6/1995	7.4	524	1.04	0.02	3.38		0.00	4.28	0.86	0.30	5.44	19.12	0.70	C2S1	0.20
35	Yanik Kavak Kuk	15/6/1995	7.5	427	1.15	0.02	3.27		0.00	3.00	1.16	0.28	4.44	25.90	0.90	C2S1	0.10
36	Baymdiri iB	15/6/1995	7.5	511	1.74	0.04	3.53		0.00	4.27	0.74	0.30	5.31	32.77	1.31	C2S1	0.48
37	Tokatbasi KH	15/6/1995	7.5	430	1.37	0.03	3.98		0.00	3.30	0.90	0.18	4.38	31.28	1.12	C2S1	0.47
38	Elifli (1) 39398	15/6/1995	7.3	612	1.54	0.03	4.73		0.00	4.41	1.60	0.29	6.30	24.44	1.00	C2S1	0.48
39	Arikbasi 14492	15/6/1995	7.3	556	1.06	0.02	4.70		0.00	4.12	1.38	0.28	5.78	18.34	0.69	C2S1	0.35
40	Haskoy	15/6/1995	7.4	300	0.25	0.01	2.86		0.00	1.80	1.12	0.20	3.12	8.01	0.21	C2S1	0.11
41	Havuzbasi KH	15/6/1995	7.3	561	1.71	0.03	4.09		0.00	4.51	1.00	0.32	5.83	29.33	1.20	C2S1	0.33
42	Asfanlar 45748	15/6/1995	7.1	752	2.76	0.06	5.00		0.00	6.62	0.80	0.40	7.82	35.29	1.75	C3S1	0.64
43	Schifer	15/6/1995	7.3	577	0.93	0.02	5.05		0.00	4.96	0.70	0.34	6.00	15.50	0.59	C2S1	0.67
44	Gozinsen	15/6/1995	7.5	498	0.55	0.01	4.61		0.00	4.00	0.90	0.27	5.17	10.64	0.36	C2S1	0.25
45	Kusculum KH	15/6/1995	6.9	790	2.81	0.06	5.34		0.00	6.81	1.02	0.38	8.21	34.23	1.72	C3S1	0.66
46	Torbali 1 27414	15/6/1995	7.0	786	3.52	0.07	4.58		0.00	6.84	0.90	0.43	8.17	43.08	2.33	C3S1	0.55
47	Ege Maden	15/6/1995	7.6	480	1.26	0.03	3.70		0.00	3.80	0.89	0.30	4.99	25.25	0.93	C2S1	0.29
48	Kavaklil (Caybasi)	15/6/1995	7.1	759	1.69	0.03	6.17		0.00	6.44	1.05	0.40	7.89	21.42	0.96	C3S1	0.16
49	Pamukyazi (30307)	15/6/1995	7.3	538	0.99	0.02	4.58		0.00	4.50	0.78	0.31	5.59	17.71	0.65	C2S1	0.74
50	Atalan	15/6/1995	7.4	364	0.39	0.01	3.38		0.00	2.80	0.78	0.20	3.78	10.32	0.30	C2S1	0.70
51	Mustafa Yilmazsu (Ciftlik)	15/6/1995	7.6	509	2.09	0.04	3.16		0.00	4.31	0.69	0.80	5.29	39.51	1.66	C2S1	0.32
52	Karateke KH	15/6/1995	7.3	900	4.35	0.09	4.92		0.00	6.95	2.60	0.41	9.36	46.47	2.77	C3S1	0.52
53	Cayirli Cavus Ca. Ku	15/6/1995	7.2	586	1.94	0.04	4.11		0.00	4.64	0.74	0.91	6.09	31.86	1.35	C2S1	0.89
54	Akyurt	15/6/1995	7.3	571	1.79	0.04	4.10		0.00	5.00	0.62	0.31	5.93	30.19	1.25	C2S1	0.13
55	Kirsak Koy Ku	15/6/1995	7.3	548	1.12	0.02	4.55		0.00	4.66	0.78	0.25	5.69	19.68	0.74	C2S1	0.67
56	Mehmet Celik	15/6/1995	7.3	820	2.47	0.05	6.00		0.00	6.45	1.54	0.43	8.52	28.99	1.43	C3S1	0.68
57	Belevi KH (1981)	15/6/1995	7.1	1061	2.55	0.05	8.43		0.00	8.32	2.22	0.49	11.03	23.12	1.24	C3S1	0.87
58	Tuluntkoy KH	15/6/1995	7.4	549	1.92	0.04	3.74		0.00	4.17	0.94	0.59	5.70	33.68	1.40	C2S1	0.16
59	Torbali Yenikoy	15/6/1995	7.5	573	0.29	0.01	5.65		0.00	4.46	1.02	0.47	5.95	4.87	0.17	C2S1	0.47
60	Urfali Cf	15/6/1995	7.4	792	2.27	0.05	5.91		0.00	5.41	2.40	0.42	8.23	27.58	1.32	C3S1	0.18
61		15/6/1995	7.5	900	3.18	0.06	6.12		0.00	7.00	1.95	0.41	9.36	33.97	1.82	C3S1	0.44
62		15/6/1995	7.4	1054	3.84	0.08	7.04		0.00	6.22	4.22	0.52	10.96	35.04	2.05	C3S1	0.52
63		15/6/1995	7.3	2530	26.12	0.53	9.66		0.00	6.68	17.04	12.59	36.31	71.94	11.89	C4S3	0.64
64		15/6/1995	7.4	1618	7.49	0.15	9.18		0.00	6.90	8.16	1.76	16.82	44.53	3.50	C3S1	0.56
65		15/6/1995	7.5	863	2.58	0.06	6.03		0.00	5.55	2.94	0.48	8.97	32.11	1.66	C3S1	0.17
66		15/6/1995	7.5	1344	8.24	0.17	5.56		0.00	5.81	7.56	0.60	13.97	58.98	4.94	C3S1	0.21
67	Ahmetbani sahil Sevan Market	15/6/1995	7.3	1880	9.81	0.20	9.54		0.00	9.25	9.43	0.87	19.55	50.18	4.49	C3S2	0.72
68	Cile (Durgun Market)	15/6/1995	7.6	641	2.29	0.05	4.32		0.00	4.62	1.58	0.46	6.66	34.38	1.56	C2S1	0.49
69	Camomu	15/6/1995	7.5	691	0.87	0.02	6.29		0.00	5.40	0.90	0.88	7.18	12.12	0.49	C2S1	0.29
70	Palamutarasi	15/6/1995	7.6	578	0.76	0.02	5.17		0.00	5.02	0.62	0.24	5.95	12.77	0.47	C2S1	0.16
71	Karaksyu	15/6/1995	7.6	513	0.81	0.02	4.50		0.00	4.23	0.80	0.30	5.33	15.20	0.54	C2S1	0.66
72	Pancar Koy	15/6/1995	7.3	738	1.86	0.04	5.77		0.00	6.18	1.14	0.35	7.67	24.25	1.10	C2S1	0.43
73	Yeni Bal Ourca DSI	15/6/1995	7.4	645	1.00	0.02	5.68		0.00	5.60	0.82	0.28	6.70	14.93	0.59	C2S1	0.40
74	Oglananahi Ordizi	15/6/1995	7.4	736	2.14	0.04	5.47		0.00	5.44	1.30	0.91	7.65	27.97	1.29	C2S1	0.49

Source : DSI-II

Table - L.13 List of the Factories in the Basin Area

	Kiraz	Beydağ	Ödemiş	Bayındır	Tire	Torbalı	Selçuk
1. Textile & Wearing apparel	-	-	6	2	3	3	2
2. Food & Beverages	1	-	3	1	2	11	1
3. Olive Oil	-	-	1	2	2	3	
4. Machine & Parts	-	-	6	1	-	7	1
5. Construction Material	-	-	1	-	-	6	-
6. Paper	-	-	-	-	1	-	-
7. Leather	-	-	-	-	-	3	-
8. Chemical Products	-	-	-	-	1	1	-
9. Wood & Wood Products	-	1	3	-	1	-	-
10. Other & Unknown	1	1	6	2	8	14	2
Total	2	2	26	8	18	48	6

Source : EBSO

Table - L.14 Location of Factories

	Kiraz	Beydağ	Ödemiş	Bayındır	Tire	Torbalı	Selçuk
Rural Area	2	2	17	7	16	21	5
Urban Area	0	0	9	1	2	27	1
Total	2	2	26	8	18	48	6

Source : EBSO

Table - L.15 List of Afforestation Project by MOF

Project	Afforestation Area (ha)	Project implementation From	To
1. Kavakalan	715	1959	1962
2. Davutdağ	1,963	1959	1977
3. Gölcük	1,215	1960	1970
4. Kabakizlar	1,680	1961	1969
5. Ovacık	158	1963	1965
6. Asarlık	276	1963	1969
7. Akyurt	359	1963	1964
8. Keçiköy	125	1964	1964
9. Asarlık Keçiköy	700	1964	1964
10. Dağkızılca	1,519	1973	1985
11. Ödemiş	1,940	1981	(1997)
12. Pranga	1,534	1979	(1996)
13. Tire	467	1984	1986
14. Kiraz+Beydağ	1,739	1988	(2000)
Total	14,390		

Source : MOF

Table - L.16 List of Endemic Species of Plants in Izmir Province (1/2)

Academic Name	Distribution	Academic Name	Distribution
1. A. consimilrs	Mountain area	35. Cirsium sipyleum	Mountain area
2. A. dipsacea	Mountain area	36. Circium tmoleum	Spred out in the Izmir Province
3. A. lydius	Mountain area	37. Colutea melanocalyx ssp. dovisrana	Mountain area
4. A. masmenaeum	Mountain area	38. Crocus fleischeri	Mountain area
5. A. oxycarpum	Mountain area	39. Crocus pestalozzae	Mountain area
6. A. propontrcum var. proponticum	Mountain area	40. Crucianella disticha	Mountain area
7. A. reuterianum	Mountain area	41. D. leucophaeus var. leucophaeus	Mountain area
8. A. stylosum	Mountain area	42. D.zonatus var. zonatus	Mountain area
9. A. tmoleus var. tmoleus	Mountain area	43. Dianthus anatolicus	Mountain area
10. A. wiedemanniana	Mountain area	44. Doronicum reticulatum	Mountain area
11. Acum balansanum	Mountain area	45. E. anacampseros var. tmolea	Mountain area
12. Aethionema demiriir	Mountain area	46. E. erythrodon	Mountain area
13. Allium pictrstamimeum var. humile	Mountain area	47. Echinophora trichophylla	Mountain area
14. Alopocurum davisi	Spred out in the Izmir Province	48. Euphorbia cardiophylla	Mountain area
15. Alyssum lycaonicum	Mountain area	49. F. aucheri	Mountain area
16. Amclanchier paruiflora var. parvifiora	Mountain area	50. F. carica ssp. carica	Mountain area
17. Asperula daphneoia	Spred out in the Izmir Province	51. F. fleischeriana	Mountain area
18. Astragalus papasianus	Spred out in the Izmir Province	52. Ferulago humilis	Mountain area
19. Aurinia rupestris ssp. orientalis	Mountain area	53. Fritillaria bithynice	Mountain area
20. Bromus macrocladus	Mountain area	54. G. brevifolium ssp. brevifolium	Mountain area
21. C. aphrodisea	Mountain area	55. G. penduliflorum	Mountain area
22. C. betonicifolro	Mountain area	56. G.campanelliferum	Mountain area
23. C. calolepis	Mountain area	57. Galium tmolium	Spred out in the Izmir Province
24. C. lydia	Mountain area	58. Geropogon hybridus	Mountain area
25. C. lyrata ssp. lyrata	Mountain area	59. Gladiolus anatolicus	Mountain area
26. C. ravayi	Mountain area	60. Gypsophila tubulasa	Mountain area
27. C. sardensis	Mountain area	61. H. tmoleum	Mountain area
28. C. teucrioides	Spred out in the Izmir Province	62. Haplophyllum negalanthum	Mountain area
29. C. zeybekii	Spred out in the Izmir Province	63. Hcsperis buschiana	Mountain area
30. Campanula tomentosa	Mountain area	64. Heldraichia atalayi	Mountain area
31. Centaurea coriensrs ssp. maculiceps	Mountain area	65. Heracleum platytaenium	Mountain area
32. Centaurea amasiensrs	Mountain area	66. Hieracium leucothecum	Mountain area
33. Chionodoxa forbasii	Mountain area	67. Hycanthella lineata	Mountain area
34. Chronanthus orientalis	Mountain area	68. Hypericum avicularifolium ssp. avicul	Mountain area

Source : MOE

Table - L.16 List of Endemic Species of Plants in Izmir Province (2/2)

Academic Name	Distribution	Academic Name	Distribution
69. Jasione supina ssp. tmolea	Mountain area	103. Sideritis tmolea	Mountain area
70. Juncus anatolicus	Mountain area	104. Silene splendens	Mountain area
71. Jurinea cadmea	Mountain area	105. Stachys tmolea	Mountain area
72. L. tmoleum	Mountain area	106. Stenbergia schubetii	Mountain area
73. Lamium pisidicum	Mountain area	107. T. conoclinium	Mountain area
74. Linum arefioides	Mountain area	108. T. subacaulis	Mountain area
75. Limonium effusun	Mountain area	109. Tragopogon oligolepis	Mountain area
76. M. anatolica var. anatolica	Mountain area	110. Trigonella rhytidocarpa	Mountain area
77. M. nifensis	Mountain area	111. Tripleurospermum hygrophilum	Mountain area
78. Malope anatolica	Mountain area	112. Uechtritzia armena	Mountain area
79. Marrubium rotundifolium	Mountain area	113. V. cuneifolia ssp. cuneifolia	Mountain area
80. Minuartra saxrfraga ssp. tmolea	Mountain area	114. V. lobatum	Mountain area
81. Muscari aucheri	Mountain area	115. V. lydium var. lydium	Mountain area
82. N.viscido	Mountain area	116. V. maeandri	Mountain area
83. Nepeta cadmea	Mountain area	117. V. napifolium	Mountain area
84. Onosma armenum	Mountain area	118. V. parviflorum	Mountain area
85. Ornithogalum nivale	Mountain area	119. V. pseudorigida	Mountain area
86. P. nissolii	Mountain area	120. V. smyrnaeum	Spred out in the Izmir Province
87. Papaver clavatum ssp. argemone	Mountain area	121. V.lydium var. heteranum	Mountain area
88. Paronychra anatolrca ssp. balansae	Mountain area	122. Velezia hispida	Mountain area
89. Phlomis armeniaca	Mountain area	123. Verbascum phrygium	Mountain area
90. Picris olympica	Mountain area	124. Veronica elmaliensis	Mountain area
91. Pirenaria tmolea	Mountain area	125. Vincetoxicum tmoleum	Spred out in the Izmir Province
92. Prunus cocomilia var. puberula	Spred out in the Izmir Province		
93. Prnthenis xylopoda	Mountain area		
94. Prstragalus papasianus	Mountain area		
95. Prunus kurdica	Mountain area		
96. Rumex tmoleus	Mountain area		
97. S. depauperata	Mountain area		
98. Salvia smyrnaea	Mountain area		
99. Saponaria chlorifolra	Mountain area		
100. Scrophularia cryptophila	Mountain area		
101. Scrophularia scopolii var. smyrnaea	Spred out in the Izmir Province		
102. Senecio castagneanus	Mountain area		

Source : MOE

Table - L.17 List of Fauna in the Küçük Menderes River Basin (1/3)

Academic Name	Turkishname	Rank in IUCN Red Data Book
Mammals		
1. Erinaceus concolor transcaucasicus	Kirpi	
2. Crocidura suaveolens dinniki	Sivriburunlu Bahcefaresi	
3. Crocidura russula gueldenstaedti	Sivriburunlu Evfaresi	
4. Crocidura leucodon	Sivriburunlu Kufaresi	
5. Crocidura lasia	Buvuk Siyriburun , Buyuk Sivrifare	
6. *Suncus etruscus*	*Etrusk Sivrifaresi*	
7. Rhinolophus f, ferrumequinum	Buyuk Nalburunluyarasa	
8. Rhinolophus h, hipposideros	Kucuk Nalburunluyarasa	
9. *Rhinolophus e, euryale*	*Akdeniz Nalburunluyarasasi*	
10. Rhinolophus mehely		
11. Rhinolophus blasii		
12. *Myotis mystacinus hajastanicus*	*Biyikliyarasa*	
13. Myotis e, emerginatus	Kirpikliyarasa	
14. Myotis myotis macrosefalicus	Buyukfarekulakhyarasa	GLOBALLY VULNERABLE
15. *Myotis blythi omari*	*Kucukfarekulakliyarasa*	
16. Myotis c, capaccinii	Uzunayakliyarasa	GLOBALLY VULNERABLE
17. Pipistrellus p, pipistrellus	Cuceyarasa	
18. *Eptesicus serotinus*	*Geniskanatli Yarasa*	
19. Miniopterus schribersi	Uzunkanatli Yarasa	
20. Lepus capensis	Kirtavsani, Yabanitavsan	
21. Sciurus anomalus syriacus	Anadolu sincabi, Kafkas sincabi	
22. Cricetulus migratorius cinarascens	Cuce Grihamster	
23. Mesocricetus brandti	Avurtlak	
24. Arvicola terrestris	Su Sicani	
25. Microtus guentheri lydius	Kisa Kuyruklu Tarla Faresi	
26. Meriones tristrami blackleri	Ege Col Faresi	
27. Spalax leucodon anatolicus	Kor Fare	
28. Apodemus m, mystacinus	Kaya Faresi	
29. Apodemus sylvaticus tauricus	Adi Tarla Faresi	
30. Rattus rattus	Ev Sicani	
31. Mus musculus	Ev Faresi	
32. Mus macedonicus	Makedonya Ev Faresi	
33. Dryomys nitedula phyrgius	Agac Faresi, Cevizkiran, Karagoz, Fare	
34. Myomimus roachi		
35. Hystrix indica	Oklu Kirpi	
36. Canis lupus	Kurt	DECLINING
37. Canis aureus	Cakal	GLOBALLY AND NATIONALLY VULNERABLE
38. Vulpes vulpes	Tilki	
39. Mustela nivalis	Gelincik	
40. Vormela peregusna	Alacali Kokarca, Benekli kokarca	
41. Meles meles	Porsuk	
42. Lutra lutra	Su Samuru	VULNERABLE
43. Herpestes ichneumon	Firavun Sicam	
44. Hyaena hyaena	Cizgili Sirtlan, Andik	ENDANGERED
45. Felis silvestris	Yaban Kedisi	
46. Felis caracal	Step vasagi, Karakulak	
47. Sus scrofa	Yaban Domuzu	

Source : Middle-East Technical University

Table - L.17 List of Fauna in the Küçük Menderes River Basin (2/3)

Academic Name	Turkishname	Rank in IUCN Red Data Book
Birds (Only threatened and rare species)		
1. Phalacrocorax pygmeus	Kucuk Katabatak	GLOBALLY THREATENED
2. Pelecanus crispus	Tepeli Kutan	ENDANGERED AND GLOBALLY THREATENED
3. Egretta alba	Buyuk Ak Balikcili	RARE
4. Haliaeetus albicilla	Deniz Kartali	ENDANGERED AND GLOBALLY THREATENED
5. Accipiter gentilis	Cakir Kusu	RARE
6. Accipiter brevipes	Yoz Atmiaca	VULNERABLE
7. Aquila pomarina	Kucuk Orman Kartali	RARE
8. Hieraaetus fasciatus	Tavsancil	ENDANGERED
9. Falco naumanni	Kucuk Kerkenez	GLOBALLY THREATENED
10. Tyto alba	Peceli Baykus	RARE
11. Ketupa zeylonensis	Balik Baykusu	ENDANGERED
12. Halcyon smyrnensis	Izmir Yalicapkini	VULNERABLE
13. Ceryle rudis	Alaca Yalicapkrni	RARE
Reptiles		
1. Emys orbicularis	Benekli kaplumbaga	
2. Mauremys caspica rivulata	Cizgili kaplumbaga	
3. Testudo graeca ibera	Tosbaga	
4. Hemidactylus t, turcicus	Genis parmakli keler	
5. Agama stellio daani	Dikenli keler	
6. Chamaeleo ch, chamaeleon	Bukalemun	
7. Ophisaurus apodus thracius	Oluklu kertenkele	
8. Lacerta anatolica aegaea	Anadolu kertenkelesi	
9. Lacerta trilineata cariensis	Iri yesil kertenkele	
10. Ophisops elegans macrodactylus	Tarla kertenkelesi	
11. Ablepharus k, kitaibeli	Ince kertenkele	
12. Mabuya a, aurata	Tiknaz kertenkele	
13. Blanus s, strauchi	Kor kertenkele	
14. Typlops vermicularis	Kor yilan	
15. Eryx jaculus turcicus	Mahmuzlu yilan	
16. Coluber caspius	Hazer yilani	
17. Coluber j, jugularis	Kara yilan	
18. Coluber n, najadum	Ince yilan	
19. Coluber nummifer		
20. Coluber r, rubriceps	Toros yilani	
21. Coronella austiaca	Avusturya yilani	
22. Eirenis m, modestus	Uysal yilan	
23. Elaphe quatuorlineata sauromates	Sari yilan	
24. Elaphe situla	Ev yilani	
25. Natrix natrix persa	Yarisucul yilan	
26. Natrix t, tessellata	Su yilani	
27. Malpolon monspessulana insignita	Cukurbasli yilan	
28. Telescopus f, fallax	Kedigozlu yilan	
29. Vipera ammodytes meridionalis	Boynuzhi engerek	
30. Vipera xanthina	Seritli engerek	
Amphibians		
1. Bufo bufo spinosus	Sigilli kurbaga	
2. Bufo viridis	Gece kurbagasi	
3. Hyla arborea	Agac kurbagasi	
4. Pelobates syriacus	Toprak kurbagasi	
5. Rana m, macrocnemis	Uludag kurbagasi	
6. Rana r, ridibunda	Ova kurbagasi	

Source : Middle-East Technical University

Table - L.17 List of Fauna in the Küçük Menderes River Basin (3/3)

Academic Name	Turkishname	Rank in IUCN Red Data Book
Fish		
1. Acipencer guldenstaedti	Rus Mersin Baligi, Karaca Baligi	ENDANGERED
2. Acipenser stellatus	Mersin baligi	ENDANGERED
3. *Acipencer sturio*	*Kolan baligi*	*GLOBALLY AND NATIONALLY ENDANGERED*
4. Anguilla anguilla	Tatlisu yilan baligi	
5. Salmo trutta macsostigmata	Dag alabaligi	VULNERABLE
6. Esox lucius	Turna baligi	
7. Abramis brama	Capak baligi	
8. Barbus capito pectoralis	Biyikli balik	
9. Barbus plebejus escherichi	Biyikli balik	
10. Capoeta capoeta bergamae	Siraz baligi	
11. Chondrostoma nasus	Karaburun baligi	
12. Cyprinus carpio	Sazan baligi	
13. Gobio gobio	Derekaya baligi	
14. Ladigesocypris ghigii		
15. Leuciscus borysthenicus	Tatlisu kefali	
16. Leuciscus cephalus	Tatlisu kefali	
17. Cobitis *simplicispinna*	Copcu baligi	
18. Noemacheilus angorae	Copcu baligi	
19. Silurus glanis	Yayin baligi	
20. Aphanius fasciatus	Sivrisinek baligi	
21. Gambusia affinis	Sivrisinek baligi	
22. Blennius fluviatilis	Horozbina baligi	

Source : Middle-East Technical University

Table - L.18 Soil Erosion Hazard in the Basin Area

Erosion Hazard Class	Definition	Area (ha)	Proportion (%)
Class I	No risk	102,200	29
Class II	Low risk	40,800	12
Class III	Moderate risk	110,300	32
Class IV	High risk	92,700	26
Built-up Area		5,000	1
Total		351,000	100

Source : JICA study team

Table - L.19 List of Cultural and Historical Assets in the Basin Area

	Kiraz	Beydağ	Ödemiş	Bayındır	Tire	Torbalı	Selçuk
1. Ancient City	1	1	2	-	-	1	1
2. Ancient Village	2	-	2	3	5	2	1
3. Ancient Area	2	-	5	2	5	7	6
4. Ancient Castle	4	1	2	1	6	3	2
5. Protected Area	-	-	-	-	-	-	2
Total	9	2	11	6	16	13	12

Source : General Directorate for Preservation of Cultural and National Heritage

Table - L.20 Protected Area in and around the Basin Area

Name	Purpose	Area (ha)
1. Pamucak	Forest Recreational Area	20
2. Eleman marsh	Protected Area for Birds (Registered)	1,050
	Protected Area for Birds (Plan)	500
3. Gölcük lake	Forest Recreational Area	20
4. Mermeroluk	Forest Recreational Area	10
5. Sanyar	Forest Recreational Area	20

Source : MOF

Table - L.21 List of Mine in the River Basin Area

	Location	Kind of Mine	Condition
1.	Akçaşehir	Coal	Working
2.	Bayındır	Zinc	Not working
3.	Kaymakaç	Titanium	Working
4.	Haliköy	Mercury/Antimony	Working
5.	Ödemiş	Titanium/Gold	Not working
6.	Gökçen	Titanium	Not working
7.	Tire - Karateke	Marble	Working
8.	Boğaziçi	Marble	Working
9.	Bayındır	Titanium	Non working
10.	Çırpı	Marble	Working
11.	Kuşçubunu	Iron	Working
12.	Torbalı	Marble	Working

Source : MTA

Table - L.22 Result of Water Analysis in the Drain from the Mercury Mine at Halıköy

(Unit : mg/l)

	Lead	Zinc	Mercury	Copper	Antimony	pH
Sample	0.107	0.510	0.002	0.104	0.498	5.2
Turkish Standard*	0.500	3.000	0.500	5.000	-	6.0-9.0

Note : * : Wastewater Discharge Standard
Analyzed data by DSİ-II

Table - L.23 Number of People to Be Dislocated from Beydağ Dam Reservoir

		Population (Year 1990)			Population	Dislocated
Village Name	Submerged Condition	Male	Female	Total	(Year 2000)	People
Beydağ District						
Bakirköy	A part of village	221	207	428	459	90
Çiftlikköy	Most of village	185	190	375	402	400
Karaoba	Only agricultural land	302	313	615	659	0
Kurudere	Only agricultural land	381	436	817	876	0
Kiraz District						
Yenişehir	Some of village	287	278	565	606	120
Yağlar	Only agricultural land	336	368	704	755	0
Karaman	Most of village	372	436	808	866	870
Total		2,084	2,228	4,312	4,623	1,480

Estimated by JICA Study Team

Table - L.24 Present Landuse in Beydağ Dam Reservoir

Present Land Use	Area (ha)	Proportion (%)
Agricultural Land		
- Annual Crop	1,010	68
- Tree Crop	230	15
Forest and Public land	250	17
Total	1,490	100

Source : DSİ-II

Table - L.25 Erosion Hazard Risk of Watershed Management Projects

1. Slope Classification

Slope Class(%)	Watershed Management Project Area (ha)					Total (ha)	Proportion (%)
	Sirimli Stream	Sulu Stream	Korga Stream	Uluçay Stream	Keles		
0-12	-	486	300	1,339	-	2,125	12
12-30	-	648	1,050	2,060	-	3,758	22
30-45	-	972	1,200	3,605	-	5,777	35
45<	-	1,134	450	3,296	-	4,880	29
Total	-	3,240	3,000	10,300	-	16,540	100

2. Present Land Use

Present Land Use	Watershed Management Project Area (ha)					Total	Proportion (%)
	Sirimli Stream	Sulu Stream	Korga Stream	Uluçay Stream	Keles		
Forest	1,450	926	895	6,550	7,216	17,037	51
Bush	-	590	925	65	1,734	3,314	9
Grassland	345	189	-	-	1,074	1,608	5
Agri. Land	1,650	1,490	1,150	3,645	2,556	10,491	32
Riverbed	25	25	-	-	153	203	1
Built-up Area	30	20	30	40	267	387	1
Total	3,500	3,240	3,000	10,300	13,000	33,040	100

3. Erosion Hazard Risk

Erosion Risk	Watershed Management Project Area (ha)					Total	Proportion (%)
	Sirimli Stream	Sulu Stream	Korga Stream	Uluçay Stream	Keles		
Low risk	1,440	1,435	821	7,430	5,027	16,150	48
Moderate risk	675	684	1,045	2,581	2,513	7,500	23
High risk	1,180	884	1,079	184	4,499	7,820	24
Others	175	217	25	65	694	1,180	4
Built-up Area	30	20	30	40	267	390	1
Total	3,500	3,240	3,000	10,300	13,000	33,040	100

Source : DSI-II

Table - L.26 List of Watershed Management Project in the Watershed of Beydağ Dam

Waiting for Construction	
1. Name:	Izmir-Kiraz-Halilar Village -Sirimli Stream
Project Area :	3,500
Study Year (Revised)	1986
Project Component:	675 ha Afforestation
	1,180 ha Land Improvement
	33 Check Dams
	3.5 km Service Road
	31 Terrace
Cost at 1995 Price (TL) :	8,254,938,702
Cooperation :	MOF and GDRS
2. Name:	Izmir -Kiraz Suludere Village-Sulu Stream
Project Area :	3,240
Study Year	1987
Project Component:	330 ha Terrace
	873 ha Afforestation
	695 ha Land Improvement
	98 Check Dams
	31 Terrace
	8 km Service Road
Cost at 1995 Price (TL) :	16,814,425,000
Cooperation :	MOF and GDRS
3. Name:	Izmir -Ödemiş-Beydağ Dam - Korga Stream
Project Area :	3,000
Study Year	1986
Precautions: 363 ha terrace	363 ha Afforestation
	870 ha Forest Improvement
	891 ha Land Improvement
	34 Check Dams
	25 Terrace
	2 km Service Road
Cost at 1995 Price (TL) :	6,686,017,123
Cooperation :	MOF and GDRS
On-going Project	
1. Name :	İzmir-Kiraz- Uluçay Tributary
Project Area :	10,300
Study Year :	1979
Project :	2,581 ha Land Improvement
	68 Check Dams
	3.34 km canal
Cost at 1995 Price (TL) :	23,312,423,310
Cooperation :	MOF and GDRS
2. Name:	Side Streams from the Küçük Menderes River (Keles Area)
Project Area :	13,000
Study Year :	1992
Project :	1,306 ha Forest Improvement
	2,2641 ha Afforestation
	1,397 ha Pasture Improvement
	46 Check dams
	3,950m Dike
	1 Sabo Dam
	6,200 m Riverbed Excavation
Cost at 1995 Price (TL) :	229,242,903,740
Cooperation :	MOF

Source : DSI-II

Table - L.27 Ground Water Quality Data in Gediz River Basin (1/3)

Wells ID No.	Date of Analizing	Water Temp. (C)	pH	EC (umhos/cm)	Cations (mek/l) Na+	K+	Ca++	Mg++	Anions (mek/l) CO3- -	HCO3-	Cl-	SO4- -	Total (mek/l)	Sodium %	SAR	Category of Water	Boron (ppm)
1.	18/9/95	-	7.10	470	0.31	0.01	4.50		0.00	4.16	0.44	0.22	4.82	6.43	0.210	C2S1	0.49
2.	18/9/95	-	7.20	688	0.80	0.02	6.33		0.00	5.72	1.04	0.39	7.15	11.19	0.450	C2S1	1.05
3.	18/9/95	-	7.30	510	0.49	0.01	4.80		0.00	4.58	0.48	0.24	5.30	9.25	0.320	C2S1	0.40
4.	18/9/95	-	7.30	700	1.66	0.03	5.66		0.00	5.66	1.22	0.47	7.35	22.59	0.990	C2S1	0.79
5.	18/9/95	-	7.30	574	1.09	0.02	4.91		0.00	5.05	0.62	0.35	6.02	18.11	0.700	C2S1	1.09
6.	18/9/95	-	7.10	760	1.56	0.03	6.39		0.00	6.72	0.82	0.44	7.98	19.55	0.870	C3S1	0.65
7.	18/9/95	-	7.00	1,155	1.76	0.04	10.21		0.00	8.52	1.58	1.91	12.01	14.65	0.780	C3S1	1.30
8.	18/9/95	-	7.20	944	3.96	0.08	5.86		0.00	5.28	1.68	2.94	9.90	40.00	2.310	C3S1	0.20
9.	18/9/95	-	7.50	465	1.28	0.03	3.52		0.00	4.02	0.56	0.25	4.83	26.50	0.970	C2S1	0.25
10.	18/9/95	-	7.00	569	1.62	0.03	4.26		0.00	5.08	0.50	0.33	5.91	27.41	1.110	C2S1	0.75
11.	18/9/95	-	7.00	1,338	5.04	0.10	8.76		0.00	9.50	2.56	1.84	13.90	36.26	2.410	C3S1	1.00
12.	18/9/95	-	7.30	584	1.43	0.03	4.61		0.00	5.12	0.66	0.29	6.07	23.56	0.940	C2S1	0.50
13.	18/9/95	-	7.30	575	0.99	0.02	4.85		0.00	5.03	0.62	0.21	5.86	16.89	0.640	C2S1	0.00
14.	18/9/95	-	7.30	644	1.51	0.03	5.22		0.00	5.32	0.60	0.84	6.76	22.34	0.940	C2S1	0.00
15.	18/9/95	-	7.10	1,083	3.00	0.06	8.20		0.00	7.92	2.08	1.26	11.26	26.64	1.480	C3S1	1.04
16.	18/9/95	-	6.70	1,127	4.83	0.10	7.00		0.00	10.47	0.68	0.78	11.93	40.49	2.580	C3S1	0.00
17.	18/9/95	-	6.90	1,501	7.76	0.16	7.87		0.00	9.07	2.62	4.10	15.79	49.15	3.910	C3S1	0.40
18.	18/9/95	-	7.30	794	3.27	0.07	4.91		0.00	6.70	1.00	0.55	8.25	39.64	2.090	C3S1	0.00
19.	18/9/95	-	7.30	730	2.12	0.04	5.43		0.00	6.31	0.92	0.36	7.59	27.93	1.290	C2S1	0.35
20.	18/9/95	-	7.40	1,168	5.82	0.12	6.42		0.00	10.42	1.10	0.84	12.36	47.09	3.250	C3S1	0.30
21.	18/9/95	-	7.70	1,023	4.29	0.09	6.36		0.00	7.27	0.62	2.85	10.74	39.94	2.410	C3S1	0.37
22.	18/9/95	-	7.40	1,130	3.49	0.07	9.32		0.00	7.94	1.98	2.96	12.88	27.10	1.620	C3S1	0.00
23.	18/9/95	-	7.40	707	1.77	0.04	5.54		0.00	6.08	0.90	0.37	7.35	24.08	1.060	C2S1	0.00
24.	18/9/95	-	7.40	1,009	1.26	0.03	9.30		0.00	9.04	0.96	0.59	10.59	11.90	0.580	C3S1	0.51
25.	18/9/95	-	7.60	444	0.99	0.02	3.65		0.00	3.77	0.62	0.27	4.66	21.24	0.730	C2S1	0.41
26.	18/9/95	-	7.40	801	1.98	0.04	6.23		0.00	6.78	1.12	0.35	8.25	24.00	1.120	C3S1	0.45
27.	18/9/95	-	7.40	525	1.18	0.02	4.20		0.00	4.26	0.90	0.24	5.40	21.85	0.810	C2S1	0.51
28.	18/9/95	-	7.20	953	4.89	0.10	4.82		0.00	6.75	2.44	0.62	9.81	49.85	3.150	C3S1	0.09
29.	18/9/95	-	7.10	889	4.10	0.08	5.15		0.00	5.93	1.70	1.70	9.33	43.94	2.560	C3S1	0.31
30.	18/9/95	-	7.60	668	2.23	0.05	4.66		0.00	5.54	1.08	0.32	6.94	32.13	1.460	C2S1	0.51
31.	18/9/95	-	7.30	890	1.97	0.04	7.24		0.00	6.92	1.84	0.49	9.25	21.30	1.040	C3S1	0.10
32.	18/9/95	-	7.40	883	1.43	0.03	7.53		0.00	7.21	1.54	0.24	8.99	15.91	0.740	C3S1	0.00
33.	18/9/95	-	7.40	1,230	4.01	0.08	8.57		0.00	7.80	4.44	0.42	12.66	31.67	1.940	C3S1	0.00
34.	18/9/95	-	7.50	817	2.13	0.04	6.24		0.00	5.53	1.92	0.96	8.41	25.33	1.210	C3S1	0.00
35.	18/9/95	-	7.70	848	2.23	0.05	6.45		0.00	6.54	1.84	0.35	8.73	25.54	1.240	C3S1	0.07
36.	18/9/95	-	7.60	834	2.34	0.05	6.20		0.00	6.91	1.28	0.40	8.59	27.24	1.330	C3S1	0.76
37.	18/9/95	-	7.30	683	1.52	0.03	5.48		0.00	5.93	0.82	0.28	7.03	21.62	0.920	C2S1	0.65
38.	18/9/95	-	7.80	875	4.55	0.09	4.37		0.00	7.75	0.86	0.40	9.01	50.50	3.080	C3S1	1.55
39.	18/9/95	-	7.40	747	2.33	0.05	5.31		0.00	6.23	1.14	0.32	7.69	30.30	1.430	C2S1	0.92
40.	18/9/95	-	7.30	995	2.82	0.06	7.46		0.00	7.48	2.42	0.44	10.34	27.27	1.460	C3S1	0.59
41.	18/9/95	-	7.00	1,042	2.47	0.05	8.42		0.00	8.46	1.84	0.64	10.94	22.58	1.200	C3S1	1.00
42.	18/9/95	-	7.10	777	3.07	0.06	5.47		0.00	6.35	1.34	0.91	8.60	35.70	1.860	C3S1	0.51
43.	18/9/95	-	7.30	571	0.79	0.02	5.07		0.00	4.81	0.76	0.31	5.88	13.44	0.500	C2S1	1.12
44.	18/9/95	-	7.20	668	2.20	0.04	4.70		0.00	5.72	0.82	0.40	6.94	31.70	1.440	C2S1	0.78
45.	18/9/95	-	7.30	1,432	7.61	0.16	7.26		0.00	9.96	1.74	3.33	15.03	50.63	3.990	C3S1	0.44
46.	18/9/95	-	7.50	557	1.77	0.04	3.98		0.00	4.81	0.68	0.30	5.79	30.57	1.260	C2S1	0.19
47.	18/9/95	-	7.60	873	1.26	0.03	7.70		0.00	6.66	1.98	0.35	8.99	14.02	0.640	C3S1	0.33

Source : DSI-II

Table - L.27 Ground Water Quality Data in Gediz River Basin (2/3)

Wells ID No.	Date of Analizing	Water Temp. (C)	pH	EC (umhos/cm)	Cations (mek/l) Na+	K+	Ca++	Mg++	Anions (mek/l) CO3-	HCO3-	Cl-	SO4-	Total (mek/l)	Sodium %	SAR	Category of Water	Boron (ppm)
1.	18/9/95	20.2	7.10	5,170	32.12	0.66	21.50		0.00	4.28	45.00	5.00	54.28	59.17	9.800		4.00
2.	18/9/95	-	7.50	780	3.91	0.08	4.20		0.00	5.50	2.08	0.61	8.19	47.74	2.700	C3S1	0.80
3.	18/9/95	21.0	8.10	929	5.32	0.11	4.32		0.00	6.20	2.62	0.93	9.75	54.56	3.620	C3S1	0.50
4.	18/9/95	-	7.80	931	5.07	0.10	4.60		0.00	5.70	3.52	0.55	9.77	51.89	3.340	C3S1	0.70
5.	18/9/95	21.2	7.30	2,390	21.06	0.43	3.60		0.00	7.66	16.18	1.25	25.09	83.94	15.700	C4S4	0.72
6.	18/9/95	21.6	7.60	750	1.58	0.03	6.26		0.00	6.28	1.14	0.45	7.87	20.08	0.890	C2S1	0.61
7.	18/9/95	-	7.40	885	2.28	0.05	6.96		0.00	7.17	1.64	0.48	9.29	24.54	1.220	C3S1	0.09
8.	18/9/95	-	7.40	628	1.15	0.02	5.42		0.00	5.10	1.10	0.39	6.59	17.45	0.700	C2S1	0.51
9.	18/9/95	-	7.40	1,189	3.47	0.07	8.94		0.00	7.70	4.12	0.66	12.48	27.80	1.640	C3S1	0.60
10.	18/9/95	-	7.90	436	0.56	0.01	4.00		0.00	3.50	0.80	0.27	4.57	12.25	0.400	C2S1	0.09
11.	18/9/95	19.2	7.60	708	1.93	0.04	5.46		0.00	5.09	1.56	0.78	7.43	25.98	1.170	C2S1	0.50
12.	18/9/95	17.9	7.20	1,076	3.76	0.08	7.55		0.00	8.98	1.70	0.71	11.39	33.01	1.940	C3S1	0.00
13.	18/9/95	18.2	7.40	552	0.35	0.01	5.43		0.00	4.96	0.50	0.33	5.79	6.04	0.210	C2S1	0.65
14.	18/9/95	16.3	7.30	791	1.74	0.04	6.52		0.00	7.00	0.86	0.44	8.30	20.96	0.960	C3S1	0.50
15.	18/9/95	-	7.30	637	0.87	0.02	5.79		0.00	5.19	0.76	0.73	6.68	13.02	0.510	C2S1	0.35
16.	18/9/95	-	7.50	519	0.42	0.01	5.01		0.00	4.40	0.78	0.26	5.44	7.72	0.270	C2S1	0.40
17.	18/9/95	-	7.60	873	1.77	0.04	7.25		0.00	6.14	1.50	1.42	9.06	19.54	0.930	C3S1	0.30
18.	18/9/95	20.2	7.60	575	2.07	0.04	3.92		0.00	4.60	1.10	0.33	6.03	34.33	1.480	C2S1	0.48
19.	18/9/95	-	7.20	1,703	6.75	0.14	10.99		0.00	9.00	7.10	1.78	17.88	37.75	2.880	C3S1	0.70
20.	18/9/95	21.4	7.30	1,068	3.73	0.08	7.40		0.00	7.14	1.78	2.29	11.21	33.27	1.940	C3S1	1.00
21.	18/9/95	-	7.20	773	2.70	0.06	5.35		0.00	5.20	2.46	0.45	8.11	33.29	1.650	C3S1	1.06
22.	18/9/95	-	7.80	2,020	11.91	0.24	9.06		0.00	10.91	9.28	1.02	21.21	56.15	5.600	C3S2	0.73
23.	18/9/95	20.5	7.10	1,679	5.61	0.11	11.90		0.00	13.92	2.64	1.06	17.62	31.84	2.300	C3S1	0.35
24.	18/9/95	19.9	7.20	1,143	3.57	0.07	8.36		0.00	9.11	1.82	1.07	12.00	29.75	1.750	C3S1	0.15
25.	18/9/95	-	7.80	600	1.51	0.03	4.76		0.00	4.66	1.26	0.38	6.30	23.97	0.980	C2S1	0.35
26.	18/9/95	17.9	7.30	733	1.97	0.04	5.68		0.00	6.28	1.00	0.41	7.69	25.62	1.170	C2S1	0.37
27.	18/9/95	-	7.60	512	0.36	0.01	5.00		0.00	4.46	0.60	0.31	5.37	6.70	0.230	C2S1	0.69
28.	18/9/95	23.1	7.40	486	0.29	0.01	4.80		0.00	4.32	0.50	0.28	5.10	5.69	0.190	C2S1	0.41
29.	18/9/95	19.9	7.40	656	0.85	0.02	6.01		0.00	5.41	1.04	0.43	6.88	12.35	0.490	C2S1	0.99
30.	18/9/95	18.9	7.40	528	1.03	0.02	4.54		0.00	4.60	0.56	0.43	5.59	18.43	0.680	C2S1	0.38
31.	18/9/95	-	7.40	677	1.67	0.03	5.40		0.00	5.81	0.89	0.40	7.10	23.52	1.020	C2S1	0.84
32.	18/9/95	16.5	7.40	579	0.80	0.02	5.25		0.00	4.97	0.73	0.37	6.07	13.18	0.490	C2S1	0.95
33.	18/9/95	16.6	7.20	772	0.84	0.02	7.24		0.00	6.78	0.88	0.44	8.10	10.37	0.440	C3S1	0.55
34.	18/9/95	17.5	7.10	1,140	2.52	0.05	9.28		0.00	8.15	1.40	2.30	11.85	21.27	1.170	C3S1	1.07
35.	18/9/95	-	7.50	993	3.76	0.08	6.58		0.00	5.16	1.98	3.28	10.42	36.08	2.070	C3S1	0.30
36.	18/9/95	-	7.70	462	0.58	0.01	4.26		0.00	3.84	0.70	0.31	4.85	11.96	0.400	C2S1	0.30
37.	18/9/95	18.7	7.30	620	2.24	0.05	4.32		0.00	5.21	0.94	0.46	6.61	33.89	1.520	C2S1	0.56
38.	18/9/95	18.1	7.10	1,238	4.81	0.10	8.08		0.00	8.36	2.18	2.45	12.99	37.03	2.390	C3S1	1.47
39.	18/9/95	21.4	7.40	667	1.87	0.04	5.09		0.00	5.52	1.08	0.40	7.00	26.71	1.170	C2S1	0.58
40.	18/9/95	17.6	7.30	554	0.66	0.01	5.14		0.00	4.22	1.22	0.37	5.81	11.36	0.410	C2S1	0.20
41.	18/9/95	-	7.00	537	1.09	0.02	4.52		0.00	4.48	0.80	0.35	5.63	19.36	0.730	C2S1	0.99
42.	18/9/95	-	6.90	1,081	4.63	0.09	7.03		0.00	7.96	2.80	0.99	11.75	39.40	2.470	C3S1	0.90
43.	18/9/95	20.8	6.80	1,103	3.95	0.08	7.55		0.00	8.91	2.00	0.67	11.58	34.11	2.030	C3S1	1.00
44.	18/9/95	-	6.80	1,120	3.91	0.08	7.77		0.00	9.37	0.63	1.76	11.76	33.25	1.980	C3S1	0.20
45.	18/9/95	21.3	7.20	624	1.67	0.03	4.85		0.00	4.26	0.95	1.34	6.55	25.50	1.070	C2S1	0.30
46.	18/9/95	-	7.20	706	1.70	0.03	5.61		0.00	6.10	0.90	0.34	7.34	23.16	1.020	C2S1	0.45
47.	18/9/95	21.0	6.90	1,200	4.93	0.10	7.57		0.00	10.60	1.30	0.70	12.60	39.13	2.530	C3S1	0.50
48.	18/9/95	-	7.20	979	2.83	0.06	7.38		0.00	6.91	2.72	0.64	10.27	27.56	1.470	C3S1	0.39
49.	18/9/95	21.4	7.20	1,112	3.29	0.07	8.31		0.00	7.29	1.24	3.14	11.67	28.19	1.610	C3S1	0.65
50.	18/9/95	19.7	7.20	1,110	2.31	0.05	9.29		0.00	9.20	1.80	0.65	11.65	19.83	1.070	C3S1	0.15
51.	18/9/95	18.7	7.30	725	2.56	0.05	5.00		0.00	3.35	2.90	1.36	7.61	33.64	1.620	C2S1	0.14
52.	18/9/95	-	7.50	436	0.34	0.01	4.22		0.00	3.62	0.62	0.33	4.57	7.44	0.230	C2S1	0.40
53.	18/9/95	20.4	7.30	816	2.86	0.06	5.64		0.00	6.80	1.28	0.48	8.56	33.41	1.700	C3S1	0.19
54.	18/9/95	-	7.10	1,342	3.92	0.08	10.04		0.00	7.25	2.04	4.75	14.04	27.92	1.750	C3S1	0.79
55.	18/9/95	18.6	7.40	599	1.90	0.04	4.34		0.00	4.50	0.93	0.85	6.28	30.25	1.290	C2S1	0.61
56.	18/9/95	18.0	7.20	876	4.17	0.09	4.83		0.00	7.14	1.52	0.43	9.09	45.87	2.680	C3S1	0.17
57.	18/9/95	-	7.30	704	2.20	0.05	5.14		0.00	5.83	1.12	0.44	7.39	29.77	1.370	C2S1	0.46
58.	18/9/95	-	7.40	857	1.20	0.02	7.77		0.00	7.00	1.52	0.47	8.99	13.35	0.610	C3S1	0.50
59.	18/9/95	21.2	7.60	751	1.17	0.02	6.69		0.00	5.91	1.50	0.47	7.88	14.85	0.640	C3S1	0.49
60.	18/9/95	18.0	7.60	1,155	3.41	0.07	8.64		0.00	7.42	4.02	0.68	12.12	28.14	1.640	C3S1	0.36
61.	18/9/95	21.5	7.10	783	1.51	0.03	6.68		0.00	6.31	1.20	0.71	8.22	18.37	0.830	C3S1	0.47
62.	18/9/95	18.4	7.20	867	1.74	0.04	7.32		0.00	5.45	2.20	1.45	9.10	19.12	0.910	C3S1	0.58
63.	18/9/95	17.0	7.40	465	1.35	0.03	3.50		0.00	2.21	1.37	1.30	4.88	27.66	1.020	C2S1	0.08
64.	18/9/95	-	7.20	807	2.75	0.06	5.66		0.00	6.72	1.30	0.45	8.47	32.47	1.640	C3S1	0.52
65.	18/9/95	18.6	7.40	595	0.43	0.01	5.80		0.00	3.80	2.05	0.39	6.24	6.89	0.250	C2S1	0.62
66.	18/9/95	22.0	7.60	862	3.97	0.08	5.00		0.00	7.31	1.20	0.54	9.05	43.87	2.510	C3S1	1.45
67.	18/9/95	-	7.30	727	3.56	0.07	4.00		0.00	5.74	1.42	0.47	7.63	46.66	2.520	C2S1	0.85
68.	18/9/95	18.7	7.20	963	2.98	0.06	6.96		0.00	7.00	2.54	0.46	10.00	29.80	1.600	C3S1	0.48
69.	18/9/95	23.7	7.20	915	1.16	0.02	8.42		0.00	8.46	0.84	0.30	9.60	12.08	0.560	C3S1	1.06
70.	18/9/95	-	7.20	776	1.62	0.03	6.49		0.00	6.35	1.46	0.33	8.14	19.90	0.900	C3S1	0.45
71.	18/9/95	17.6	7.30	571	0.38	0.01	5.60		0.00	4.49	0.84	0.66	5.99	6.34	0.230	C2S1	1.00
72.	18/9/95	-	7.30	622	1.03	0.02	5.48		0.00	4.00	0.86	1.67	6.53	15.77	0.620	C2S1	0.58
73.	18/9/95	17.8	7.30	818	0.46	0.01	8.00		0.00	6.89	0.90	0.68	8.47	5.43	0.230	C3S1	0.64
74.	18/9/95	16.9	7.40	513	1.82	0.04	3.52		0.00	4.25	0.64	0.49	5.38	33.83	1.370	C2S1	0.16
75.	18/9/95	16.8	7.40	743	1.10	0.02	6.78		0.00	6.06	1.30	0.54	7.90	13.92	0.600	C2S1	0.53

Source : DSI-II

Table - L.27 Ground Water Quality Data in Gediz River Basin (3/3)

Wells	Date of	Water	pH	EC	Cations (meK/l)				Anions (meK/l)				Total	Sodium	SAR	Category	Boron
ID No.	Analizing	Temp (C)		(umhos/cm)	Na+	K+	Ca++	Mg++	CO3- -	HCO3-	Cl-	SO4- -	(meK/l)	%		of Water	(ppm)
76.	18/9/95	-	7.40	828	0.85	0.02	7.82		0.00	6.92	1.26	0.51	8.69	9.78	0.430	C3S1	0.40
77.	18/9/95	-	7.40	1,030	3.34	0.07	7.40		0.00	7.62	2.58	0.61	10.81	30.90	1.740	C3S1	0.60
78.	18/9/95	-	7.40	1,217	4.28	0.09	8.30		0.00	7.67	4.40	0.60	12.67	33.78	2.100	C3S1	0.89
79.	18/9/95	-	6.90	2,760	18.34	0.37	10.27		0.00	20.61	6.60	1.77	28.98	63.29	8.090	C4S2	5.00
80.	18/9/95	-	7.60	700	2.10	0.04	5.21		0.00	4.94	1.94	0.47	7.35	28.57	1.300	C2S1	0.54
81.	18/9/95	-	7.40	852	2.10	0.04	6.80		0.00	7.00	1.18	0.76	8.94	23.49	1.140	C3S1	0.22
82.	18/9/95	19.7	7.20	1,136	3.35	0.07	8.50		0.00	8.35	1.06	2.51	11.92	28.10	1.630	C3S1	1.05
83.	18/9/95	-	7.60	758	1.38	0.03	6.54		0.00	6.18	0.74	1.03	7.95	17.36	0.760	C3S1	0.60
84.	18/9/95	19.7	7.40	975	3.17	0.06	7.00		0.00	8.25	0.88	1.10	10.23	30.99	1.690	C3S1	0.67
85.	18/9/95	-	7.40	882	2.01	0.04	7.18		0.00	7.88	0.92	0.46	9.26	22.03	1.080	C3S1	0.31
86.	18/9/95	24.2	8.10	755	3.07	0.06	4.79		0.00	6.00	1.38	0.54	7.92	38.76	1.980	C3S1	0.52
87.	18/9/95	14.6	7.70	456	0.39	0.01	4.58		0.00	3.75	0.80	0.43	4.98	7.83	0.260	C2S1	1.35
88.	18/9/95	-	7.50	482	0.38	0.01	4.67		0.00	4.23	0.50	0.33	5.06	7.51	0.250	C2S1	0.70
89.	18/9/95	21.5	7.40	1,185	3.21	0.07	8.84		0.00	10.04	0.89	1.19	12.12	26.49	1.530	C3S1	3.00
90.	18/9/95	17.2	7.40	890	2.08	0.04	7.22		0.00	7.30	1.00	1.04	9.34	22.27	1.100	C3S1	0.47
91.	18/9/95	22.0	7.80	560	0.76	0.02	5.10		0.00	4.66	0.82	0.40	5.88	12.93	0.480	C2S1	0.00
92.	18/9/95	-	7.40	712	2.36	0.05	5.06		0.00	6.06	1.00	0.41	7.47	31.59	1.480	C2S1	0.61
93.	18/9/95	-	7.80	1,141	4.68	0.10	7.20		0.00	7.37	0.68	3.93	11.98	39.07	2.470	C3S1	0.53
94.	18/9/95	-	7.50	1,815	10.79	0.22	8.04		0.00	7.77	4.70	6.58	19.05	56.64	5.380	C3S2	2.66
95.	18/9/95	20.9	7.20	744	3.36	0.07	4.38		0.00	3.68	3.70	0.43	7.81	43.02	2.270	C2S1	0.76
96.	18/9/95	-	7.10	1,614	6.64	0.14	10.16		0.00	5.53	7.62	3.79	16.94	39.20	2.950	C3S1	0.60
97.	18/9/95	-	7.50	534	0.74	0.02	4.84		0.00	4.29	0.86	0.45	5.60	13.21	0.480	C2S1	0.30
98.	18/9/95	17.6	7.30	574	1.53	0.03	4.46		0.00	5.07	0.60	0.35	6.02	25.42	1.030	C2S1	0.25
99.	18/9/95	-	7.40	389	0.57	0.01	3.50		0.00	2.97	0.62	0.49	4.08	13.97	0.430	C2S1	0.31
100.	18/9/95	19.6	7.20	796	3.34	0.07	4.94		0.00	6.63	1.30	0.42	8.35	40.00	2.130	C3S1	0.09
101.	18/9/95	19.4	7.20	813	3.16	0.06	5.31		0.00	5.51	2.14	0.88	8.53	37.05	1.940	C3S1	0.80
102.	18/9/95	14.4	7.40	645	1.02	0.02	5.73		0.00	4.43	1.66	0.68	6.77	15.07	0.600	C2S1	0.05
103.	18/9/95	20.0	7.20	906	2.28	0.05	7.23		0.00	7.97	1.08	0.51	9.56	23.85	1.200	C3S1	0.20
104.	18/9/95	16.8	7.30	413	0.88	0.02	3.43		0.00	2.65	1.38	0.30	4.33	20.32	0.670	C2S1	0.09
105.	18/9/95	-	7.40	360	0.33	0.01	3.44		0.00	2.80	0.62	0.36	3.78	8.73	0.250	C2S1	0.07
106.	18/9/95	-	7.30	680	2.65	0.05	4.44		0.00	5.87	0.80	0.47	7.14	37.11	1.780	C2S1	0.56
107.	18/9/95	-	7.30	405	1.29	0.03	2.93		0.00	3.27	0.68	0.30	4.25	30.35	1.070	C2S1	0.30
108.	18/9/95	-	7.30	483	1.94	0.04	3.09		0.00	3.36	1.42	0.29	5.07	38.26	1.560	C2S1	0.57
109.	18/9/95	-	6.90	1,810	5.26	0.11	13.63		0.00	13.78	0.60	4.62	19.00	27.68	2.020	C3S1	0.48
110.	18/9/95	18.3	7.10	1,428	4.73	0.10	10.16		0.00	11.28	2.90	0.81	14.99	31.55	2.100	C3S1	0.84
111.	18/9/95	-	7.20	1,096	2.53	0.05	8.92		0.00	9.36	1.50	0.64	11.50	22.00	1.200	C3S1	0.79
112.	18/9/95	17.3	7.60	741	2.56	0.05	5.17		0.00	5.32	1.92	0.54	7.78	32.90	1.590	C2S1	0.68
113.	18/9/95	-	7.30	1,128	2.59	0.05	9.20		0.00	8.74	2.42	0.68	11.84	21.88	1.210	C3S1	0.65
114.	18/9/95	20.9	7.70	756	0.83	0.02	7.08		0.00	6.31	1.10	0.52	7.93	10.47	0.440	C3S1	1.74
115.	18/9/95	17.4	7.50	893	2.75	0.06	6.56		0.00	7.58	0.65	1.14	9.37	29.35	1.520	C3S1	0.56
116.	18/9/95	22.5	7.50	808	0.44	0.01	8.03		0.00	7.22	0.70	0.56	8.48	5.19	0.220	C3S1	0.69
117.	18/9/95	18.6	7.60	633	0.50	0.01	6.13		0.00	5.59	0.64	0.41	6.64	7.53	0.290	C2S1	0.46
118.	18/9/95	17.7	7.80	623	0.56	0.01	5.97		0.00	5.54	0.58	0.42	6.54	8.56	0.320	C2S1	0.90
119.	18/9/95	16.0	7.80	607	0.66	0.01	5.70		0.00	5.42	0.56	0.39	6.37	10.36	0.390	C2S1	0.52
120.	18/9/95	21.2	7.40	1,650	2.89	0.06	14.37		0.00	15.07	1.40	0.85	17.32	16.69	1.080	C3S1	3.00
121.	18/9/95	20.2	7.20	1,977	12.78	0.26	7.71		0.00	13.60	4.46	2.69	20.75	61.59	6.510	C3S2	3.71
122.	18/9/95	19.8	7.30	921	1.64	0.03	8.00		0.00	8.08	0.76	0.83	9.67	16.96	0.820	C3S1	1.23
123.	18/9/95	18.5	7.20	1,097	3.83	0.08	7.60		0.00	7.56	1.08	2.87	11.51	33.28	1.970	C3S1	3.93
124.	18/9/95	18.2	7.30	725	1.88	0.04	5.69		0.00	6.10	0.60	0.91	7.61	24.70	1.120	C2S1	0.81
125.	18/9/95	22.7	7.30	664	1.78	0.04	5.15		0.00	5.65	0.52	0.80	6.97	25.54	1.110	C2S1	1.00
126.	18/9/95	29.5	7.00	718	5.15	0.10	4.28		0.00	6.36	0.52	2.65	9.53	54.04	3.520	C2S1	1.22
127.	18/9/95	-	7.10	785	1.31	0.03	6.80		0.00	6.06	0.62	1.46	8.14	16.09	0.710	C3S1	0.88
128.	18/9/95	28.2	7.60	730	3.33	0.07	4.20		0.00	6.10	0.76	0.74	7.60	43.82	2.300	C2S1	1.77
129.	18/9/95	17.5	7.40	384	0.62	0.01	3.40		0.00	3.20	0.53	0.30	4.03	15.38	0.480	C2S1	0.60
130.	18/9/95	-	7.70	419	0.38	0.01	4.00		0.00	3.47	0.65	0.27	4.39	8.66	0.270	C2S1	0.63
131.	18/9/95	-	7.60	539	0.86	0.02	4.77		0.00	4.44	0.48	0.73	5.65	15.22	0.560	C2S1	0.15
132.	18/9/95	-	7.50	600	1.95	0.04	4.31		0.00	5.08	0.82	0.40	6.30	30.95	1.330	C2S1	1.81
133.	18/9/95	30.3	7.10	1,300	7.67	0.16	5.82		0.00	12.05	0.80	0.80	13.65	56.19	4.500	C3S1	0.70
134.	18/9/95	32.0	7.80	1,053	9.19	0.19	1.67		0.00	9.49	0.88	0.68	11.05	83.17	10.060	C3S2	3.00
135.	18/9/95	18.5	7.50	441	0.70	0.01	3.92		0.00	3.66	0.54	0.43	4.63	15.12	0.500	C2S1	1.09
136.	18/9/95	16.2	7.50	581	1.39	0.03	4.68		0.00	5.14	0.54	0.42	6.10	22.79	0.910	C2S1	2.38
137.	18/9/95	-	7.50	665	1.16	0.02	5.80		0.00	5.62	0.90	0.46	6.98	16.62	0.680	C2S1	0.36
138.	18/9/95	14.7	7.50	522	0.57	0.01	4.90		0.00	4.51	0.58	0.39	5.48	10.40	0.360	C2S1	0.38
139.	18/9/95	-	7.40	781	1.33	0.03	6.74		0.00	6.73	0.96	0.41	8.10	16.42	0.720	C3S1	0.50
140.	18/9/95	-	7.20	927	0.72	0.01	9.00		0.00	6.66	1.68	1.39	9.73	7.40	0.340	C3S1	0.17
141.	18/9/95	18.5	7.30	699	0.93	0.02	6.38		0.00	5.93	1.04	0.36	7.33	12.69	0.520	C2S1	0.15
142.	18/9/95	19.8	6.70	2,540	7.30	0.15	19.22		0.00	21.70	2.82	2.15	26.67	27.37	2.360	C4S1	1.45
143.	18/9/95	-	7.20	1,090	2.71	0.06	8.68		0.00	5.43	1.28	4.72	11.43	23.71	1.300	C3S1	0.18
144.	18/9/95	18.0	7.30	612	1.31	0.03	5.08		0.00	5.25	0.76	0.41	6.42	20.40	0.820	C2S1	0.11
145.	18/9/95	-	7.50	817	2.32	0.05	6.20		0.00	6.74	1.24	0.59	8.57	27.07	1.320	C3S1	0.19
146.	18/9/95	-	6.70	1,861	2.07	0.04	17.43		0.00	17.09	1.32	1.13	19.54	10.59	0.700	C3S1	0.09
147.	18/9/95	-	7.40	932	2.06	0.04	7.68		0.00	4.30	1.46	4.02	9.78	21.06	1.050	C3S1	0.19
148.	18/9/95	22.3	6.70	3,350	17.23	0.35	17.59		0.00	30.95	2.51	1.71	35.17	48.99	5.810	C2S1	4.97
149.	18/9/95	-	7.20	1,040	3.74	0.08	7.10		0.00	6.13	1.22	3.57	10.92	34.25	1.990	C3S1	0.68
150.	18/9/95	-	7.20	2,060	5.52	0.11	17.00		0.00	8.44	4.64	9.55	22.63	24.39	1.890	C3S1	0.61
151.	18/9/95	-	7.60	746	1.54	0.03	6.29		0.00	2.68	1.16	4.02	7.86	19.59	0.870		0.00
152.	18/9/95	17.7	7.40	1,553	5.21	0.11	10.98		0.00	10.15	3.24	2.91	16.30	31.96	2.220	C3S1	0.00

Source : DSI-II

FIGURES

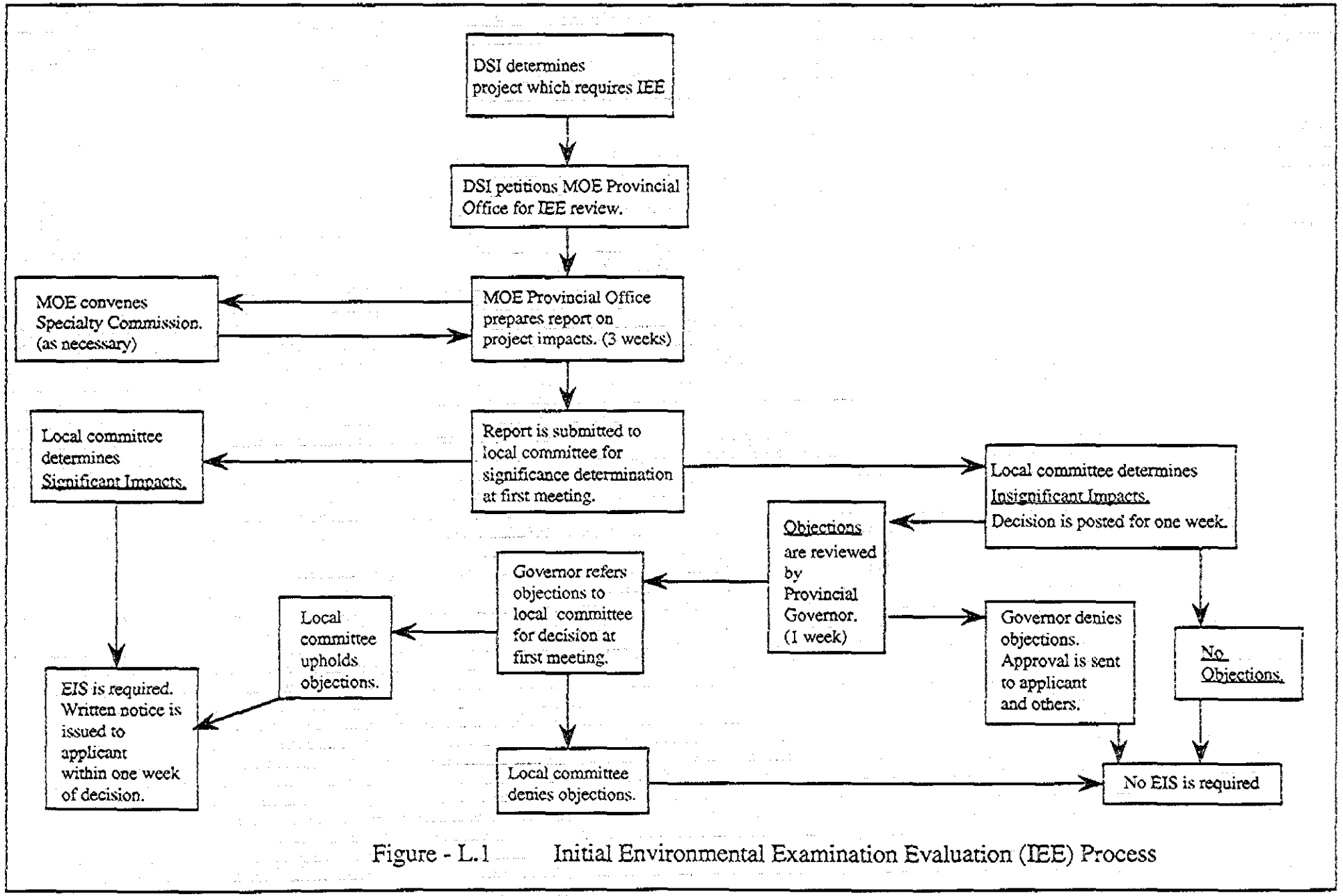


Figure - L.1 Initial Environmental Examination Evaluation (IEE) Process

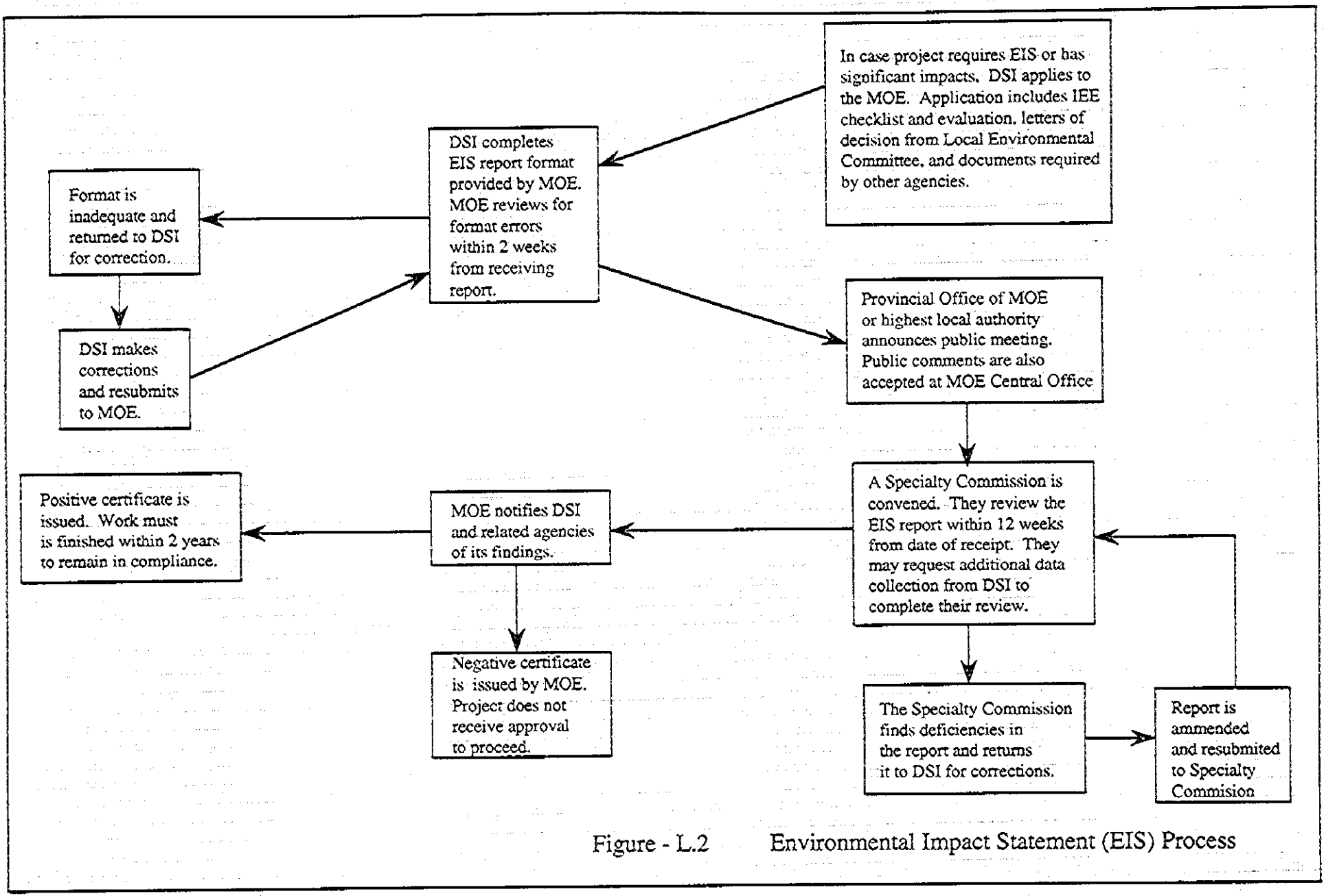


Figure - L.2 Environmental Impact Statement (EIS) Process

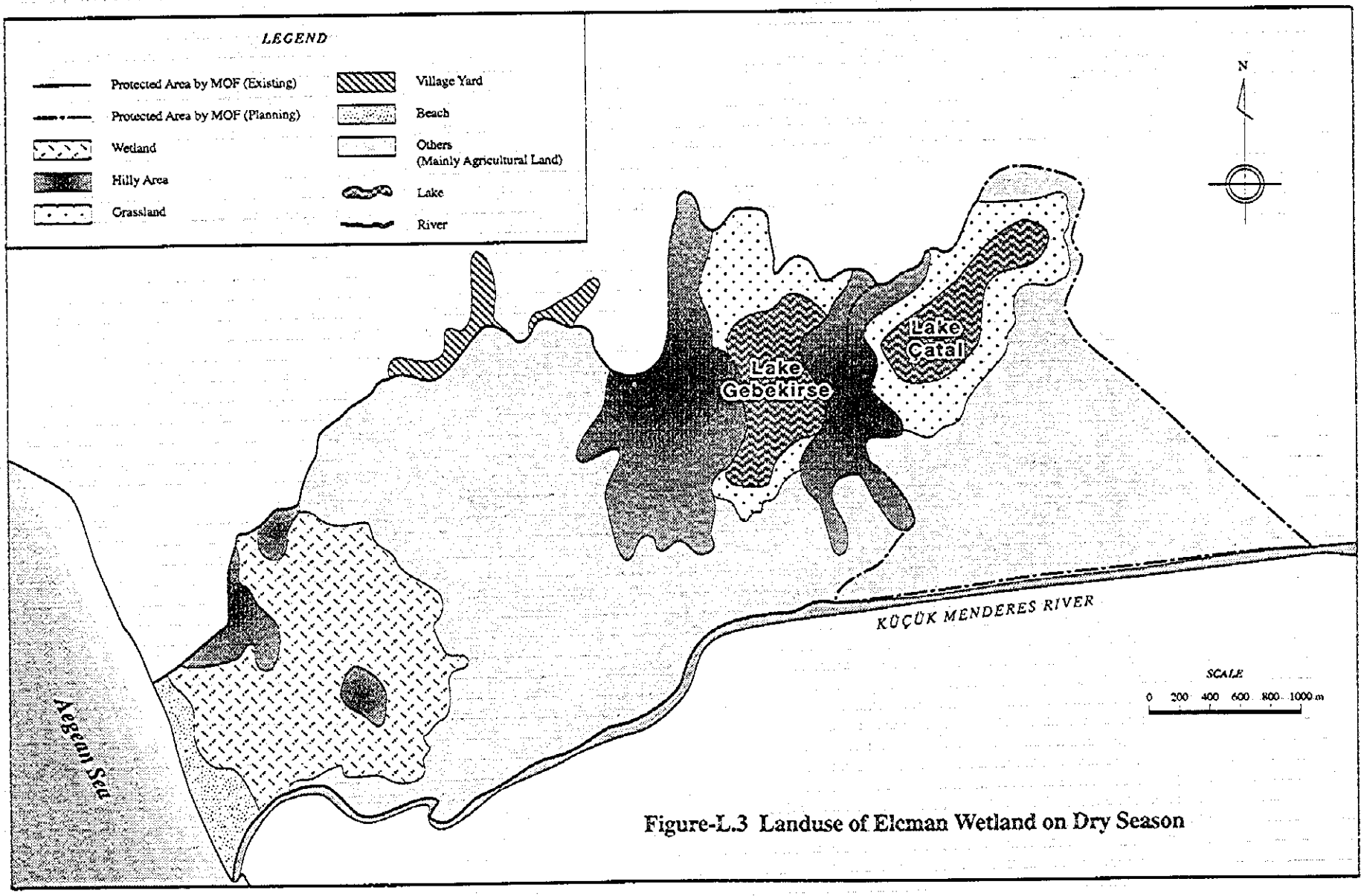


Figure-L.3 Landuse of Elcman Wetland on Dry Season

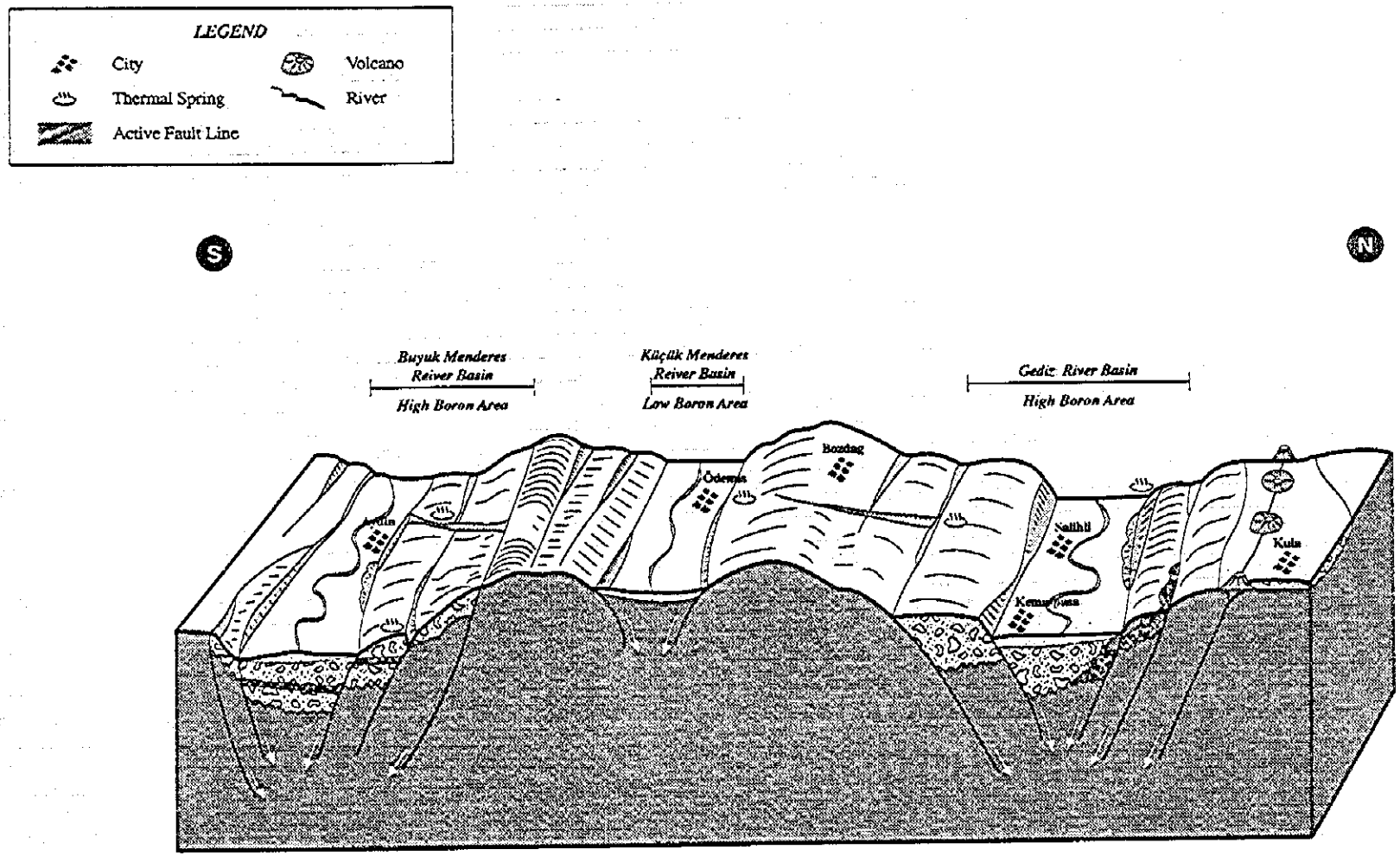


Figure - L.4 Relationship between Geo-thermal Effect and Boron Concentration in Groundwater

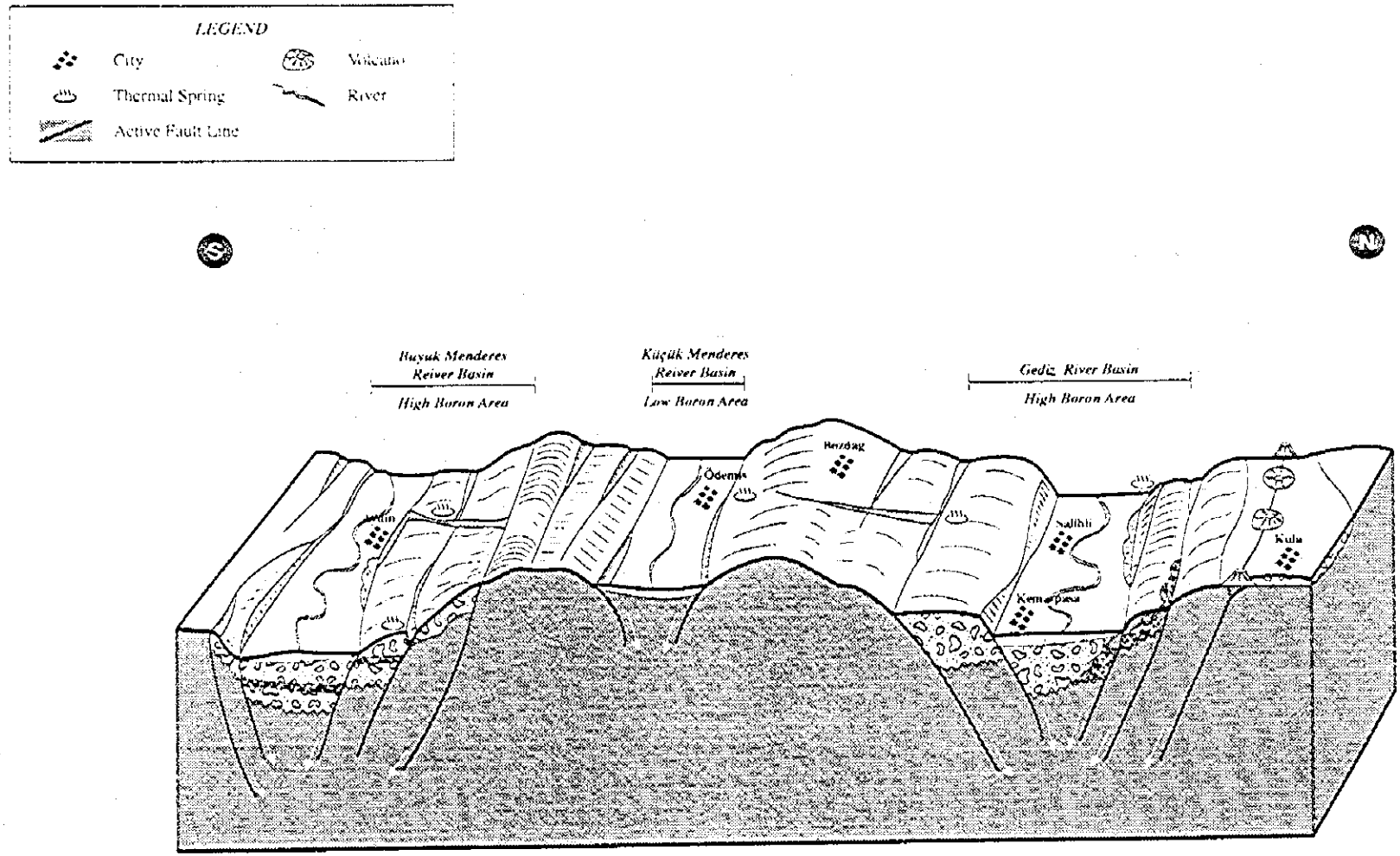


Figure - L.4 Relationship between Geo-thermal Effect and Boron Concentration in Groundwater

ANNEX M

PUBLIC CONSULTATION

ANNEX M

PUBLIC CONSULTATION

Table of Contents

List of Attachments

ANNEX M

PUBLIC CONSULTATION

The public consultation meetings were organized at three villages; Tosunlar, Mescitli and Konaklı, all of which are located in the Project Area, by DSİ under the assistance of the JICA Study Team on October 4 and 6, 1995. The main purposes of the meeting were to explain the outline and necessity of the Beydağ Irrigation Project to farmers and to promote the farmers' understanding of the present constraints for irrigation development, acquisition of their lands, payment of water charge, and the organization of water users' associations.

The meetings were opened by the Director of Planning Section of DSİ-II and welcome speech was given by the Deputy Project Manager of JICA Study Team. Then, the present constraints for the agricultural development in the Project Area and outline of the Project were explained by the Chief Engineer and Agro-economist of DSİ-II, and the farmers' cooperation to the project implementation was requested by said two DSİ staff based on the explanation note attached hereto as Attachment-M.1.

The meeting was attended by 48 villagers including village chiefs (Muhtars) at Tosunlar, 102 villagers at Mescitli and 39 villagers at Konaklı. The opinions and requests of the villagers in each meeting are summarized in the Record of Public Consultation Meeting, and these records are attached hereto as Attachment-M.2, M.3 and M.4.

ATTACHMENT

Explanation Notes for Public Consultation

1. Farmers' Understanding on Present Problem and Outline of Project

1.1 Present Situation of Irrigation by Groundwater

Groundwater is intensively utilized for irrigation by the most of farmers, particularly in summer season. It is understood that the present problems on irrigation for individual farmers are (1) difficulty to obtain enough irrigation water, (2) high cost for pumping, and (3) lowering of groundwater table.

The groundwater is a limited water resource, and its utilization should be balanced with the rechargeable volume in the annual climate cycle. However, rapid decline of groundwater table indicates that the current utilization of groundwater is far exceeding the rechargeable volume. If this situation remains, it is expected that the water table will be continuously lowered and farmers will need to dig wells deeper and deeper in the future.

The aquifer in this area forms a part of the groundwater basin in Ödemiş-Tire-Bayındı-Torbalı along the Küçük Menderes river and therefore, the same problem is prevailing in the whole groundwater basin. Groundwater use for irrigation has been rapidly expanding, and the groundwater resource will be seriously reduced or exhausted in the near future. In this regard, groundwater users should understand this situation from both his individual and social viewpoints in terms of sustainable use.

1.2 Outline of the Project

The concept of the project is that (1) the excessive water presently flowing from the upper basin into sea without any use will be stored the Beydağ reservoir, (2) the stored water will be used for irrigation by as the substitution of groundwater. This substitution of irrigation water source will contribute to both improvement of the sustainability of groundwater utilization and farmers economy.

The irrigation plan of the Beydağ Irrigation Project is being revised for the most efficient use of water through introduction of the modernized irrigation system. The main feature of the irrigation component at the tentative basis is as follows:

Command area:	Approximately 18,000 ha in gross in the Ödemiş plain, covering the western part of Beydağ district and the eastern to western part of Ödemiş districts.
Main distribution	Open canals (total 80 km consisting of 40 km in left bank and 40 km in right, canalets and pipes for the secondary and tertiary canals, farm pond to regulate water, and pipe lines for distributaries to prevent loss.
Irrigation method:	Partly sprinkler and drip irrigation for effective use of water, and other traditional improved irrigation methods like spring (çesme) irrigation and furrow irrigation.
Drainage system:	Sufficient drainage canals to drain excess water in the fields, particularly for rainfall.
Crops:	Cotton, potatoes, watermelon/melon (bostan), and vegetable as main crops, supplemented by cereal grains, fodder, orchards.

Cropping intensity: 140% to 150% on average taking a crop rotation system within the above crops.

After the project implementation, the groundwater utilization would be reduced to the proper level to maintain its resource, and the farmers income will be increased.

(We'd like to request attendants to provide their views and opinions.)

2. Cooperation in Implementation Stage (Detailed Design and Construction)

2.1 Land Acquisition for Canals and Structures

The lands in the project area will partly be used for construction of such project facilities as canals, canalets, cross drains, diversion outlets, farm ponds, maintenance roads, pipelines, and other related structures. Those land for the project facilities will be acquired through either compensation or providing substitutional lands in accordance with the Turkish laws and regulations.

In this study, the outline of the project facilities will be prepared and major modification will be made before construction. In the later stage of the project, location and size of land necessary for the construction of facilities and structures will be identified in the detailed design stage. In the design stage, the effort will be paid by the design engineers to minimize the facilities and structures in the villages.

2.2 Disturbance of Cropping while Construction

In the construction stage, the construction work will be made by using heavy equipment and labors. Construction materials will also be transported by trucks and placed temporarily near the construction sites.

These construction work will temporarily suffer the cropping in the surrounding areas of project facilities and structures. It is expected that this disturbance will be for one or two crops, and cropping will only be resumed after construction in these areas.

The damages made by this disturbance will be compensated by the project according to the Turkish laws and regulations.

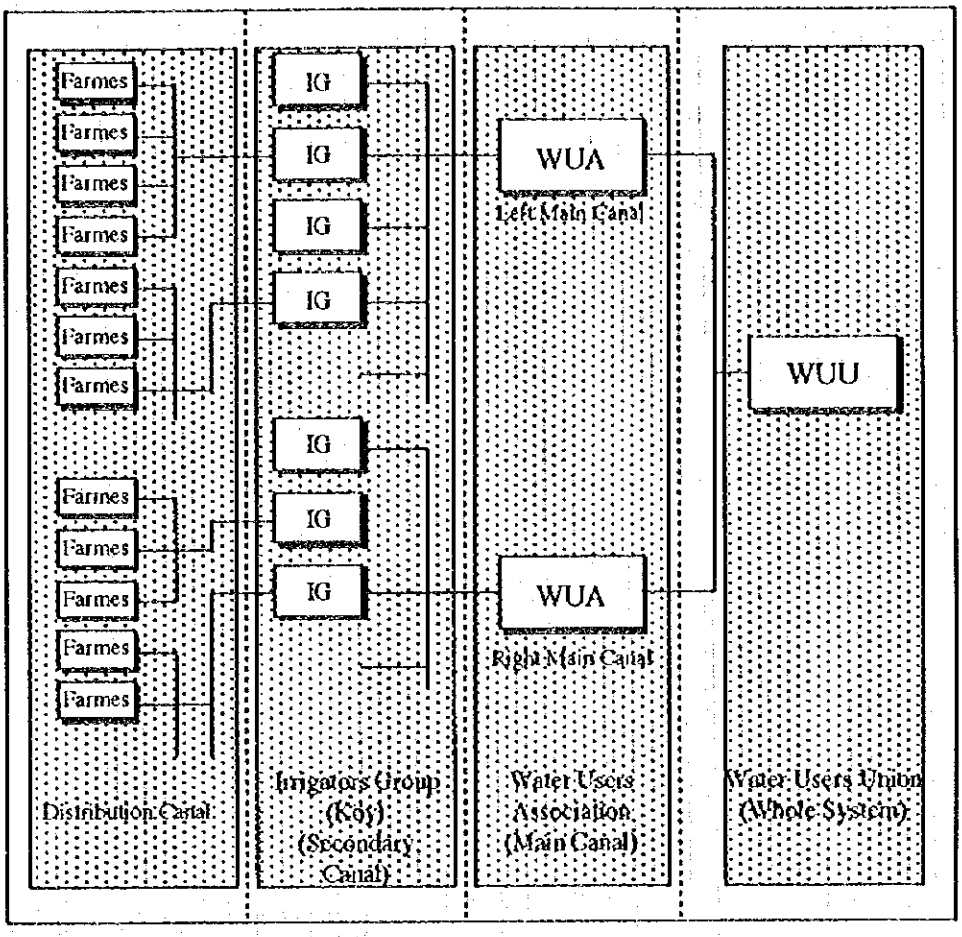
3. Operation and Maintenance of the Irrigation System

3.1 Formation of Farmers Organization for O&M

Transfer of irrigation facilities and fomation of organization for O&M

After construction of the irrigation facilities, the project facilities will be transferred to the beneficiaries (farmers in the project area) from DSİ. And then, their operation and maintenance will be made by farmers' organization of Irrigators Groups (IGs) and proposed Water Users Associations (WUAs) and Water Users Union (WUU).

IGs are the primary organizations at the smallest units, and assumed to be village level in the command areas of secondary canals, for operation and maintenance of irrigation system. All the farmers in the project area have obligation to join the IGs to obtain irrigation water supply. WUAs will be formed through associating IGs at the level of main canals. WUU will be established by incorporating WUAs and will keep a close contact to DSİ for the operation and maintenance of the Baydağ dam and irrigation and drainage systems.



Organization Chart for Operation and Maintenance of Irrigation System

Function of IGs, WUAs and WUU

The function of IGs, WUAs and WUU is to (1) prepare, adjust and finalize the water distribution schedule based on the cropping pattern and schedule, (2) record and monitoring of actual demand and supply of irrigation water, (3) collection of water charge covering costs of operation, maintenance and expenses for managing office of WUGs and WUAs, (4) operation, maintenance and repair of irrigation facilities, (5) coordination of beneficiaries necessary to operate irrigation system, (6) control of groundwater use for irrigation.

In the implementation stage, rules and regulations will be prepared in order to manage IGs, WUAs and WUU.

Fairness of water distribution

Irrigation water will be distributed according to the distribution schedule prepared by the IGs, WUAs and WUU. Farmers located in the upstream of the irrigation system have to secure the proper water distribution to the downstream farmers.

Collection of water charges

Farmers will pay the water charge to cover the cost for operation and maintenance of the irrigation system. The cost will include (1) cost to hire or employ personnel

necessary for gate and equipment operation, (2) running cost for office of IGs, WUAs and WUU.

Procurement of irrigation equipment at the level of farmers' field

Sprinkler and drip irrigation methods will be applied in the project area in order to save irrigation water for such crops as cotton, vegetable, watermelon, melon, fodder. Farmers need to procure those equipment for spinkler and drip irrigatiom, at their own expenses. Credit scheme will be necessary for farmers to purchase such irrigation equipment.

3.2 Control of Groundwater Use for Irrigation

After starting operation of the irrigation system, the groudwater use for irrigation should be reduced to the proper level through decrease of operational wells. Otherwise, lowering of groundwater table will bring about more serious situation in the groundwater basin.

DSİ is looking for the best way to control and manage the pumping volume of groundwater in a practical manner. Electricity is currently used as the most popular power source for pumping, since the farmers are able to obtain an advantage of cheeper price of electricity for agricultural use than other purposes through registration to DSİ. One of the way most likely for DSİ to take is revising registration of well and water right.

At the later stages of detailed design and construction, registration of wells will be revised in the project area. Although most of the farmers can enjoy the irrigation water form the Beydağ dam, only registered wells will be operated by applying cheeper electicity price after the project operation. This means that the wells which will be cancelled because of the water supply from the dam will not be able to register, and those wells without registration can not be applied for the subsidized electric charge.

Services from Line Agencies
Local Administration (District Office and Municipality Office),
GDRS (KHGM),
Agricultural Extension, (District Agricultural Office)
Agricultural Credit Institutions,
Chamber of Agriculture (Tarim Odaş),
Agricultural Sales Cooperatives.

RECORD OF PUBLIC CONSULTATION MEETING

Place: Tosunlar village in Beydağ district.

Date and Time: 13:30 to 16:00 on October 4, 1995.

Attendants:

Local government:	Governor of Beydağ district office, Mayor of Beydağ town,
Line agencies:	Director, agricultural engineer and technician of district agricultural office, Chairman of Agricultural Chamber, Beydağ,
Villagers:	Village Chiefs (Muhtars) and 48 villagers from Tosunlar, Halıköy, Yağcılar, Sarıkaya, and Emirli, (Ref. Attendant List attached hereto)
DSİ II	Director, Chief Engineer, and Agro-economist of Study and Planning Department,
JICA Study Team:	Co-team leader, agro-economist, soil & land use expert, coordinator, translator and recorders.

Summary of Farmers' Understanding, View and Opinions

Through the explanation and discussion with farmers, the following understandings, views and opinions were obtained from farmers:

1. The district governor stated the importance of the project for the district economy, and requested the villagers to express their views and opinions about the project in order to reflect them in the project plan.

2. Farmers understood the serious situation on lowering of groundwater table and the need of the project. Accordingly, they asked DSİ to implement the dam and irrigation project as soon as possible. Farmers also asked DSİ when the project would be completed. The governor and DSİ explained that the dam should be completed by 1998, though there would be the fund restraints.

3. The governor put a question on the benefit of new irrigation system. DSİ explained that new irrigation system would be more economical than the existing one from the viewpoint of the annual cost, though the initial investment would be more. For this reason, positive impacts from the project would be accrued from increase of yield, increase of cropping intensity, increase of employment, increase of income, development of processing industry and mitigation of out-migration of younger generation.

5. Farmers understood the necessity of land acquisition for the construction of the project facilities and the disturbance of copping while construction of the facilities, and expressed that they should be ready to extend their cooperation to DSİ on these matters.

6. Farmers understood that the irrigation facilities would be transferred to farmers after their completion, and they should establish irrigation groups (IGs) for their operation and maintenance. Farmers also understood that water charges should be collected from the beneficiaries for operation and maintenance of the project facilities.

7. Farmers requested the Government to execute land consolidation. For their request, DSİ explained that land consolidation would be done in collaboration with a Council of Ministers Decision, if 51% of the local farmers signed the request form.

8. In addition to the above, farmers and attendants put various questions on the project, and DSİ answered the questions. Of these questions, the followings were the main concern: (1) sufficiency of water supply and use of the wells after implementation of the project, (2) role of JICA in this project, (3) structure of main canals in irrigation network, (4) obligation and formation timing of IGs, (5) pricing basis of water charges and its collection, (6) prevention of flood, (7) possibility of erosion hazards, (8) construction schedule of irrigation system, (9) distribution of water vulve at irrigation plot, (10) use of service road for communication purposes, (11) impact on fig plantation surrounding the reservoir.

Beydağ İlçesi, Tosunlar
Üreticiyi Bilgilendirme Toplantısına Katılım Listesi
(List of Participants for Public Meeting at Tosunlar in Beydağ İlçe)

Tarih: 4 Ekim 1995
Date: October 04, 1995

No.	İsim (Name)	Köy/Teşkilat (Village/Agency)	İmza (Signature)
1	Ahmet Topel	Y. Tosunlar köyü	
2	Saclik Kaplan	yağcılar köyü	
3	Cahit Karabaş	Halı köy	
4	Selçuk ARI	Tosunlar	
5	Süleyman yeşil	"	
6	Metin TOPAL	"	
7	Erşan Kösecoğlu	"	
8	Mustan Şaban	"	
9	GÜNAY DEVECİ	"	
10	KENAN ARI	"	
11	Ali Karadağ	Tosunlar	
12	imdat topal	"	
13	Habib Çapan	Halıköy	
14	Mehmet Bozkurt	Tosunlar	
15	Mehmet Köseoğlu	"	
16	Memin yeşil		
17	Sami Deveci	=	
18	Duran kutaş		
19	Yakup Kurt	EMİRLİ	
20	Hüseyin yeşil		

Beydağ İlçesi, Tosunlar
Üreticiyi Bilgilendirme Toplantısına Katılım Listesi
(List of Participants for Public Meeting at Tosunlar in Beydağ İlçe)
Tarih: 4 Ekim 1995
Date: October 04, 1995

No.	İsim (Name)	Köy/Teşkilat (Village/Agency)	İmza (Signature)
21	Ali Yeşil	Tosunlar	
22	Hasan Tuncel	Tosunlar	
23	Cemal KUTAK	Tosunlar	
24	Emin yeşil	Tosunlar	
25	Mustafa	yükçoğlen	
26	mehmet Dumanlı	emirli	
27	Akın topal	tosunlar	
28	Ahmet Kökmen	Yaşlı/köy	
29	Şahin kapadar	yağcılar	
30	Hasan Kapadar	Yağcılar	
31	Nihat Gündüz	Yağcılar	
32	Şükrü Kökçü	Yağcılar.	
33	Osman kapadar	Yağcılar	
34	Niyazi nevruz	Tosunlar	
35	Ali TOPAL	Tosunlar	
36	Seyfettin Tuncel	Tosunlar	
37	Üzeyir Arı	Tosunlar	
38	kurtuluş yeşil	Tosunlar	
39	ZAHİR DERE	Tosunlar	
40	CENGİZ ARI	Tosunlar	

Beydağ İlçesi, Tosunlar
Üreticiyi Bilgilendirme Toplantısına Katılım Listesi
(List of Participants for Public Meeting at Tosunlar in Beydağ İlçe)

Tarih: 4 Ekim 1995
Date: October 04, 1995

No.	İsim (Name)	Köy/Teşkilat (Village/Agency)	İmza (Signature)
41	Muharrem Selek	Yağcılar koyu	
42	Talip Karabaş	Yağcılar Köyü	
43	İlyas Çatal	Yağcılar köyü	
44	H. Ali Bündüz	Sarıkaya Köyü	
45	Şakir Sarıkaya	Sarıkaya Köyü	
46	Ali SELEK	HALIKÖY	
47	İbrahim Karagell	sarıkayakoyu	
48	İsmet Koç	Sarıkaya köyü	
49			
50			
51			
52			
53			
54			
55			
56			
57			
58			
59			
60			

Beydağ İlçesi, Tosunlar
Üreticiyi Bilgilendirme Toplantısına Katılım Listesi
(List of Participants for Public Meeting at Tosunlar in Beydağ Ilçe)

Tarih: 4 Ekim 1995
Date: October 04, 1995

No.	İsim (Name)	Köy/Teşkilat (Village/Agency)	İmza (Signature)
81	Süleyman DEMİROĞLU	Zir. Müh. İLÇE TARIM MÜDÜRLÜĞÜ	
82	İlyas GİMEN	Zir. Müh. İLÇE TARIM Müdürlüğü	
83	M. Akif Köse	Ziraat odası Başkanı	
84	İbrahim Soyer	İlçe Tarım Müdürü	
85	Muhsin Pulcu	Mayor of Beydağ Town	
86	Yılmaz Aydın	district of governor. Beydağ Kaymakamı	
87	Şakir Sarıkaya	Sarıkaya Köyü Muhtarı	
88	Ahmet Topar	Tosunlar Köyü Muhtarı	
89			
90			
91			
92			
93			
94			
95			
96			
97			
98			
99			
100			

RECORD OF PUBLIC CONSULTATION MEETING

Place: Mescitli village in Ödemiş district.

Date & Time: 13:30 to 16:00 on October 6 (Friday), 1995.

Attendants

Local government:	Deputy Governor of Ödemiş district office (cum. District Education Director),
Line agencies:	District agricultural engineers (two persons) and district agricultural technician,
Villagers:	Village Chief (Muhtar) and 102 villagers from three villages, (Ref. Attendant List attached hereto)
DSİ II:	Director, Chief Engineer, and Agro-economist of the Study and Planning Department,
JICA Study Team:	Co-team leader, agronomist, agro-economist, soil & land use expert, coordinator, translator and recorders.

Summary of Farmers' Understanding, View & Opinion

Through the explanation and discussion with farmers, the following understandings, views and opinions were obtained from the farmers:

1. Farmers basically understood the serious situation of lowering of groundwater table and the need of the project. Then, farmers asked DSİ when a dam would be completed. DSİ replied to this question that the construction work would be completed in 1998, but there would be a budget restraint.

2. One of the farmers stated that water quality of his well had become harmful to crops, and he asked DSI to solve this problem. DSİ answered that a research on the water quality would first be made.

3. A farmer put a question on the effectiveness of drip irrigation method and annual cost of this method. To this question, DSİ replied that the information of the effectiveness of this irrigation method could be provided to the farmers after completion of the experiments being carried out by DSİ at Konaklı. As for the annual cost of this irrigation, DSİ replied that the annual cost would be cheap as compared to the other method, though the initial investment is more expensive. The district agricultural engineer also explained that economic use of water would be of great importance, and from this viewpoint, the drip irrigation method would the best.

4. One of farmers put a question on the possibility to involve his small land in the project irrigation system. DSİ answered that the small land holdings would be most welcome to the project, and the land consolidation was recommended to be conducted under the project. The district agricultural engineer also explained the importance of the land consolidation in the Project Area..

5. Farmers understood that the land consolidation would be necessary for the success of the project, and the disturbance of copping might occur while construction of the project facilities.

6. A farmer inquired about the size of land to be acquired for construction of canal and asked about the effectiveness of pipelines. To this questions, DSİ replied the size of land acquisition in general way and the layout plan of irrigation canal system of the project.

7. Farmers understood that the irrigation facilities would be transferred to farmers after their completion, and they should establish the water users' associations (WUAs) for the efficient operation and maintenance of the project facilities. Farmers also understood that the water charges should be collected from the beneficiaries for the operation and maintenance of the facilities.

8. Farmers put a question about the formation of Irrigation Group (IG). To this question, DSİ replied that IG would be established at a village or a canal level, and several IGs would be joined to form a WUA.

9. DSİ remarked that villagers' awareness and participation in the project would be necessary to attain the succesful goal.

Ödemiş İlçesi Mescitli
Üreticiyi Bilgilendirme Toplantısına Katılım Listesi
(List of Participants for Public Meeting at Mescitli in Ödemiş Ilçe)

Tarih: 6 Ekim 1995
Date: October 06, 1995

No.	İsim (Name)	Köy/Teşkilat (Village/Agency)	İmza (Signature)
1	Yelmet Yılmaz	Mescitli Köyü	
2	M. İbrahim Karadaş	" "	
3	Raşit Peşlu	" "	
4	Zeki İnce	Bademli Bucağı	
5	Tahsin Sezgin	Bademli "	
6	Cafer Erol	Mescitli "	
7	Hilmi Fenen	Mescitli Köyü	
8	Ali Arslan	Mescitli Köyü	
9	Mehmet Yürer	Mescitli Köyü	
10	Nevzat Kayalı	Mescitli Köyü	
11	Mayretin Özveren	Mescitli Köyü	
12	Tahsin Akgüç	" "	
13	Kazım Çuloğlu	" "	
14	Mehmet Erol	" "	
15	Hüseyin Kanle	" "	
16	Osman Ünal	" "	
17	Osman Balcı	" "	
18	İsmayıl Özen	// //	
19	Latif Gonen	// //	
20	Cemal Uysuner	// //	

Ödemiş İlçesi, Mescitli
Üreticiyi Bilgilendirme Toplantısına Katılım Listesi
(List of Participants for Public Meeting at Mescitli in Ödemiş İlçe)

Tarih: 6 Ekim 1995
Date: October 06, 1995

No.	İsim (Name)	Köy/Teşkilat (Village/Agency)	İmza (Signature)
21	Fuat Çelik	Mescitli Köyü	
22	Cevdet Aksu	Mescitli Köyü	
23	Muhsin yüzer	mescitli köyü	
24	ihlan Gülücü	mescitli köyü	
25	Lutfi özven	"	
26	Şakir Develioğlu	"	
27	Cavit Nykun	Mescit Köyü	
28	Hüseyin mercan	" "	
29	Şaban sevgen	" "	
30	Hüseyin Gönen	" "	
31	Ahmet mercan	" "	
32	Kadir Selma	" "	
33	Ali mehmet ayözü	" "	
34	Nizamettin gören	" "	
35	Mustafa taşkın	" "	
36	Müsegin Develi	" "	
37	H. Hüseyin Tekeli	" "	
38	ömer yüzer	" "	
39	İsmail Aksu	" "	
40	Ali misli	" "	

Ödemiş İlçesi, Mescitli
Üreticiyi Bilgilendirme Toplantısına Katılım Listesi
(List of Participants for Public Meeting at Mescitli in Ödemiş Ilçe)

Tarih: 6 Ekim 1995
Date: October 06, 1995

No.	İsim (Name)	Köy/Teşkilat (Village/Agency)	İmza (Signature)
41	Ali Mercan	Mescitli Odemis	
42	Gungör Arslan	mescitli Köyü	
43	Ahmet Misli	"	
44	Hüseyin Bağlama	"	
45	Selahattin Mussuna	"	
46	Nihat Kocak	"	
47	IRFAN AKSU	"	
48	Abdullah saydan	"	
49	Ali Bilbil	"	
50	Suleyman celik	"	
51	Kani cubukcan	"	
52	mesat yüksel	"	
53	mehmet yılmaz	"	
54	Kamil güneş	"	
55	MUSTAFA AKSU	"	
56	ALI AKSU	"	
57	Zekiri yoldaş	"	
58	Tevfik bal	"	
59	Muammer gulec	"	
60	Sadik Aycan	"	

Ödemiş İlçesi, Mescitli
Üreticiyi Bilgilendirme Toplantısına Katılım Listesi
(List of Participants for Public Meeting at Mescitli in Ödemiş İlçe)

Tarih: 6 Ekim 1995
Date: October 06, 1995

No.	İsim (Name)	Köy/Teşkilat (Village/Agency)	İmza (Signature)
61	Hikmet Özkoya	Mescitli köyü	
62	Mustafa Kıraz	Mescitli köyü	
63	İbrahim Ceylan	mescitli köyü	
64	Hamdi Zeybek	mescitli köyü	
65	Ahmet Serezli	mescitli köyü	
66	Muharrem ünal	mescitli köyü	
67	Hüseyin Ova	Mescitli	
68	Hüseyin Yoldaş	mescitli	
69	Şevki ünal	Mescitli köyü	
70	Selim Aşkın	Mescitli köyü	
71	İsmail Kaya	mescitli	
72	Nurettin kaşık	mescitli kö	
73	Yılmaz Arslan	Mescitli	
74	Halil Bal	Mescitli	
75	Mümin Dorver	mescitli	
76	Rasit Poslu	mescitli	
77	İbrahim Devecioğlu	Mescitli	
78	Cevat Kaşık	11	
79	Mehmet ARSLAN	11	
80	Akın Erkoyuncu	11	
81	Faik Özeş		
82	Hamdi Kaya		

Ödemiş İlçesi, Mescitli
Üreticiyi Bilgilendirme Toplantısına Katılım Listesi
(List of Participants for Public Meeting at Mescitli in Ödemiş Ilçe)

Tarih: 6 Ekim 1995
Date: October 06, 1995

No.	İsim (Name)	Köy/Teşkilat (Village/Agency)	İmza (Signature)
81	Bekir Şimşek	Z. Müh. İlçe Tarım Md.	
82	Hilmi AKAROĞLU	Ziraat Y. Müh.	
83	İsmail Altın	Ovaköy K.G. Teknisyeni	
84	Mesut ÇEÇAL	İlçe Milli Eğitim Md. Kaymakam V.	
85	Ümmet Aslan	Mescitli Köyü	
86			
87	Mustafa Altın	Mescitli Köyü	
88	Metin Gök	"	
89	Halit yılmaz	"	
90	Ferdun Gölcü	"	
91	Halil ibrahim güzel	"	
92	Ahmet Akan	"	
93	Melik oyaroğlu	"	
94	Şevki Tutar	"	
95	Aydın Sevgin	"	
96	Eyüp çiçek	"	
97	Yılmaz kaya	"	
98	Mustafa Bellı	"	
99	Hüseyin Deligöz	"	
100	Osman Ünal	"	

Attachment-M.4

RECORD OF PUBLIC CONSULTATION MEETING

Place: Konaklı municipality in Ödemiş district.

Date & Time: 17:00 to 18:30 on October 6 (Friday), 1995.

Attendants

Local government:	Mayor of Konaklı municipality,
Line agencies:	Chairman of Chamber of Agriculture,
Villagers:	Village Chief (Muhtar) and 39 villagers from three villages (ref. Attendant List attached hereto)
DSİ II:	Director, Chief Engineer, and Agro-economist of the Study and Planning Department,
JICA Study Team:	co-team leader, agronomist,agro-economist, soil & land use expert, coordinator, translator and recorders.

Summary of Farmers' View & Opinion

Through the explanation and discussion with farmers, the following understandings, views and opinions were obtained from the farmers:

1. Farmers understood the serious situation on lowering of groundwater table and the need of the project, and they requested DSİ to complete the project as soon as possible in order to prevent depletion of the groundwater resource and to perform economical irrigation practices.

2. Farmers understood that the land acquisition would be necessary for the construction of the project facilities, the disturbance of cropping might occur while construction of the facilities. For this matters, they promised to provide a necessary cooperation to the Government.

3. Farmers understood that the irrigation facilities would be transferred to farmers after their completion, and they should establish water users' associations (WUAs) for the efficient operation and maintenance of the facilities. Farmers also understood that water charges should be collected from the beneficiaries for the use of operation and maintenance of the project facilities.

4. Farmers requested DSİ to conduct experiments and demonstrations in the experimental farm at Konaklı to show the performance of new irrigation methods for various crops like cut flower grown by constructing a green house. For this request, DSİ mentioned that the farmers' assistance would be required for the successful accomplishment of the experiment, and farmers replied that they would be able to provide their assistance to DSİ.

5. Farmers asked DSİ to explain the present situation of the Beydağ dam construction. For this request, DSİ explained the DSİ's difficulty of the financial restraint. Regarding this, farmers put a question on the possibility of fund arrangement from international agencies to ensure implementation of the project. For this question, DSİİ replied that this matter should be decided by the Central Government.

6. Farmers expressed their view that they should be ready to reduce the groundwater use after completion of the project.

7. Farmers expressed that they should have a financial difficulty in establishing sprinkler and drip irrigation system. For this matter, DSİ explained that this system would be economical as compared with the other systems from the viewpoint of annual cost, though their initial investment is more expensive.

8. Chairman of Chamber of Agriculture in Ödemiş mentioned the necessity of the project implementation and explained that the Chamber of Agriculture would provide its assistance necessary for the project implementation and operation.

Ödemiş İlçesi, Konaklı
Üreticiyi Bilgilendirme Toplantısına Katılım Listesi
(List of Participants for Public Meeting at Konaklı in Ödemiş İlçe)

Tarih: 6 Ekim 1995
Date: October 06, 1995

No.	İsim (Name)	Köy/Teşkilat (Village/Agency)	İmza (Signature)
1	HASAN UĞRAŞ	Konaklı	
2	Abdullah Karataş	Konaklı	
3	Yusuf Kavakçı	Konaklı	
4	Eşref Tarhan	konaklı	
5	Recep Kayaraş	Konaklı	
6	Mehmet Sancak	Konaklı	
7	Mustafa Koç	Konaklı	
8	Nazmi Gürbüz	Konaklı	
9	Sami Gökçen	Konaklı	
10	Cevdet Tunkara	Konaklı	
11	Muammer Gezgin	Konaklı	
12	Hasan Çıtlak	Konaklı	
13	Selahattin DÖNER	"	
14	İlhan AKSU	"	
15	Mustafa KAYA	"	
16	Süleyman GENÇ	"	
17	Süleyman Taner	"	
18	Süleyman Sarı	"	
19	Mesdar Genç	"	
20	Kamil Tuğar	"	

Ödemiş İlçesi, Konaklı
Üreticiyi Bilgilendirme Toplantısına Katılım Listesi
(List of Participants for Public Meeting at Konaklı in Ödemiş Ilçe)

Tarih: 6 Ekim 1995
Date: October 06, 1995

No.	İsim (Name)	Köy/Teşkilat (Village/Agency)	İmza (Signature)
21	Halil Gıtlık	Konaklı	
22	Şerif Özdil	"	
23	Hüseyin Saçır	Konaklı	
24	OSMAN Duran	Gökçen Fahiha Mahallesi	
25	Ali İşçi	Konaklı	
26	Mehmet Yalçın		
27	İsmail Orman		
28	mehmet çelik		
29	Kiri Bakıcı		
30	Mustafaoğlu		M. Uğur
31	Mustafa Boz		Mustafa Boz
32	Hasan Tutar		
33	Mustafa Türker	Konaklı	
34	Turan Başkan	"	
35	Orhan Başkan	"	
36	Hüseyin KURUL	"	
37	ZOP. Yön Kurulu Bşk. Ahmet Kocaoğlu	"	
38			
39			
40