ANNEX G

ENVIRONMENT/SOIL

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G.1 Soil and Land Use in Turkey

Definition of Soil Groups in Turkey

The 23 soil groups are distributed in Turkey and its characteristic following.

1. Alluvial Soils (A)

These are stored by the rivers, usually the C profile earth (A) on the early sedimentary deposits. The alluvial soil form in; 1) River banks, 2) Alluvial range (The areas between high grounds to valley beds), 3) Deltas, 4) Gulfs, 5) Old river beds, 6) Old watering areas (Thick material layers caused by watering), 7) Barrier plateaus. The mineral compounds of alluvial earth depend on the characteristics and geology of river basin, erosion and deposit period. As the sediments in the wet and humid tropical regions consist of totally decomposed and washed materials, their fertility/efficiency is rather low. The soil in the volcanic and warmer regions are more fertile than the ones in the tropical regions. These lands on which every plantation can be cultivated due to the climates and which are of highest fertilization quality, can be found in plateaus of the rivers, coastal deltas and planes and in the old river banks. The alluvial in Turkey are young in age and soil formation is not observed in them. These are the most fertile soils in the country and some regions are subject to floods.

2. Hydromorphic Alluvial Soils (H)

In the Turkish Developed Soil Map Studies, the alluvial soils subject to floods and that have high level subsoil water and gleyed profile are called hydromorphic alluvial soils. Their vegetation are meadow grass, reed, bulrush and plants that grow in wetlands. Their topographies are inefficient, subsoil waters are high leveled and sublayers are wet. The ups and downs of the subsoil waters, cause uplifting and descending of the soil layers. Thus, bluish gray descending and reddish uplifting stains occur. The rust stains are seen along the cracks and root channels. Sometimes concretions may occur. The layers below the subsoil waters are totally gleyed and they have block stains caused by the rotten plant roots. If these soils have depth, the layers that are gleyed limit the root part.

3. Colluvial Soil (K)

By the gravity in the cliff edges, solifluctions, ground stream or accumulated from neighboring rivers formed on the material called coluvium are young (A) C profile soils. Their soil characteristics are similar to those of high land soils. The main material is not ranked or is wrongly ranked. Due to the precipitation and the stream intensity and the degree of slopes, the layers contain different piece size. The colluvial

soils have a slope on the condition that it is more than 2%. However, by the careful putting forth in especially the wet agriculture areas, this slope may be reduced from 2%. The slope is not complex, it is heterogeneous and it increases through the direction of the material. The color in these soils depend on the material from which they compose. They don't need a special climate to grow. The vegetation depends on the climate. The agricultural lands are very fertile. They can be found everywhere in Turkey.

4. Salt - Sodium Affected Soils (C)

The electrical conductivity values of salty soils within saturation extracts are more than 4 millimhos. In sodic soils, exchangeable sodium are more than 15%. These are usually seen in arid climates where the vaporization is high and there is a drainage problem. The ones that are solonetz and solonchak can be recognized by particular profile characteristics.

5. Organic (Wet Turba) Soils (O)

They are AC profiled soils. They have a thick A horizon and high (20-95%) organic materials. If the thickness of organic materials layer is more than 30 cm and the organic clay quantity is 1) more than 50%, 2) clay do not exist and is more than 20%, 3) clay quantity is less than 50%, it should be between 20-30%. Due to the chemical weathering, they are called pit and mak. The organic material in pit is humus. The plant extracts forming the organic material in mak are totally distracted and their tissues can not be seen. The shallow organic soils have a depth of 30-50 cm.

6. Red - Yellow Podzolic Soils (P)

These are deep soils observed in humid climates, being evolved, well drained, having acidic characteristics and ABC profiles. The vegetation is forests consisting of conifers or deciduous trees. The main material is rather silica and poor in calcium. O horizon is slight, it has organic mineral A1 horizon underneath A2 horizon occurs on light colored, containing more clay, red, yellowish-red or yellow B horizon. B horizon has a construction of blocks and clay membrane on ped surfaces. On the bottom horizon of these thick materialized soils, there are red, yellow, brown and light gray thick lines and dots as a characteristic.

7. Gray - Brown Podzolic Soils (G)

These are slightly podzolized ABC profiled soils. The vegetation is usually forests consisting of plants that have leaf falls. On the surface, there are slight rotten leaf layers, underneath there are granules of

dark grayish-brown and humus layer of 5-10 cm. The humus layer transforms into grayish-brown mineral A1 horizon. In A1 horizon the organic material is in the shape of mull. The A2 horizons are gray or yellowish brown and are 12.5-30cm. This alluvial horizon is characterized by a horizontal flaky structure. Despite the watering, calcium due to considerable differentiation exist in the colloid complexes. The upper part of B horizon varies from yellowish brown to light reddish brown. Due to the accumulation of silicate clays the characteristics are heavier than A horizon and usually block structured. The calcination of these soils and manuring by organic and chemical manure have efficient results.

8. Brown Forest Soils (M)

These are soils that can be observed in hot humid sub-humid and dry climates, having A (B) C profiles. A horizon has a structure of highly developed cramp and granules. The organic material is mixed with mineral material. A horizon is on the B horizon which has a granular, round edged blocks structure. B horizon contains more clay than C horizon. These are usually silicate clays. On the B horizon the base saturation varies from the top to the middle. The boundaries between the horizons are transitive. The depth of the soil usually varies between 50-90 cm. The below parts of B horizon usually consists of calcium carbonate. The profile in the calcite brown forest soils of the Mediterranean climate is totally calcareous. The organic material is totally mixed with calcareous minerals.

9. Non - Calcarious Brown Forest Soils (N)

These are the soils that have A (B) C profile. A horizon involves a porosity structure. The organic material in A horizon is usually acidic and it displays a separate or a minimum mixing. (B) horizon has a structure of granular or round edged blocks that are brown or dark brown. In (B) horizon clay accumulation is very low or it does not exist at all. The silicate clays are from kaolinite or illite groups. The horizon boundaries are transitive and gradual. Their depths are usually around 40-70 cm. The vegetation is forest trees that are deciduous trees. The climate is warm humid regions that do not have dry seasons. The annual precipitation amount is around 500-750 mm. The main material claystone belonging to Miocene and Pliocene, consist of calcarious, sandy clay or pebble deposits.

10. Non - Calcarious Brown Soils (U)

These are soils that have A (B) C profiles. They have brown or light brown diffusable upper soil and a heavier structured faded reddish brown B horizon. Watering usually exist, so upper part of the soil has a more acidic character than the below parts of the soil. Sometimes carbonates can be observed in the

below parts though little. The vegetation is a mixture of grass and grass-brush-wood. The climate is semiarid and subhumid and the precipitation is 400-750 mm. The main material is calcarious sandy clay and sandy clay stones and deposits of pebbles, sand and clay.

11. Chestnut Colored Soils (C)

These are zonal soils formed as a result of calcification and they have ABC or A(B)C profiles. Their profiles are rich in calcium as a result of calcification and their base saturation are high. A Horizon is of 30-50 cm. thick, granular structured, having medium organic materials, diffusable form and dark brown. The organic material is mixed with the mineral material and is more than brown soils regarding the amount. The pH of A1 horizon is neutral and alkaline. The color of B horizon is either dark brown or reddish brown; the structure is prismatic and it displays a limestone accumulation. Underneath the B horizon usually limestone accumulation horizon exists. Under this horizon, gypsum accumulation horizon may exist. These soils are of medium calcarious and the amount of CaCO3 increases in the lower levels. As the precipitation is more, the lime accumulation exists in a deeper level than it exists in the Brown Soils. In the profile, the illicit group of silicate clays are dominant. The vegetation is short and tall bushes, grass and a few trees. They can be found in subhumid and semiarid climates where many months of the year are dry. When compared to Brown Soils the precipitation in summer is less, the temperature is higher and the annual average precipitation is around 370-620 mm. The main material is diffused limestone, gneiss, schist, basalt and other extrusive that are rich in lime.

12. Red Chestnut Colored Soils (D)

Most of their characteristics are the same as or similar to the chestnut colored soils except their color. The color of A horizon is dark red brown, its reaction is neutral and alkaline.

B horizon has a heavier form and its color is reddish brown. It forms in the places where temperature and precipitation are more than the chestnut colored soils. The average annual precipitation is 450-700 mm. As exceeding heat oxidants the iron in the soil, their color is red and as the organic diffusion increases, the amount of organic material is low.

13. Red Mediterranean Soils (T)

They have an ABC horizons they are red in color formed under 600 mm. and more precipitation on limestone in Mediterranean climates. On some occasions, they may form on main material without limestone. The top part of the soil is poor in material and A horizon has a uniform red color. The base

saturation on ped surfaces are more than 40%. The color has a high chromate (Red or yellow). The base saturation increases with the depth. In B horizon the structure is blocks or prismatic, in ped surfaces or caverns, thick clay membranes may be observed. The dominant clays in B horizon is 2:1 type clays. They have different depths. The vegetation is bushes, maquis and various forest trees. The climate is humid with dry seasons and subhumid. The soil is dry through most of the year. However, it is moist in cool and dry seasons. The annual average precipitation is about 500-1100 mm.. The main material is hard limes particularly, limestone, dolomite, calcarious sand stone, calcarious sand and pebbles, calcareous clay stone, coral limestone , calcareous conglomerate, partially claystone and volcanic rocks.

14. Red Brown Mediterranean Soils (E)

The soils are mainly a mixture of Red Mediterranean and Brown Mediterranean Soils. They have ABC profiles. Their A1 horizon is developed and has a medium organic material. The organic material is totally mixed with mineral material. A weak A2 horizon can be observed. The B horizon has a heavier and blocky, edged blocky and prismatic structure. Clay membranes can be observed on ped surfaces. These belong to illite and kaolinite groups. The base saturation is more than 35% and this increases as the depth increases. In dry seasons, A and B horizons have a severe condition. The vegetation is bushes, maquis and various forest trees. They can be found in dry seasoned, humid and subhumid climates. The soil is dry through most of the year. However, it is moist in cool and rainy seasons. The annual average precipitation is about 400-1000 mm. The main material being lime, granite, clay stone, sand stone, various metamorphic, crystal rocks, fliche and limestone can be observed in rocky regions.

15. Rendzina Soils (R)

They are involved in the calcimorphic group of intrerzonal soils. They own their characteristics to calcarious main material. Their horizons are weaker than zonal soils and they have AC profiles. A horizon is thin, granular structured, medium characterized, of various colors ranging from dark grayish brown to black, having alkaline reactions and is rich in organic materials. The organic material is totally mixed with mineral material. CaCO3 is diffused in the profile and the base saturation is high in the profile. The vegetation is bushes, meadows, and bush-heather. They can be found in cool, humid and semi-arid climates. The annual average precipitation is about 500-750 mm. The main material is limestone, dolomite, marl and chalk.

16. Brown Soils (B)

These have calcification characteristics and are zonal soils of ABC profiles. If they were subject to erosion, calcium, high level of base saturation and AC horizon can be observed.

A horizon has a thickness of 10-25 cm., as a structure of definite porous and medium level of organic material. Its pH is neutral or alkaline and its color is gray-brown or brown.

B horizon has a color range of light brown to dark brown and its structure is rough round edged blocks. The vegetation is short, or medium height bushes or grass. These soils can be observed in climates varying from arid to semiarid. The soil is dry through the most of the year. The annual average precipitation is 340-520 mm. The main materials are marl, schist with clay, valley having calcarious or schist sublayers.

17. Red Brown Soils (F)

All the characteristics are as same as the brown soils except the color. The color of A horizon is either reddish brown or red, B horizon is red or reddish brown. These can be found in warmer places than Brown Soils. For iron oxidation increases as the heat increases, their colors are redder. As high temperature causes organic material diffusion, their A horizons are poor in organic materials. The precipitation, vegetation or main material characteristics are as same as or similar to those of brown soils.

18. Sierozem Soils (Z)

These soils are formed as a result of calcification and they are ABC profiled zonal soils. They can be found in arid climates varying from hot to cool-warm. The annual precipitation is 200-275 mm.. AC profile can be observed in those subject to erosion. The vegetation is desert plants, grass and bushes. The main material can vary. A horizon has been weakly formed, it has a color range of light grayish brown to pale gray, a structure of weak scales and a low or medium degree of organic material. B horizon has a weak structure and it has a high amount of lime in it. Under this zone, a gypsum accumulation may exist. The fertility of these soils may increase when irrigated corps is applied.

19. Vertisole Soils (V)

They are dark colored clay soils, having a heavy structure, contacted in dry seasons and expanded in rainy seasons. These have deep and wide cracks, gilga microrelief and shear grounds. These soils can be seen in tropical and subtropical countries. The lime contents are usually 40-60% and sometimes 80%. They are deep and usually dark colored AC profiled soils. The reason for the dark color of A layer is not

because they contain high organic material but because of this material's mixture with clay. The upper parts of A horizon has a granular structure when they are dry. The subparts have a prismatic structure. The vegetation is usually bushes, grass and savannah. They can be found in various climates having dry seasons and having an annual precipitation of 500-750 mm.

The main material of most of the vertisoles are accumulated material. Some of them form as a result of basalt or limestone diffusion.

20. High Mountain Meadow Soils (Y)

These soils form in Alpine climates varying from cool-warm to freezing weather they can be found in high latitudes, altitudes and above the forest boundary. They are formed by various main materials in poor drainage and cold climatic conditions due to gley and calcifications. On the upper part there is A horizon 30-60 cm thick having a dark brown color. Underneath grayish, rust colored, lined and dotted soil prevails. The vegetation is grass, reed and plants with flowers. Their fertility is rather low as they exist in cool climates and they are usually used for pasturing in summers.

21. Regosol Soils (L)

They are young soils in deep mineral deposits. They can be found in every climate, from humid to arid, from warm to hot. These soils are basically found in areas of sand, loess, and steep sloped glaciers. In Regosoles A and C horizons formed. The vegetation is grass, trees, little trees and bushes. The main material is as stated above deposits, volcanic tuffs and ashes.

22. Basaltic Soils (X)

The characteristics of these soils are in a way similar to those that have been formed on limestone. These soils are usually of medium depth or shallow but there are some deeper than 1 m. These are heavy soils with clay and their profiles have not been developed fully. The structure of A horizon varies from granules to blocks. B horizon is usually heavier in structure and it has blocks. The physical characteristics of these soils are not as good as those formed from limestone rocks. In basaltic soils, there is no lime. The reaction varies between neutral and medium alkaline. The soils are poor in organic material. The cation exchangeable capacity is of medium height. The most important variable cation is calcium. As their physical characteristics are poor, the fertility of these soils are rather low. As most of these soils are stony, these should be cleaned when used for intense ploughing.

23. Coastal Alluvial Marsh (S)

These are soils that can be found near lake and sea shores, and are in a wet condition or turn into marsh due to the surface, lake and sea streams during all year. They can be salty or have a certain degree of sodium. These areas can not be used as agricultural areas so they can be used as a shelter for wild animals or as an entertainment place, also the reeds growing on can be used.

Table G.1.1 Area of the Soil Groups in Turkey

Soil Group	Area(ha)	Percentage
1. Alluvial Soils	4,512,087	6.47
2. Hydromorphic Alluvial Soil	319,005	0.46
3. Colluvial Soils	2,907,820	4.17
4. Salt-Sodium Affected Soils	54,347	0.08
5. Organic(Wet Turba) Soils	33,656	0.05
6. Red-Yellow Podzolic Soils	1,847,574	2.65
7. Gray-Brown Podzolic Soils	1,948,641	2.80
8. Brown Forest Soils	14,933,343	21.42
9. Non-Calcarious Brown Forest Soils	9,048,804	12.98
10. Non-Calcarious Brown Soils	4,953,162	7.11
11. Chestnut Colored Soils	2,802,272	4.02
12. Red Chestnut Colored Soils	578,554	0.83
13. Red Mediterranean Soils	1,450,024	2.08
14. Red Brown Mediterranean soils	1,626,039	2.33
15. Rendzina Soils	831,630	1.19
16. Brown Soils	11,713,909	16.80
17. Red Brown Soils	4,566,291	6.55
18. Sierozem soils	81,342	0.12
19. Vertisole Soils	598,693	0.86
20. High Mountain Meadow Soils(Alpine soils)	602,775	0.86
21. Regosol Soils	673,744	0.97
22. Basaltic Soils	3,593,607	5.16
23. Coastal Alluvial Marsh	30,171	0.04
Total	69,707,490	100.00

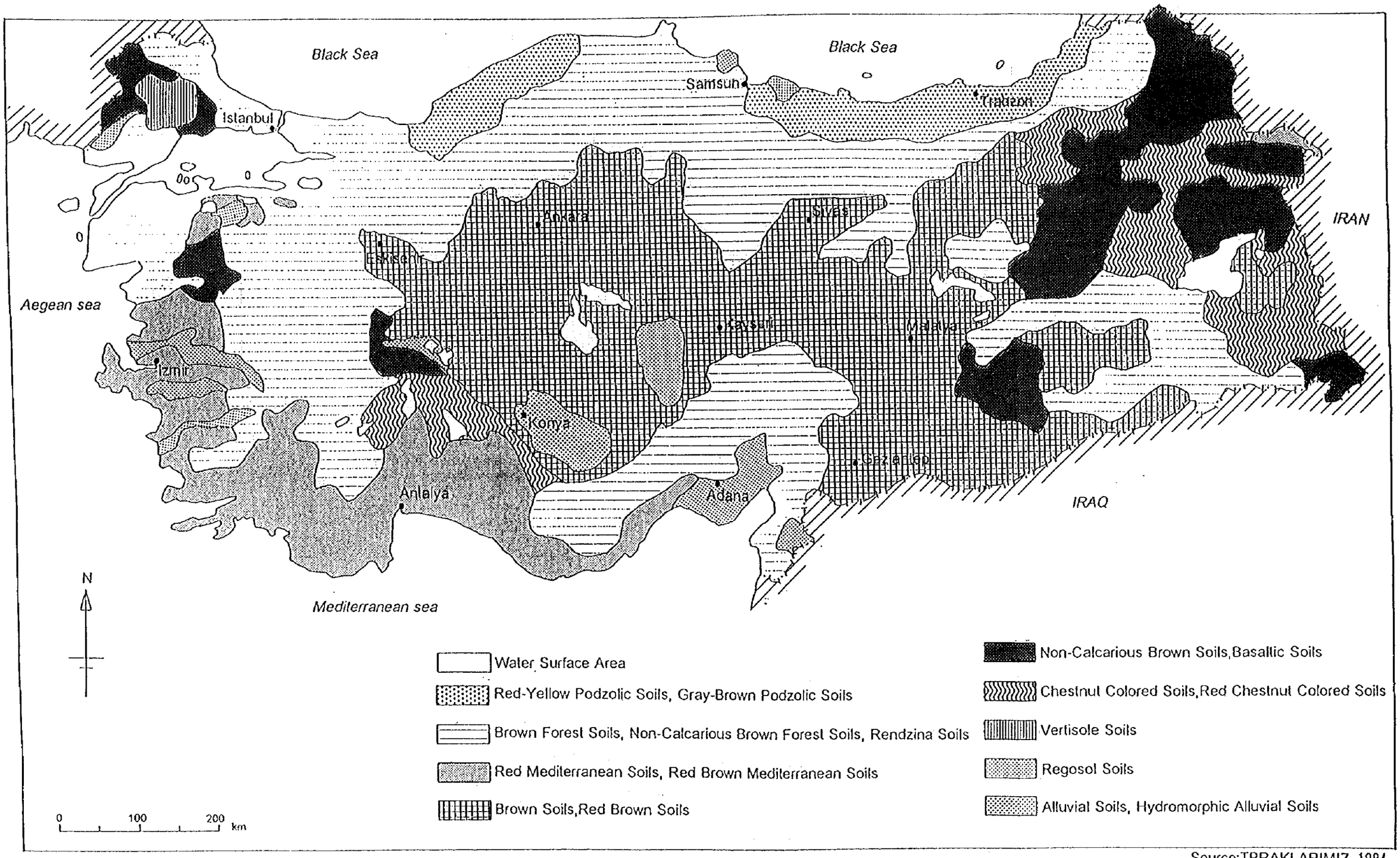
Source: Topraksu Genel Mudurlugu, GDRS (1972)

Table G.1.2 Area of Soil Groups in the Provinces of Turkey

(unit : ha)

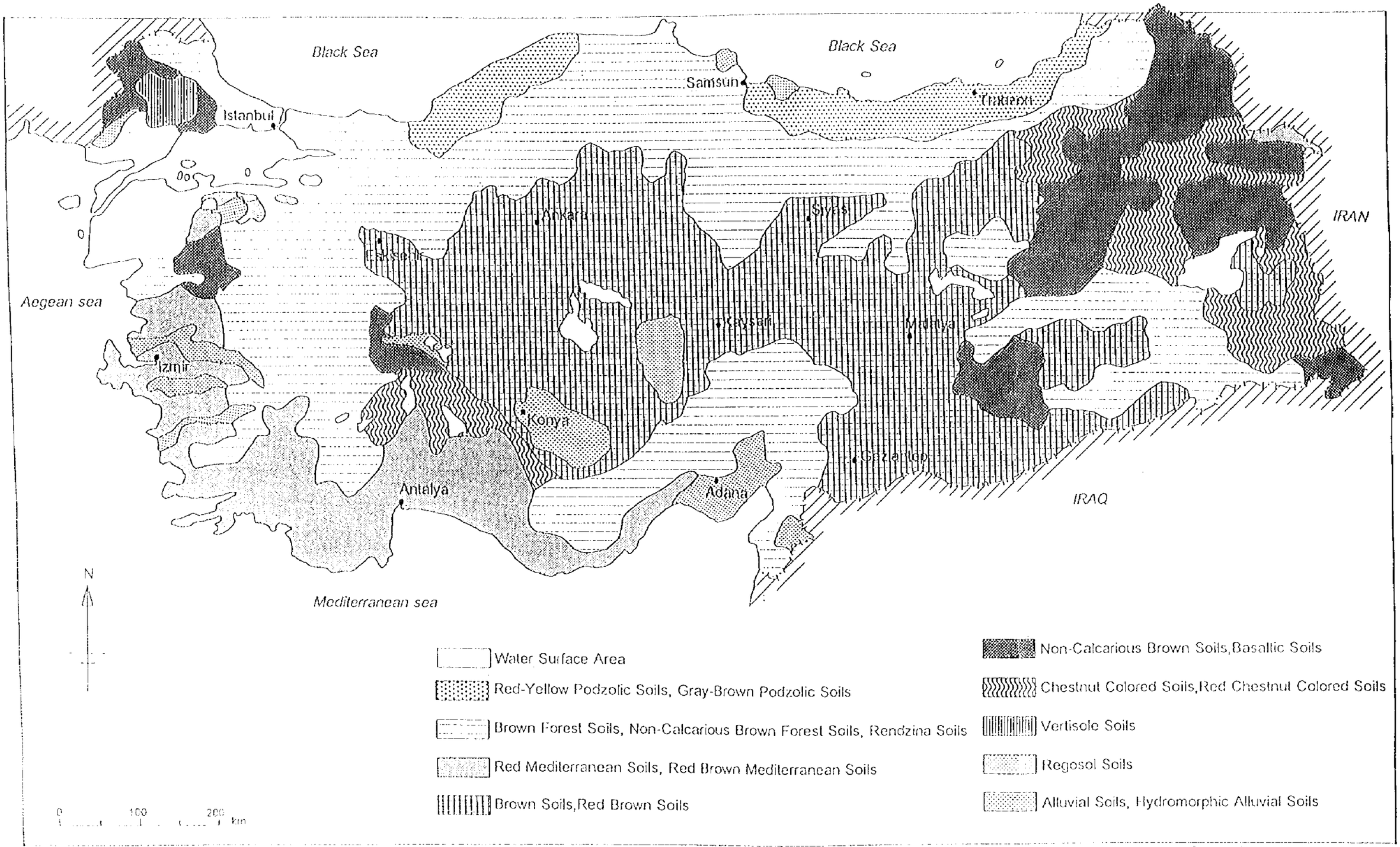
Province	1 Alluvial Soils	2 Hydromorphic Alluvial Soils	3 Colluvial Soils	4 Salt-Sodium affected Soils(Sarran)	5 Organic(Net Turba)Soils	6 Red-Yellow Podzolic Soils	7 Gray-Brown Podzolic Soils	8 Brown Forest Soils	9 Non-Calcarious Brown Forest Soils	10 Non-Calcarious Brown Soils	11 Chestnut Colored Soils	12 Red Chestnut Colored Soils	13 Red Mediterranean Soils	14 Red Brown Mediterranean Soils	15 Rendzina Soils	16 Brown Soils	17 Red Brown Soils	18 Sierozem Soils	19 Vertisole Soils	20 High Mountain Meadow Soils	21 Regosol Soils	22 Basaltic Soils	23 Coastal Alluvial Marsh	Total
ADANA	343.309	14.388	84.507	-	73	-	-	601.956	395.589	39.928	-	412	47.082	79.593	927	1.014	-	-	935	-	2.576	3.153	296	1.615.738
ADIYAMAN	4.012	1.456	12.864	-	-	-	-	90.684	80.863	120.035	-	-	-	12.758	-	208.723	190.094	-	-	-	-	-	194	721.683
AFYON	141.304	15.750	62.642	-	-	-	-	237.537	161.420	189.521	32.871	1.077	-	7.140	-	460.245	9.403	-	-	-	-	-	-	1.318.910
AGRI	64.012	2.291	42.995	-	-	-	-	-	-	400.436	-	39.110	-	-	-	542	-	-	-	-	5.100	-	-	554.486
AMASYA	41.009	-	20.038	-	-	1.990	19.611	233.732	-	2.592	112.324	6.278	-	-	-	81.385	23.236	-	-	-	-	-	-	542.195
ANKARA	16.886	6.610	104.486	583	-	-	-	259.174	252.345	37.412	-	-	-	-	-	1.714.542	33.568	-	-	-	22.360	-	-	2.447.966
ANTALYA	116.715	1.413	60.363	836	2.889	-	-	296.012	218.823	-	71.363	-	609.751	236.613	52.581	-	-	-	-	1.814	6.648	-	499	1.676.320
ARTVIN	1.154	-	1.840	-	-	100.426	-	447.990	685	-	2.029	-	-	-	-	-	-	-	-	89.814	-	-	-	643.938
AYDIN	123.187	586	66.751	-	-	-	-	18.197	122.643	219.830	1.834	997	864	100.790	36.103	-	-	-	-	-	39.310	-	2.549	783.641
BALIKESIR	77.285	1.622	27.636	-	-	-	-	199.715	670.340	235.675	-	-	35	51.395	79.454	-	-	-	63.283	576	126	-	1.578	1.408.720
BILECIK	17.493	-	840	-	-	-	-	267.037	125.970	3.474	-	-	-	-	294	4.541	-	-	-	-	-	-	-	419.649
BINGOL	7.143	-	26.213	-	-	-	-	77.443	149.628	190.891	60.057	-	-	-	-	30.929	-	-	-	-	-	259.438	-	801.742
BITLIS	19.291	5.831	5.600	-	-	14.230	-	6.031	120.422	223.586	25.283	-	-	-	-	15.350	-	-	-	-	92.038	-	-	527.662
BOLU	62.001	-	18.004	-	476	105.993	128.187	398.425	337.636	-	38.154	-	-	-	-	-	-	-	-	-	-	-	-	1.088.876
BURDUR	37.949	3.359	56.253	1.184	1.822	-	-	145.003	119.218	-	100.599	-	82.759	67.680	-	-	-	-	-	235	1.054	-	-	617.115
BURSA	115.308	1.903	32.759	-	-	-	-	245.510	516.705	16.740	-	-	-	29.212	49.875	-	-	-	22.943	1.347	-	-	1.967	1.034.269
CANAKKALE	62.199	1.982	20.840	120	-	-	-	198.434	569.581	8.606	-	-	2.530	36.706	22.941	-	-	-	23.305	-	2.448	-	2.210	951.902
CANKIRI	44.972	299	27.019	-	-	6.525	2.640	399.160	57.506	-	58.865	-	-	-	-	216.452	11.203	-	-	-	-	-	-	824.641
CORUM	102.022	753	41.767	652	-	-	-	641.959	7.832	137	38.909	4.199	-	-	-	332.965	90.262	-	-	-	-	-	-	1.261.457
DENIZLI	75.692	2.329	136.457	-	2.132	29.107	-	318.896	74.279	40.430	16.303	34.055	38.055	234.748	113.052	10.162	-	-	-	-	12.328	-	370	1.141.395
DIYARBAKIR	31.661	-	25.898	-	-	-	-	628.816	-	-	-	-	-	-	-	195.391	323.102	-	-	-	-	275.204	-	1.480.072
EDIRNE	87.570	14.120	-	-	-	-	-	10.268	201.926	201.970	-	-	-	-	17	-	-	-	103.131	-	-	-	-	619.002
ELAZIG	17.315	-	25.676	-	-	-	-	141.899	10.044	-	-	-	-	-	-	333.876	183.968	-	-	-	-	-	-	712.778
ERZINCAN	29.855	-	50.029	-	-	-	-	135.031	14.306	96.561	39.615	-	-	-	-	712.789	1.886	-	-	-	-	8.198	-	1.088.270
ERZURUM	65.561	1.470	144.291	-	390	-	-	186.842	6.240	5.703	845.897	42.253	-	-	-	133.751	-	-	-	49.761	-	916.579	-	2.398.738
ESKISEHIR	92.501	16.856	3.624	-	-	-	-	359.787	173.187	19.616	-	-	-	-	-	611.494	6.307	-	-	-	-	-	-	1.283.372
GAZIANTEP	19.909	218	142.206	-	2.184	-	-	11.360	81.974	-	-	-	46.871	-	-	25.572	310.613	-	-	-	-	112.877	-	753.784
GIRESUN	1.006	-	2.272	-	-	1.630	354.921	110.490	44.668	19.362	95	-	-	-	-	18.992	-	-	-	87.625	-	-	-	641.061
GUMUSHANE	24.696	-	20.005	-	-	-	31.215	294.362	18.634	56.995	49.645	-	-	-	-	305.792	6.595	-	-	98.499	-	-	-	906.439
HAKKARI	9.231	11.828	1.293	-	-	71.912	-	230.175	-	266.403	212.520	-	-	-	-	-	-	-	-	-	-	-	-	803.362
HATAY	90.073	583	74.105	-	-	-	-	103.057	180.307	-	-	-	47.129	645	-	-	-	-	-	-	-	29.092	-	524.991
ISPARTA	47.990	2.206	63.609	950	-	13.671	-	142.156	61.081	57.666	115.489	-	68.932	81.904	-	-	-	-	-	112	5.337	-	159	661.262
ICEL	78.933	-	47.865	-	1.196	79.115	-	69.349	222.143	718	-	-	241.546	75.290	50.547	-	-	-	-	-	3.884	-	477	871.063
ISTANBUL	21.919	1.349	2.514	129	-	4.121	-	20.761	338.368	15.704	-	-	-	-	52.478	-	-	-	64.754	-	683	-	2.297	525.077
IZMIR	142.807	-	141.844	-	433	-	-	51.459	196.324	362.927	5.157	1.246	30.504	100.098	40.090	-	-	-	963	-	1.642	-	2.944	1.078.438
KARS	122.332	1.129	41.119	-	-	-	-	-	-	-	73.224	2.080	-	-	-	142.075	-	-	-	86.214	14.787	1.284.247	-	1.767.207
KASTAMONU	42.694	927	24.558	-	-	85.995	67.320	814.302	126.475	-	129.645	2.195	-	-	-	-	-	-	-	-	-	-	-	1.294.111
KAYSERI	115.956	14.645	108.813	-	7.824	-	-	82.554	60.520	283.742	100.892	-	-	-	-	611.108	92.616	-	-	-	21.125	-	983	1.500.778
KIRKLARELI	33.317	-	707	-	-	-	-	33.236	341.055	137.551	-	-	-	-	-	-	-	-	101.443	-	-	-	375	647.684
KIRSEHIR	27.894	7.126	44.596	12.868	-	-	-	32.551	-	9.174	-	-	-	-	-	337.934	139.204	-	-	-	-	-	-	611.407
KOCAELI	16.494	-	7.335	-	-	-	-	10.955	294.815	9.678	-	-	-	1.796	54.590	-	-	-	229	-	2.380	-	-	398.272
KONYA	645.009	103.443	289.338	22.085	626	535.431	-	268.101	241.183	62.172	30.155	326.632	35.176	-	-	846.115	779.794	78.886	19.583	-	85.147	-	7.569	4.376.445
KUTAHYA	68.538	1.249	22.813	-	2.230	-	-	648.910	306.211	7.153	8.712	17.590	-	-	11.291	54.592	158	-	-	1.959	-	-	-	1.151.406
MALATYA	21.945	-	28.836	-	-	-	-	85.482	81.270	159.358	-	-	-	-	-	525.411	237.912	-	-	-	-	44.675	-	1.184.889
MANISA	142.893	-	90.260	4.283	-	-	-	133.769	271.295	245.662	7.275	17.705	34.273	78.094	233.996	-	-	-	-	-	20.028	-	-	1.279.533
MARAS	68.411	294	109.859	-	8.970	-	-	-	249.718	44.397	9.157	-	11.432	85.332	-	198.386	48.264	-	-	-	-	52.230	-	886.450
MARDIN	4.044	-	67.716	-	-	-	-	480.124	30.443	-	-	-	-	-	-	13.341	535.963	-	-	-	-	40.583	-	1.172.214
MUGLA	34.506	745	88.277	235	-	290.923	-	80.728	132.521	33.506	321	2.158	153.085	346.245	4.495	-	-	-	-	-	3.820	-	4.590	1.176.155
MUS	56.184	830	12.022	-	-	-	-	-	107.373	84.242	359.729	-	-	-	-	-	-	-	71.150	-	7.570	112.993	-	812.093
NEVSEHIR	29.585	193	33.364	-	-	-	-	-	-	10.424	-	-	-	-	-	228.311	73.389	-	-	-	155.284	-	-	530.550
NIGDE	178.935	44.044	81.798	9.497	2.411	-	-	56.987	57.508	162.872	-	-	-	-	1.258	564.775	22.796	2.456	2.840	-	143.627	-	-	1.331.804
ORDU	4.309	-	621	-	-	69.429	342.028	80.302	74.760	-	-	-	-	-	-	-	-	-	-	22.883	-	-	-	594.332
RIZE	1.251	-	275	-	-	180.459	59.270	-	26.148	-	-	-	-	-	-	-	-	-	-	93.351	-	-	-	360.754
SAKARYA	88.842	2.515	12.444	-	-	-	-	88.750	262.589	-	-	-	-	-	7.016	-	-	-	88	-	-	-	416	462.660
SAMSUN	142.578	153	13.710	-	-	4.135	256.316	391.936	-	-	125.619	-	-	-	-	134	3.550	-	-	-	148	-	487	938.166
SIIRT	6.294	-	9.477	-	-	-	-	703.433	-	-	-	-	-	-	-	289.572	-	-	-	-	-	-	-	1.008.776
SINOP	9.976	-	7.686	-	-	23.631	109.832	373.335	10.127	-	23.953	1.688	-	-	-	12.507	-	-	-	-	-	-	-	572.735
SIVAS	122.712	6.197	32.369	775	-	-	86	1.110.042	121.918	97.855	11.485	-	-	-	-	1.092.626	158.068	-	-	4.617	-	-	-	2.758.750
TEKIRDAG	54.265	218	-	150	-	-	-	103.324	133.710	197.195	-	-	-	-	-	-	-	-	124.046	-	-	-	-	612.908
TOKAT	54.028	228	29.149	-	-	-	16.224	620.561	122.967	-	75.867	49.622	-	-	-	8.540	-	-	-	-	-	-	-	977.186
TRABZON	754	-	2.276	-	-	87.950	281.118	-	-	-	-	-	-	-	-	-	-	-	-	63.968	-	-	-	436.066
TUNCELI	4.058	-	6.854	-	-	-	-	150.596	153.718	108.058	-	-	-	-	-	238.845	-	-	-	-	-	23.120	-	685.249
URFA	3.846	-	20.365	-	-	-	-	11.835	-	-	-	-	-	-	-	162.325	1.236.368	-	-	-	-	431.218	-	1.870.955
USAK	13.158	300	7.813	-	-	-	-	202.622	171.071	6.943	1.648	29.257	-	-	20.625	61.855	-	-	-	-	-	-	-	515.292
VAN	67.514	25.389	21.318	-	-	-	-	-	22.995	399.537	-	-	-	-	-	285.000	-	-	-	-	19.294	-	211	841.258
YOZGAT	58.341	178	94.803	-	-	-	-	488.087	5.271	60.724	3.716	-	-	-	-	620.890	47.974	-	-	-	-	-	-	1.379.984
ZONGULDAK	37.454	-	4.144	-	-	140.901	279.873	302.114	62.456	-	13.865	-	-	-	-	-	-	-	-	-	-	-	-	840.807
Total	4.512.087	319.005	2.907.820	54.347	33.656	1.847.574	1.948.641	14.933.343	9.048.804	4.953.162	2.802.272	578.554	1.450.024	1.626.039	831.630	11.713.909	4.566.291	81.342	598.693	602.775	673.744	3.593.607	30.171	69.707.490

Source: TOPRAKSU GENEL MUDURLUGU (1972)



Source:TPRAKLARIMIZ. 1984

Figure G.1.1 Soil Map of Turkey



Source:TPRAKLARIMIZ. 1984

Figure G.1.1 Soil Map of Turkey

Table G.1.3 The Present Land Usage according to Its Capability in Turkey

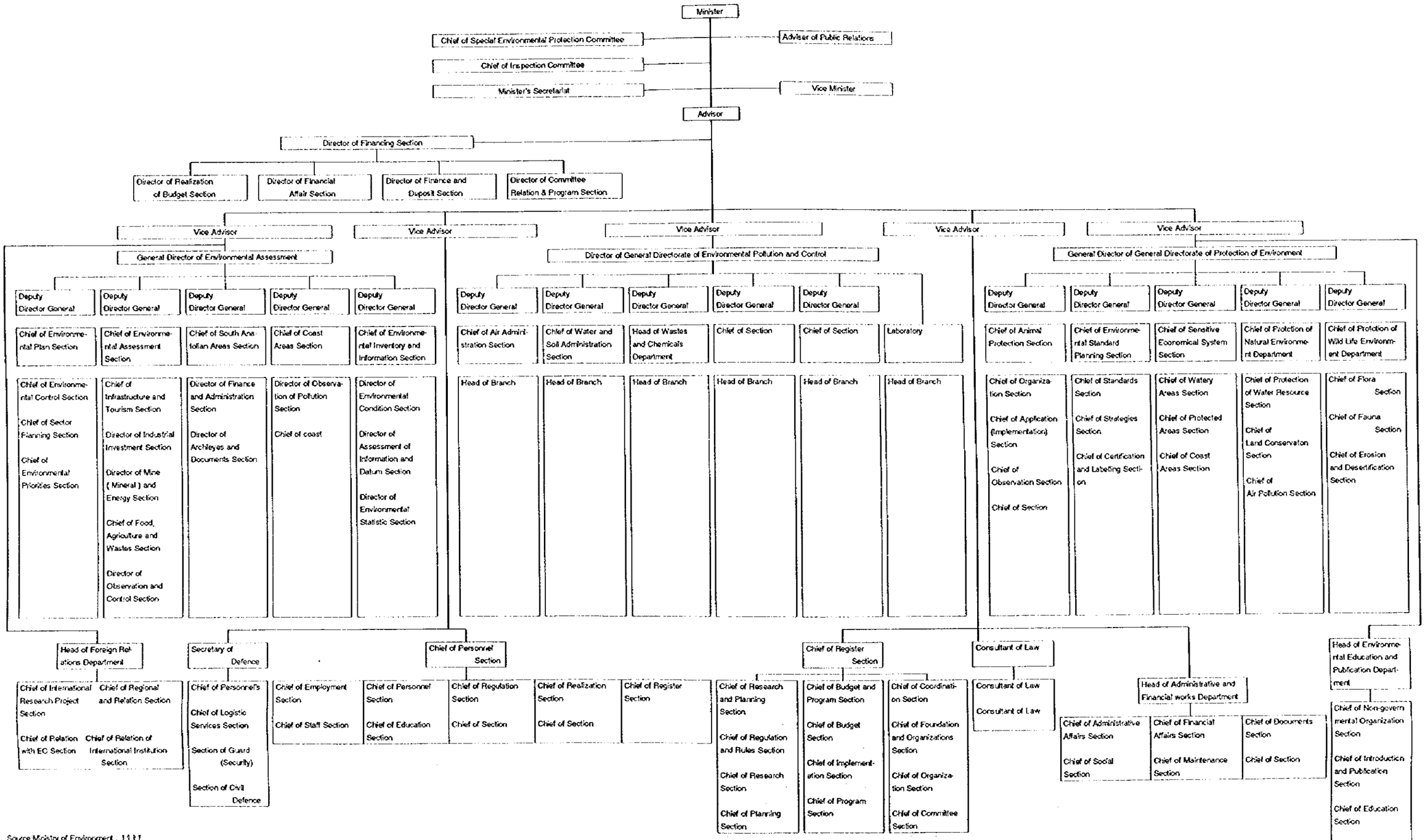
Land Use	The Land Capability (ha)										Total	Percentage to total
	I	II	III	IV	Subtotal	V	VI	VII	Subtotal	VIII		
Agricultural land	4,825,442	6,040,590	6,036,224	4,877,061	21,779,317	7,969	3,965,201	2,301,020	6,274,190	-	28,053,507	36.0
Rain-fed fallow field	1,586,720	2,801,963	3,774,460	3,508,127	11,671,270	4,412	2,469,711	873,975	3,348,098	-	15,119,368	(53.5)
Rain-fed field	944,965	1,695,533	1,202,919	769,313	4,612,730	1,743	867,283	754,124	1,623,150	-	6,235,880	(22.2)
Irrigated field	1,715,478	973,576	600,307	198,783	3,488,144	1,661	83,095	19,487	104,243	-	3,592,387	(12.8)
Partly irrigated field	300,040	239,851	126,288	56,555	722,734	-	35,391	4,148	39,539	-	762,273	(2.7)
Vineyard(rain-fed)	34,297	62,882	110,744	104,334	312,257	22	131,829	90,129	221,980	-	534,237	(1.9)
Vineyard(irrigated)	14,477	9,615	4,533	2,958	31,583	81	576	162	819	-	32,402	(0.1)
Garden(rain-fed)	48,296	43,567	40,595	37,255	169,713	-	37,691	25,238	62,929	-	232,642	(0.8)
Garden(irrigated)	129,365	92,630	47,859	35,040	304,894	-	18,744	6,445	25,189	-	330,083	(1.2)
Pistachio	5,959	17,721	16,543	14,628	54,851	-	16,608	62,355	78,963	-	133,814	(0.5)
Tea	500	1,233	1,413	9,339	12,485	-	44,059	31,807	75,866	-	88,351	(0.3)
Olive	26,885	74,068	78,226	60,693	239,872	50	87,970	169,552	257,572	-	497,444	(1.8)
Nut	3,656	10,590	24,544	78,780	117,570	-	162,526	234,963	397,489	-	515,059	(1.9)
Chest nut	-	122	-	-	122	-	290	1,807	2,097	-	2,219	(tr.)
Banana	173	1,706	231	-	2,110	-	-	-	-	-	2,110	(tr.)
Citrus fruits	12,291	10,918	3,123	630	26,962	-	1,059	44	1,103	-	28,065	(0.1)
Pine nut	-	-	-	-	-	-	579	2,094	2,673	-	2,673	(tr.)
Fig	-	-	921	-	921	-	-	17,506	17,506	-	18,427	(tr.)
Mulberry	2,340	4,615	3,518	626	11,099	-	7,790	7,184	14,974	-	26,073	(0.1)
Meadow - Pasture	149,151	444,477	737,300	1,641,382	2,972,310	90,028	4,163,387	14,279,443	18,532,858	-	21,505,168	27.6
Meadow land	54,669	158,129	98,553	73,010	384,361	75,137	48,685	138,508	262,330	-	646,691	(3.0)
Pasture land	94,482	286,348	638,747	1,568,372	2,587,949	14,891	4,114,702	14,140,935	18,270,528	-	20,858,477	(97.0)
Forest - Heather(scrub)	13,112	178,810	420,315	846,063	1,458,300	27,970	2,624,014	19,117,691	21,769,675	-	23,227,975	29.8
Forest land	7,708	112,525	290,924	593,173	1,004,330	9,447	1,639,313	2,531,789	14,180,549	-	15,184,879	(65.4)
Heath land(scrub)	5,404	66,285	129,391	252,890	453,970	18,523	984,701	6,585,902	7,891,126	-	8,043,096	(34.6)
Non agricultural land	98,302	108,996	88,924	60,539	356,841	1,967	73,160	138,186	213,313	323,999	894,153	1.1
National park	-	199	68	309	576	258	741	53,658	54,657	31,620	86,853	(9.7)
Residential(compact)	18,243	10,844	6,672	7,214	42,973	592	3,704	8,204	12,500	289,468	344,941	(38.6)
Residential(not compact)	62,466	81,620	65,565	46,613	256,264	646	56,365	66,688	123,699	1,537	381,500	(42.7)
Touristic area	1,428	2,026	901	238	4,593	49	766	1,572	2,387	725	7,705	(0.9)
Industry area	6,268	6,951	4,845	2,127	20,191	442	4,375	1,577	6,374	603	27,168	(3.0)
Military area	6,076	4,605	8,870	3,613	23,164	-	6,652	6,400	13,052	46	36,262	(4.1)
Airport area	3,901	2,751	2,003	425	9,080	-	557	87	644	-	9,724	(1.0)
Other lands	-	-	-	-	-	-	-	-	-	3,060,788	3,060,788	4.0
Water surface area	-	-	-	-	-	-	-	-	-	1,158,109	1,158,109	1.5
Total	5,086,087	6,772,873	7,282,763	7,425,045	26,566,768	127,934	10,825,762	35,836,340	46,790,036	4,542,896	77,899,700	100.0

Source: Turkish Land Possessions, 1982-1984

Table G.1.4 Different Area of Erosion Types in Turkey

Degree of erosion	Description	Area (ha)	Ratio to the country area(%)
0Y	Flat Bottomland (improperly drained)	2,783,781	3.58
0	Flat Bottomland (Well drained)	2,382,846	3.06
1	Slightly Eroded	5,611,892	7.22
2	Moderately Eroded	15,592,750	20.04
3	Severely Eroded	28,334,933	36.42
4	Very Severely Eroded	17,366,463	22.32
CK	Rock Surfaces-Debris	2,930,933	3.77
R1	Slight Wind Erosion	165,664	0.65
R2	Moderate Wind Erosion	231,041	
R3	Severe Wind Erosion	64,385	
R4	Very Severe Wind Erosion	7,304	
SK	Coastal Dunes	37,915	
	Total	75,509,907	97.06
	The country area	77,797,127	

Source : Erosion map of Turkey, Ministry of Village Affairs and Cooperatives General Directorate of Topraksu,1981



Source:Ministry of Environment , 1991

Figure G. 2 . 1 Organization of Ministry of Environment

Table G.3.1 Checklist for Proving Environmental Impact

Applicable columns with the following impact degree are marked with "X".
SEI : Significant Environmental Impact
A : The subject SEI is unquestionably induced by the Project.
B : The subject SEI is likely to be induced by the Project.
C : The SEI is not fully known.
D : There is no possibility that the subject SEI is likely to be induced by the Project.

Categories of Environmental Impact	Evaluation				Evaluation Basis
	A	B	C	D	
1. Planned residential settlement					
2. Involuntary resettlement					
3. Substantial changes in the way of life					
4. Conflict among communities and people					
5. Impact on native people					
6. Population increase					
7. Drastic change in population composition					
8. Changes in bases of economic activities					
9. Occupational change and loss of job opportunities					
10. Increase in income disparities					
11. Adjustment & regulation of water or fishing (riparian) rights					
12. Changes in social and institutional structures					
13. Changes in existing institutions and customs					
14. Increased use of agrochemicals					
15. Outbreak of endemic diseases					
16. Spreading of endemic diseases					
17. Residual toxicity of agrochemicals					
18. Increase in domestic and other human wastes					
19. Impairment of historic remains and cultural assets					
20. Damage to aesthetic sites					

Categories of Environmental Impact	Evaluation A	B	C	D	Evaluation Basis
21. Impairment of buried assets					
22. Changes in vegetation					
23. Negative impact on important or indigenous fauna and flora					
24. Degradation of ecosystems with biological diversity					
25. Proliferation of exotic and/or hazardous species					
26. Destruction of wetlands and peat lands					
27. Decrease of tropical rain forests and wild lands					
28. Destruction or degradation of mangrove forests					
29. Degradation of coral reefs					
30. Soil erosion					
31. Soil salinization					
32. Deterioration of soil fertility					
33. Soil contamination by agrochemicals and others					
34. Devastation or desertification of land					
35. Devastation of hinterland					
36. Ground subsidence					
37. Change in surface water hydrology					
38. Change in ground water hydrology					
39. Inundation and flooding					
40. Sedimentation					
41. Riverbed degradation					
42. Impediment of inland navigation					
43. Water contamination and deterioration of water quality					
44. Water eutrophication					
45. Sea water intrusion					
46. Change in temperature of water					
47. Air pollution					

Table G.3.2 Definition of Environmental Impact Categories

Categories of Environmental Impact	Definition
Social Environment	
(1) Socio-economic issues	
(1)-1 Social issues	
1. Planned residential settlement	New land settlement implemented in agriculture & rural development projects such as land clearing & leveling sea/swamp reclamation and irrigation development; settlement expected for nomad, landless farmers or shifting cultivators.
2. Involuntary resettlement	Forced resettlement of the inhabitants from their original dwelling places in the area that will be submerged with the development of the project.
3. Substantial changes in the way of life	Changes in the way of life of the people in particular in the role of women in family & society brought about by agricultural and rural development.
4. Conflict among communities and people	Friction due to conflicting interests between beneficiaries and non-beneficiaries, people in favor of and those against development, new settlers and host people, insiders and outsiders, people in a project area and those affected in the surrounding area.
5. Impact on native people	Adverse effects of development on local communities composed partly or entirely of indigenous people (including tribal groups), low-caste groups, ethnic minorities, or nomads.
(1)-2 Demographic issues	
6. Population increase	Significant population increase in a project or surrounding area due to development.
7. Drastic change in population composition	Drastic change in population composition in a project or surrounding area due to development.
(1)-3 Economic activities	
8. Changes in bases of economic activities	Forced or involuntary relocation of economic bases or means such as farmland, fishing grounds, etc., under a project due to land acquisition, changes in land use regulation, and deterioration or depletion of bases or means for economic activities.
9. Occupational change and loss of job opportunities	Forced or involuntary occupational change due to land acquisition and loss or deterioration of means or bases of economic activities; it includes loss of job opportunities due to farm mechanization.
10. Increase in income disparities	Increase in income disparities among groups brought about by the development; it implies relative impoverishment of the economically weak.
(1)-4 Institutional and custom related issues	
11. Adjustment & regulation of water or fishing (riparian) rights	Adverse development effects on water or fishing (riparian) rights and necessary adjustments or regulations.
12. Changes in social and institutional structures	Changes in social and institutional structures as a result of establishment of new or modified rural organizations caused by development.
13. Changes in existing institutions and customs	Changes in existing institutions and customs involved in or induced by development activities.

Categories of Environmental Impact	Definition
(2) Health and sanitary issues	
14. Increased use of agrochemicals	Increased use of chemical pesticides due to intensification of agriculture; introduction of high-yielding species & new crops and irrigation.
15. Outbreak of endemic diseases	Spreading of endemic diseases as a result of the adverse effects of development.
16. Spreading of endemic diseases	Spreading of endemic diseases attributable to the adverse effects of development.
17. Residual toxicity of agrochemicals	Accumulation in the natural environment (soil, water, etc.) of agrochemicals or chemical substances with high residual toxicity such as organo-chloric insecticides, etc.
18. Increase in domestic and other human wastes	Increase in domestic and other human wastes due to the consequences of development such as population increase.
(3) Cultural asset issues	
19. Impairment of historic remains and cultural assets	Direct or indirect impairment or destruction of sites, structures, and remains of archaeological, historical, religious, cultural, or aesthetic value as result of development.
20. Damage to aesthetic sites	Direct or indirect negative effects on aesthetic features as a result of development.
21. Impairment of buried assets	Impairment or destruction of buried assets due to development activities.
Natural Environment	
(4) Biological and ecological issues	
22. Changes in vegetation	Direct or indirect deterioration or degradation of vegetation due to development activities including removal of vegetation cover, alternation of land use, encroachment into forest, alteration of environmental conditions, etc.
23. Negative impact on important or indigenous fauna and flora	Adverse effects on important or indigenous animal & plant species due to destruction of or changes in habitats.
24. Degradation of ecosystems with biological diversity	Degradation of ecosystems that allows the wild species of plants and animals to withstand external stress.
25. Proliferation of exotic and/or hazardous species	Introduction of pathogenic agents or spreading of hazardous species due to creation of environment conductive to their propagation.
26. Destruction of wetlands and peatlands	Extinction of wetlands or peatlands caused directly by development activities such as large-scale earth filling, or indirectly by changes of hydrological regime such as drying and decomposition.
27. Decrease of tropical rain forests and wildlands	Decrease or disappearance of tropical rain forests due to direct or indirect effects of development.
28. Destruction or degradation of mangrove forests	Disappearance of mangrove forests attributable to direct destruction or deterioration of supporting environmental conditions.
29. Degradation of coral reefs	Disappearance of coral reefs due to direct destruction, or damage to and deterioration of the supporting environment caused by sedimentation, etc.

Categories of Environmental Impact	Definition
(5) Soil and land resources	
(5)-1 Soil resources	
30 Soil erosion	Washing or blowing away of soil from the earth surface by the action of water or wind.
31. Soil salinization	Phenomena in which soluble salts accumulate in the surface layer of soil and crops growth is consequently affected.
32. Deterioration of soil fertility	Deterioration of soil productivity due to leaching and decomposition of nutrients, nutrient absorption by plants, surface soil erosion, salinization, failure in soil management, etc.
33. Soil contamination by agrochemicals and others	Accumulation of agrochemicals in soil with high residual toxicity.
(5)-2 Land resources	
34. Devastation or desertification of land	Deterioration of land productivity or desertification caused by artificial or natural impacts.
35. Devastation of hinterland	Devastation of area surrounding a project area as a result of secondary or indirect impacts of development.
36. Ground subsidence	Subsidence of ground caused by the dehydration or drying of wetlands, peat swamp, or reclaimed lands, or excessive exploitation of groundwater.
(6) Hydrology, water quality and air	
(6)-1 Hydrology	
37. Change in surface water hydrology	Alteration of river discharge or water level as the effects of reservoir construction, irrigation water intake, or drainage.
38. Change in ground water hydrology	Changes in the groundwater recharge mechanism or groundwater table caused by infiltration of irrigation water and exploitation of groundwater.
39. Inundation and flooding	Overflowing of a river onto the surrounding land or the surrounding of sea water onto the coastal land. Inundation or flooding are caused by increased river or run-off discharge or poor water management.
40. Sedimentation	Settlement of transported sediment in river, estuaries and reservoir.
41. Riverbed degradation	Degradation of riverbed in lower basin areas due to insufficient sediment load to maintain riverbed level.
42. Impediment of inland navigation	Adverse impacts on navigation due to development activities.
(6)-2 Water quality and temperature	
43. Water contamination and deterioration of water quality	Deterioration of water quality due to development activities.
44. Water eutrophication	Accumulation in water of nutritive soluble salts such as nitrate and phosphate.
45. Sea water intrusion	Intrusion of salt water wedge along the riverbed.
46. Change in temperature of water	Adverse impact of low temperate irrigation water on crops.
(6)-3 Atmosphere	
47. Air pollution	Diffusion of agrochemicals, sand dust, stench and exhaust gas from vehicles and machines.

Table G.3.3 List of Initial Environmental Examination(IEE) Survey areas

1.Ankara Regional Area(14 Areas)

Province	District	Name of the Project	Code Number
Ankara(6)	S.Kochisar	Seymenli	01-06-008
	Gudul	Gapipce	-040
	Beypazari	Acisu	-062
	Haymana	Calis	-066
	Polatli	Girmec	-068
	Haymana	Sogulca	-077
Bolu(1)	Sevan	Sebankoyleri	01-14-069
Cankiri(2)	Atkaracalar	Atkaraca-Mrk	01-18-070
	Ilgaz	Yuvasaray	-071
Kirikkale(5)	Merkez	Hacilar	01-71-072
	Karakecili	Sulubuk	-073
	Bahsili	Karaanmetli	-074
	Merkez	Anili	-075
	Keskin	Esatmuminli	-076

2.Konya Regional Area(62 Areas)

Province	District	Name of the Project	Code Number
Konya(37)	Aksehir	Gozpinari	02-42-001
	Altinekin	Borukkuyu	-002
	Altinekin	Yenikuyu	-003
	Beysehir	Yenidogan	-004
	Cumra	Alibeyhuyugu	-005
	Cumra	Buyukaslama	-006
	Cumra	Icfricumra	-007
	Cumra	Urunlu	-008
	Cumra	Surguc	-010
	Derebucak	Huglu	-011
	Eregli	Tasagil	-012
	Eregli	Yenizengen	-013
	Eregli	Kutoren	-014
	Emirgazi	Cinikyayl	-015
	Emirgazi	Ikizli	-016
	Guneysinir	M.Aliveorenboyali	-017
	Guneysinir	Merkez	-018
	Ilgin	Agalar	-020
	Ilgin	Argithani	-021
	Ilgin	Balki	-022
	Ilgin	Mahmuihisar	-023
	Karapinar	Serpekyayl	-024
	Karapinar	Oymali	-025
	Karapinar	Islik	-026
	Karapinar	Akoren	-027
	Karapinar	Merkez	-028
	Karapinar	Taspinar	-029
	Karapinar	Sazlipinar	-030
	Karapinar	Sircali	-031
	Karapinar	Yavsancukuru	-032

Konya (Continued)	Karapinar	Kucukaslama	02-42-033
	Karatay	Kemerlikolca	-034
	Karatay	Buyukburnak	-035
	Sarayonu	Bashuyuk	-036
	Yunak	Merkez	-037
	Tuzlukcu	Kokluce	-038
	Cumra	Kapali	-039
Aksaray(10)	Agacoren	Oymaagac	02-68-039
	Eskil	Esmekaya	-040
	Eskil	Besaran	-041
	Eskil	Sekeler	-042
	Merkez	Kargin	-043
	Ortakoy	Harmendali	-044
	Merkez	Kocpinar	-045
	Merkez	Altinkaya	-046
	Merkez	Ulukrmak	-047
	Eskil	Eskil-Esmekaya	-048
Karaman(8)	Merkez	Sariveliler	02-70-049
	Merkez	Mesdiye	-050
	Merkez	Suleymanhaci	-051
	Kazimkarabekir	K.Karabekir	-052
	Merkez	Coglu	-053
	Merkez	Karaman-Mrk	-054
	Merkez	Osmaniye	-055
	Karimlovabekir	Kizilkuyu	-056
Nigde(7)	Bor	Bayat	02-51-061
	Bor	Kaynarca	-062
	Ciftuk	Azatli	-067
	Altunhisar	Ulukisla	-070
	Merkez	Aktas	-082
	Camardi	Beyazkislakci	-085
	Camardi	Pinarbasi	-088

3.Adana Regional Area(20 areas)

Province	District	Name of the Project	Code Number
Adana(10)	Tatsus	Yuregir(Drn II)	03-01-001
	Karatas	Yuregir(Lc and Fd)	-002
	Tarsus	Yuregir(Drn IV)	-003
	Boztahta	Boztahta	-004
	Doganbeyli	Doganbeyli	-005
	Kalesekisi	Kalesekisi	-006
	Orcun	Orcun	-007
	Emelcik	Emelcik	-008
	Baklali	Baklali	-009
	Bagtepe	Bagtepe	-010
Icel(6)	Merkez	Kosbucagi	03-33-011
	Merkez	Degirmendere	-012
	Merkez	Golpinari	-013
	Silifke	Akdere	-014

Icel (Continued)	Merkez Erdemli	Tascili Karakiz	03-33-015 -016
Hatay(4)	Karsu Yenikoy Merkez Kirikhan	Karsu Yenikoy Erzin 408 Evler	03-31-020 -021 -022 -023

4.Kayseri Regional Area(13 areas)

Province	District	Name of the Project	Code Number
Kayseri(10)	Tomarza	Kiziloren	04-38-001
	Talas	Kamber	-002
	Kocasinan	Mahzemin	-003
	Bunyan	Tuzhisar	-004
	Develi	Sarica	-005
	Pinarbasi	As.Karagoz	-006
	Pinarbasi	As.Borandere	-007
	Bunyan	Akmescit	-008
	Develi	Gazi	-009
	Develi	Cayirozu	-010
Kirsehir(1)	Kaman	Agapinar	04-40-011
Nevsehir(2)	Avanos	Hacibektas	04-50-012
	Urgup	Sahinefendi	-013

5.Sivas Regional Area(25 areas)

Province	District	Name of the Project	Code Number
Sivas(19)	Yildizeli	A.Ekecik	05-58-001
	Hafik	Tavsankli	-002
	Yildizeli	Yildizeli-Yavu	-004
	Merkez	Gumusdere	-011
	Sarkisla	Baglararasi	-014
	Merkez	Akgoze	-015
	Yildizeli	Sariyar	-016
	Merkez	Durdulu	-021
	Merkez	Sugul	-023
	Hafik	Durulmus	-025
	Yildizeli	Kizilli	-032
	Merkez	Caypinar	-066
	Gurun	Gurun-Yesild	-096
	Gurun	Gobekoren	-097
	Kengal	Yaylacik	-110
	Koyulhisar	Akseki	-124
	Parkila	Alaman	-144
	Zara	Girit	-166
	Zara	Belentarla	-169
Tokat(6)	Camlibel	Camlibel	05-60-037
	Turhal	Yenikoy	-056
	Merkez	Guncali	-172
	Artova	Mertekli	-187
	Sulusavay	Beyazit	-228

Tokat	Turhal	Kayacik-Haci	05-60-233

6.Trabzon Regional Area(17 areas)

Province	District	Name of the Project	Code Number
Artvin(8)	Merkez	Seyitler	11-08-016
	Savsat	Meydancik	-034
	Savsat	Velikoy	-038
	Ardanuc	Gumushane	-042
	Yusufeli	Alanbasi	-068
	Yusufeli	Celtikduzu	-074
	Yusufeli	Balaman	-077
	Ardanuc	Harmanli	-209
Bayburt(4)	Merkez	Polatli	11-69-103
	Merkez	Guzelce	-106
	Merkez	Harmanozu	-107
	merkez	Nisantasi	-108
Giresun(3)	Camoluk	Gucer	11-28-112
	Alucra	Boyluca	-113
	Camoluk	Usluca	-132
Gumushane(2)	Kose	Yuvacik	11-29-210
	kelkit	Gerdekhisar	-211

7.Samsun Regional Area(27 areas)

Province	District	Name of the Project	Code Number
Samsun(7)	Bafra-Alacam	Bafra, Sahil	12-55-002
	Carsamra	Carsamba, Sahil	-003
	Bafra	Bafra, Ovasi	-004
	Carsamba	Sarsamba, Ovasi	-005
	Terme	Kozluk, Kusca	-006
	Tekkekoy	Gokcedere	-007
	Vezirkopru	As, Narli	-008
Amasya(11)	Merkez	Saraycik	12-05-009
	Merkez	Aybayrak	-010
	Goynucek	Sihilar	-011
	Tasova	Bol-Esencay	-012
	Tasova	Kumkuca	-013
	Tasova	Bol-Gungormus	-014
	Tasova	Bol-Dutluk	-015
	Merzifon	Caybasi	-016
	Goynucek	Yassikisla	-017
	Tasova	Golbeyli	-018
	Tasova	Caydebi	-019
Corum(9)	Alaca	Balcikhisar	12-19-020
	Alaca	Evci	-022
	Mecitozu	Figani	-028
	Mecitozu	Bayindir	-029
	Merkez	Derekoy	-032
	Sungurlu	Giftlik	-034

Corum (Continued)	Sungurlu	Akderre	12-19-051
	Osmancik	Ardic	-055
	Merkez	Hacibey	-058

8.Kastamonu Regional Area(14 areas)

Province	District	Name of the Project	Code Number
Kastamonu(4)	Merkez	Ortabogaz	13-37-002
	Merkez	Kuskara	-004
	Cide	Baltaci	010
	Taskopru	Goleti	-014
Sinop(6)	Boyabat	Boyali	13-57-038
	Boyabat	Eglence	-039
	Boyabat	Carsak	-059
	Duragan	Yesilkent	-077
	Gerze	Beloren-Turkmen	-093
	Boyabat	Karacaoren	-147
Karabuk(2)	Merkez	Bulak	13-78-105
	Safranibolu	Degirmencilik	-125
Bartin(2)	Merkez	Sarkoy	13-74-129
	Merkez	Dallica	-142

9.Eskisehir Regional Area(26 areas)

Province	District	Name of the Project	Code Number
Eskisehir(14)	Alpu	Karakamis	14-26-001
	Alpu	Osmaniye	-002
	Inonu	Inonu	-003
	Merkez	Cukurhisar	-004
	Merkez	Beyazaltin	-005
	Mihaesazi	Bozanic	-006
	Saricakaya	Saricakaya	-007
	Alpu	Ozdenk	-008
	Beilikova	Beylikova	-009
	Sivrihisar	Okcu	-010
	Alpu	Yayikli	-011
	Alpu	Aktepe	-012
	Alpu	Guneli	-013
	Beylikova	Suleymaniye	-049
Afyon(5)	Ihsaniye	Akoren	14-03-022
	Bayat	Akpinar	-027
	Emirdag	Kurucakoy	-028
	Emirdag	E.Akoren	-029
	Ihsaniye	Muratlar	-030
Kutahya(3)	Tavsanli	Ayvali	14-43-050
	Saphane	Kizilkoltuk	-051
	merkez	Kopruoren	-052
Usak(4)	Merkez	Sorkun	14-64-045
	merkez	Bolme	-046

Usak (Continued)	Esme	Gullubag	14-64-047
	Banaz	Kusdemir	-048

10.Antalya Regional Area(18 areas)

Province	District	Name of the Project	Code Number
Antalya(8)	Merkez	Kovanlik	15-07-001
	Merkez	Cakirlar	-002
	Alanya	Sogukpinar	-007
	Alanya	Imamlidam	-008
	Elmali	Cukurelma	-016
	Elmali	Islamlar	-018
	Korkuteli	Kayabasi	-035
	Kumluca	Altinkaya	-040
Burdur(8)	Bucak	Camlikelsazi	15-15-050
	Merkez	Yazikoy-Akkaya	-051
	Cavdir	Ishal	-052
	Yesilova	Onacak	-053
	Karamanli	Kagilcik	-054
	Tefenni	Yuvalak	-055
	Yesilova	Doganbaba	-066
	Merkez	Ilyas	-067
Isparta(2)	Egirdir	Bademli	15-32-068
	Merkez	Bozanonu	-069

11.Izmir Regional Area(31 areas)

Province	District	Name of the Project	Code Number
Izmir(8)	Torbali	Turum	16-35-001
	Bergama	Aziziye	-002
	Torbali	Karakizlar	-003
	Menderes	Oglananasi	-004
	Bergama	Ahametbeyler	-005
	Bayindir	Elifli	-006
	Torbali	Aslanlar	-007
	Odemis	Konakli	-008
Aydin(5)	Kuyucak	Camdibi	16-09-009
	Karacasu	Atakoy	-010
	Karacasu	Isiklar	-011
	Buharkent	Kizildere	-012
Denizli(8)	Acipayam	Karahoyukavsari	16-20-014
	Acipayam	Yesiliyuva	-015
	Bozkurt	Cumali	-016
	Civril	Isikli	-017
	Civril	Emirhisar	-018
	Guney	Camrak	-019
	Merkez	Alaattin	-020
	Merkez	Karatas	-021
Manisa(5)	Sarigol	Ahametaga	16-45-023
	Sarigol	Cavuslar	-024

Manisa (Continued)	Akhisar	Gokceahmet	16-45-025
	Akhisar	Camonu	-026
	Kula	Kenger	-027
Mugla(6)	Ula	Gulagzi	16-48-028
	Koycegiz	Uzuncabuk	-031
	Koycegiz	Agla	-032
	Yatagan	Bozhoyuk	-033
	Ula	Sarayyani	-034
	Fethiye	Oren	-035

12.Bursa Regional Area(14 areas)

Province	District	Name of the Project	Code Number
Bursa(5)	Karacabey	Ariz	17-16-001
	Karacabey	Akcakoyun	-002
	Yenisehir	Demirboga	-003
	Erenler	Erenler	-004
	Iznik	Aydinlar	-005
Balikesir(3)	Erdek	Yukariyapici	17-10-006
	Havran	Havran	-007
	Burhaniye	Goruh	-008
Bilecik(1)	Merkez	Seloz	17-11-009
Canakkale(3)	Yenice	A-Cavus(3 villages)	17-17-010
	Bayramic	E-Cavuslu	-011
	Gelibolu	Kavakli	-012
Yalova(2)	Ciftlikkoy	Ilyaskoy	17-77-013
	Armutlu	Mecidiye	-014

13.Istanbul Regional Area(3 areas)

Province	District	Name of the Project	Code Number
Kirklareli(3)	Luleburgaz	K.Karistiran	18-39-016
	Luleburgaz	Akcakoy	-017
	Luleburgaz	Ayvali	-018

Table G.3.4 Result of IEE for Proving Environmental Impact, Ankara Regional Area

1. Ankara Regional Area(14 Areas)

Environmental Item	Number of Evaluation ※					Total
	A	B	C	D	Excluded	
1. Planned residential settlement	0	0	0	14	0	14
2. Involuntary resettlement	0	0	0	14	0	14
3. Substantial changes in the way of life	0	0	0	14	0	14
4. Conflict among communities and people	0	1	0	13	0	14
5. Impact on native people	0	0	0	14	0	14
6. Population increase	0	0	8	6	0	14
7. Drastic change in population composition	0	0	0	14	0	14
8. Changes in bases of economic activities	0	0	0	14	0	14
9. Occupational change and loss of job opportunities	0	0	0	14	0	14
10. Increase in income disparities	0	0	0	14	0	14
11. Adjustment & regulation of water or fishing rights	0	0	0	0	14	14
12. Changes in social and institutional structures	0	0	0	14	0	14
13. Changes in existing institutions and customs	0	0	0	14	0	14
14. Increased use of agrochemicals	0	0	5	9	0	14
15. Outbreak of endemic diseases	0	0	0	14	0	14
16. Spreading of endemic diseases	0	0	0	14	0	14
17. Residual toxicity of agrochemicals	0	0	9	5	0	14
18. Increase in domestic and other human wastes	0	0	1	13	0	14
19. Impairment of historic remains and cultura assets	0	0	0	14	0	14
20. Damage to aesthetic sites	0	0	0	14	0	14
21. Impairment of buried assets	0	0	0	14	0	14
22. Changes in vegetation	0	0	0	14	0	14
23. Negative impact on important fauna and flora	0	0	0	14	0	14
24. Degradation of ecosystems with biological diversity	0	0	0	14	0	14
25. Proliferation of exotic and/or hazardous species	0	0	4	10	0	14
26. Destruction of wetlands and peat lands	0	0	0	14	0	14
27. Decrease of tropical rain forest and wild lands	0	0	0	0	14	14
28. Destruction or degradation of mangrove forests	0	0	0	0	14	14
29. Degradation of coral reefs	0	0	0	0	14	14
30. Soil erosion	0	1	1	12	0	14
31. Soil salinization	0	0	1	13	0	14
32. Deterioration of soil fertility	0	0	0	14	0	14
33. Soil contamination by agrochemicals and others	0	0	4	10	0	14
34. Devastation or desertification of land	0	0	0	14	0	14
35. Devastation of hinterland	0	0	0	14	0	14
36. Ground subsidence	0	0	0	14	0	14
37. Change in surface water hydrology	0	0	2	12	0	14
38. Change in ground water hydrology	0	0	2	12	0	14
39. Inundation and flooding	0	0	0	14	0	14
40. Sedimentation	0	0	0	14	0	14
41. Riverbed degradation	0	0	0	14	0	14
42. Impediment of inland navigation	0	0	0	0	14	14
43. Water contamination and deterioration of water quality	0	0	0	14	0	14
44. Water eutrophication	0	0	0	14	0	14
45. Sea water intrusion	0	0	0	1	13	14
46. Change in temperature of water	0	0	0	14	0	14
47. Air pollution	0	0	0	7	7	14
Total	0	2	37	529	90	658

※ SEI: Significant Environmental Impact

A: The subject SEI is unquestionably induced by the Project.

B: The subject SEI is likely to be induced by the Project.

C: The SEI is not fully known.

D: There is no possibility that the subject SEI is likely to be induced by the Project.

Table G.3.5 Result of IEE for Proving Environmental Impact ,Konya Regional Area

2. Konya Regional Area(62 Areas)

Environmental Item	Number of Evaluation※					Total
	A	B	C	D	Excluded	
1. Planned residential settlement	0	0	0	62	0	62
2. Involuntary resettlement	0	0	0	62	0	62
3. Substantial changes in the way of life	0	0	43	19	0	62
4. Conflict among communities and people	0	0	55	7	0	62
5. Impact on native people	0	0	30	32	0	62
6. Population increase	0	0	30	32	0	62
7. Drastic change in population composition	0	0	1	61	0	62
8. Changes in bases of economic activities	0	0	0	62	0	62
9. Occupational change and loss of job opportunities	0	0	1	61	0	62
10. Increase in income disparities	0	0	0	62	0	62
11. Adjustment & regulation of water or fishing rights	0	1	0	60	1	62
12. Changes in social and institutional structures	0	0	49	13	0	62
13. Changes in existing institutions and customs	0	0	24	38	0	62
14. Increased use of agrochemicals	0	60	0	2	0	62
15. Outbreak of endemic diseases	0	0	0	62	0	62
16. Spreading of endemic diseases	0	0	0	62	0	62
17. Residual toxicity of agrochemicals	0	61	0	1	0	62
18. Increase in domestic and other human wastes	0	0	1	61	0	62
19. Impairment of historic remains and cultura assets	0	0	0	62	0	62
20. Damage to aesthetic sites	0	0	0	62	0	62
21. Impairment of buried assets	0	0	0	62	0	62
22. Changes in vegetation	0	1	0	61	0	62
23. Negative impact on important fauna and flora	0	0	0	62	0	62
24. Degradation of ecosystems with biological diversity	0	1	0	61	0	62
25. Proliferation of exotic and/or hazardous species	0	0	52	10	0	62
26. Destruction of wetlands and peat lands	0	6	0	56	0	62
27. Decrease of tropical rain forest and wild lands	0	0	0	0	62	62
28. Destruction or degradation of mangrove forests	0	0	0	0	62	62
29. Degradation of coral reefs	0	0	0	0	62	62
30. Soil erosion	0	0	1	61	0	62
31. Soil salinization	0	0	0	62	0	62
32. Deterioration of soil fertility	0	0	0	62	0	62
33. Soil contamination by agrochemicals and others	0	60	0	2	0	62
34. Devastation or desertification of land	0	0	0	62	0	62
35. Devastation of hinterland	0	0	1	61	0	62
36. Ground subsidence	0	0	0	62	0	62
37. Change in surface water hydrology	0	0	0	62	0	62
38. Change in ground water hydrology	0	0	0	62	0	62
39. Inundation and flooding	0	0	0	61	1	62
40. Sedimentation	0	0	0	13	49	62
41. Riverbed degradation	0	0	0	7	55	62
42. Impediment of inland navigation	0	0	0	0	62	62
43. Water contamination and deterioration of water quality	0	0	2	59	1	62
44. Water eutrophication	0	0	6	2	54	62
45. Sea water intrusion	0	0	0	2	60	62
46. Change in temperature of water	0	0	5	56	1	62
47. Air pollution	0	0	5	57	0	62
Total	0	190	306	1,948	470	2,914

※ SEI: Significant Environmental Impact

A: The subject SEI is unquestionably induced by the Project.

B: The subject SEI is likely to be induced by the Project.

C: The SEI is not fully known.

D: There is no possibility that the subject SEI is likely to be induced by the Project.

Table G.3.6 Result of IEE for Proving Environmental Impact,Adana Regional Area

3. Adana Regional Area(20 Areas)

Environmental Item	Number of Evaluation※					Total
	A	B	C	D	Excluded	
1. Planned residential settlement	0	0	0	20	0	20
2. Involuntary resettlement	0	0	0	20	0	20
3. Substantial changes in the way of life	0	0	15	5	0	20
4. Conflict among communities and people	0	0	14	6	0	20
5. Impact on native people	0	0	11	9	0	20
6. Population increase	0	0	16	4	0	20
7. Drastic change in population composition	0	0	0	20	0	20
8. Changes in bases of economic activities	0	0	0	20	0	20
9. Occupational change and loss of job opportunities	0	0	1	19	0	20
10. Increase in income disparities	0	0	0	20	0	20
11. Adjustment & regulation of water or fishing rights	0	0	0	20	0	20
12. Changes in social and institutional structures	0	0	15	5	0	20
13. Changes in existing institutions and customs	0	0	2	18	0	20
14. Increased use of agrochemicals	0	20	0	0	0	20
15. Outbreak of endemic diseases	0	0	0	20	0	20
16. Spreading of endemic diseases	0	0	0	20	0	20
17. Residual toxicity of agrochemicals	0	20	0	0	0	20
18. Increase in domestic and other human wastes	0	0	0	20	0	20
19. Impairment of historic remains and cultura assets	0	0	0	20	0	20
20. Damage to aesthetic sites	0	0	0	20	0	20
21. Impairment of buried assets	0	0	0	20	0	20
22. Changes in vegetation	0	0	1	19	0	20
23. Negative impact on important fauna and flora	0	0	0	20	0	20
24. Degradation of ecosystems with biological diversity	0	0	0	20	0	20
25. Proliferation of exotic and/or hazardous species	0	0	9	11	0	20
26. Destruction of wetlands and peat lands	0	0	0	20	0	20
27. Decrease of tropical rain forest and wild lands	0	0	0	0	20	20
28. Destruction or degradation of mangrove forests	0	0	0	0	20	20
29. Degradation of coral reefs	0	0	0	0	20	20
30. Soil erosion	0	0	0	20	0	20
31. Soil salinization	0	0	0	20	0	20
32. Deterioration of soil fertility	0	0	0	20	0	20
33. Soil contamination by agrochemicals and others	0	20	0	0	0	20
34. Devastation or desertification of land	0	0	0	20	0	20
35. Devastation of hinterland	0	0	0	20	0	20
36. Ground subsidence	0	0	0	20	0	20
37. Change in surface water hydrology	0	0	0	20	0	20
38. Change in ground water hydrology	0	0	0	20	0	20
39. Inundation and flooding	0	0	0	20	0	20
40. Sedimentation	0	0	0	11	9	20
41. Riverbed degradation	0	0	0	1	19	20
42. Impediment of inland navigation	0	0	0	0	20	20
43. Water contamination and deterioration of water quality	0	0	0	20	0	20
44. Water eutrophication	0	0	8	0	12	20
45. Sea water intrusion	0	0	0	0	20	20
46. Change in temperature of water	0	0	7	13	0	20
47. Air pollution	0	0	0	20	0	20
Total	0	60	99	641	140	930

※ SEI: Significant Environmental Impact

A: The subject SEI is unquestionably induced by the Project.

B: The subject SEI is likely to be induced by the Project.

C: The SEI is not fully known.

D: There is no possibility that the subject SEI is likely to be induced by the Project.

Table G.3.7 Result of IEE for Proving Environmental Impact,Kayseri Regional Area

4. Kayseri Regional Area(13 Areas)

Environmental Item	Number of Evaluation※					Total
	A	B	C	D	Excluded	
1. Planned residential settlement	0	0	0	13	0	13
2. Involuntary resettlement	0	0	0	13	0	13
3. Substantial changes in the way of life	0	0	0	13	0	13
4. Conflict among communities and people	0	0	0	13	0	13
5. Impact on native people	0	0	0	1	12	13
6. Population increase	0	0	13	0	0	13
7. Drastic change in population composition	0	0	0	13	0	13
8. Changes in bases of economic activities	0	0	0	13	0	13
9. Occupational change and loss of job opportunities	0	0	0	13	0	13
10. Increase in income disparities	0	0	0	13	0	13
11. Adjustment & regulation of water or fishing rights	0	0	0	13	0	13
12. Changes in social and institutional structures	0	0	0	13	0	13
13. Changes in existing institutions and customs	0	0	0	13	0	13
14. Increased use of agrochemicals	0	0	13	0	0	13
15. Outbreak of endemic diseases	0	0	0	13	0	13
16. Spreading of endemic diseases	0	0	0	13	0	13
17. Residual toxicity of agrochemicals	0	0	0	13	0	13
18. Increase in domestic and other human wastes	0	0	13	0	0	13
19. Impairment of historic remains and cultura assets	0	0	0	13	0	13
20. Damage to aesthetic sites	0	0	0	13	0	13
21. Impairment of buried assets	0	0	0	0	13	13
22. Changes in vegetation	0	0	0	13	0	13
23. Negative impact on important fauna and flora	0	0	0	0	13	13
24. Degradation of ecosystems with biological diversity	0	0	0	13	0	13
25. Proliferation of exotic and/or hazardous species	0	0	0	13	0	13
26. Destruction of wetlands and peat lands	0	0	0	0	13	13
27. Decrease of tropical rain forest and wild lands	0	0	0	0	13	13
28. Destruction or degradation of mangrove forests	0	0	0	0	13	13
29. Degradation of coral reefs	0	0	0	0	13	13
30. Soil erosion	0	0	0	13	0	13
31. Soil salinization	0	0	0	13	0	13
32. Deterioration of soil fertility	0	0	0	13	0	13
33. Soil contamination by agrochemicals and others	0	0	0	13	0	13
34. Devastation or desertification of land	0	0	0	13	0	13
35. Devastation of hinterland	0	0	0	13	0	13
36. Ground subsidence	0	0	0	13	0	13
37. Change in surface water hydrology	0	0	0	0	13	13
38. Change in ground water hydrology	0	0	8	5	0	13
39. Inundation and flooding	0	0	0	13	0	13
40. Sedimentation	0	0	0	13	0	13
41. Riverbed degradation	0	0	0	0	13	13
42. Impediment of inland navigation	0	0	0	0	13	13
43. Water contamination and deterioration of water quality	0	0	0	13	0	13
44. Water eutrophication	0	0	0	13	0	13
45. Sea water intrusion	0	0	0	0	13	13
46. Change in temperature of water	0	0	0	13	0	13
47. Air pollution	0	0	0	13	0	13
Total	0	0	47	422	142	611

※ SEI: Significant Environmental Impact

A: The subject SEI is unquestionably induced by the Project.

B: The subject SEI is likely to be induced by the Project.

C: The SEI is not fully known.

D: There is no possibility that the subject SEI is likely to be induced by the Project.

Table G.3.8 Result of IEE for Proving Environmental Impact,Sivas Regional Area

5. Sivas Regional Area(25 Areas)

Environmental Item	Number of Evaluation					Total
	A	B	C	D	Excluded	
1. Planned residential settlement	0	0	0	25	0	25
2. Involuntary resettlement	0	0	0	25	0	25
3. Substantial changes in the way of life	0	0	0	25	0	25
4. Conflict among communities and people	0	0	0	25	0	25
5. Impact on native people	0	0	1	8	16	25
6. Population increase	0	0	1	24	0	25
7. Drastic change in population composition	0	0	0	25	0	25
8. Changes in bases of economic activities	0	0	0	25	0	25
9. Occupational change and loss of job opportunities	0	0	0	25	0	25
10. Increase in income disparities	0	0	0	25	0	25
11. Adjustment & regulation of water or fishing rights	0	0	0	25	0	25
12. Changes in social and institutional structures	0	0	0	25	0	25
13. Changes in existing institutions and customs	0	0	0	25	0	25
14. Increased use of agrochemicals	0	0	23	2	0	25
15. Outbreak of endemic diseases	0	0	0	25	0	25
16. Spreading of endemic diseases	0	0	0	25	0	25
17. Residual toxicity of agrochemicals	0	0	1	24	0	25
18. Increase in domestic and other human wastes	0	0	22	3	0	25
19. Impairment of historic remains and cultura assets	0	0	0	25	0	25
20. Damage to aesthetic sites	0	0	0	25	0	25
21. Impairment of buried assets	0	0	0	9	16	25
22. Changes in vegetation	0	0	0	25	0	25
23. Negative impact on important fauna and flora	0	0	0	25	13	25
24. Degradation of ecosystems with biological diversity	0	0	0	25	0	25
25. Proliferation of exotic and/or hazardous species	0	0	0	25	0	25
26. Destruction of wetlands and peat lands	0	0	0	7	18	25
27. Decrease of tropical rain forest and wild lands	0	0	0	0	25	25
28. Destruction or degradation of mangrove forests	0	0	0	0	25	25
29. Degradation of coral reefs	0	0	0	0	25	25
30. Soil erosion	0	0	16	9	0	25
31. Soil salinization	0	0	0	25	0	25
32. Deterioration of soil fertility	0	0	0	25	0	25
33. Soil contamination by agrochemicals and others	0	0	1	24	0	25
34. Devastation or desertification of land	0	0	0	25	0	25
35. Devastation of hinterland	0	0	0	25	0	25
36. Ground subsidence	0	0	0	4	21	25
37. Change in surface water hydrology	0	0	1	8	16	25
38. Change in ground water hydrology	0	0	1	24	0	25
39. Inundation and flooding	0	0	0	25	0	25
40. Sedimentation	0	0	0	25	0	25
41. Riverbed degradation	0	0	0	25	13	25
42. Impediment of inland navigation	0	0	0	1	24	25
43. Water contamination and deterioration of water quality	0	0	0	25	0	25
44. Water eutrophication	0	0	0	25	0	25
45. Sea water intrusion	0	0	0	1	24	25
46. Change in temperature of water	0	0	0	8	17	25
47. Air pollution	0	0	0	25	0	25
Total	0	0	67	881	227	1,175

※ SEI: Significant Environmental Impact

A: The subject SEI is unquestionably induced by the Project.

B: The subject SEI is likely to be induced by the Project.

C: The SEI is not fully known.

D: There is no possibility that the subject SEI is likely to be induced by the Project.

Table G.3.9 Result of IEE for Proving Environmental Impact,Trabzon Regional Area

6. Trabzon Regional Area(17 Areas)

Environmental Item	Number of Evaluation					Total
	A	B	C	D	Excluded	
1. Planned residential settlement	0	0	0	17	0	17
2. Involuntary resettlement	0	0	0	17	0	17
3. Substantial changes in the way of life	0	0	0	17	0	17
4. Conflict among communities and people	0	0	0	17	0	17
5. Impact on native people	0	0	0	17	0	17
6. Population increase	0	0	0	17	0	17
7. Drastic change in population composition	0	0	0	17	0	17
8. Changes in bases of economic activities	0	0	0	17	0	17
9. Occupational change and loss of job opportunities	0	0	0	17	0	17
10. Increase in income disparities	0	0	0	17	0	17
11. Adjustment & regulation of water or fishing rights	0	0	0	17	0	17
12. Changes in social and institutional structures	0	0	0	17	0	17
13. Changes in existing institutions and customs	0	0	0	17	0	17
14. Increased use of agrochemicals	0	0	9	8	0	17
15. Outbreak of endemic diseases	0	0	0	17	0	17
16. Spreading of endemic diseases	0	0	0	17	0	17
17. Residual toxicity of agrochemicals	0	0	0	17	0	17
18. Increase in domestic and other human wastes	0	0	0	17	0	17
19. Impairment of historic remains and cultura assets	0	0	0	17	0	17
20. Damage to aesthetic sites	0	0	0	17	0	17
21. Impairment of buried assets	0	0	0	17	0	17
22. Changes in vegetation	0	0	0	17	0	17
23. Negative impact on important fauna and flora	0	0	0	17	0	17
24. Degradation of ecosystems with biological diversity	0	0	0	17	0	17
25. Proliferation of exotic and/or hazardous species	0	0	0	17	0	17
26. Destruction of wetlands and peat lands	0	0	0	17	0	17
27. Decrease of tropical rain forest and wild lands	0	0	0	0	17	17
28. Destruction or degradation of mangrove forests	0	0	0	0	17	17
29. Degradation of coral reefs	0	0	0	17	0	17
30. Soil erosion	0	0	0	17	0	17
31. Soil salinization	0	0	0	17	0	17
32. Deterioration of soil fertility	0	0	0	17	0	17
33. Soil contamination by agrochemicals and others	0	0	0	17	0	17
34. Devastation or desertification of land	0	0	0	17	0	17
35. Devastation of hinterland	0	0	0	17	0	17
36. Ground subsidence	0	0	0	17	0	17
37. Change in surface water hydrology	0	0	0	17	0	17
38. Change in ground water hydrology	0	0	0	17	0	17
39. Inundation and flooding	0	0	0	17	0	17
40. Sedimentation	0	0	0	17	0	17
41. Riverbed degradation	0	0	0	17	0	17
42. Impediment of inland navigation	0	0	0	17	0	17
43. Water contamination and deterioration of water quality	0	0	0	17	0	17
44. Water eutrophication	0	0	0	17	0	17
45. Sea water intrusion	0	0	0	17	0	17
46. Change in temperature of water	0	0	0	17	0	17
47. Air pollution	0	0	0	17	0	17
Total	0	0	9	756	34	799

※ SEI: Significant Environmental Impact

A: The subject SEI is unquestionably induced by the Project.

B: The subject SEI is likely to be induced by the Project.

C: The SEI is not fully known.

D: There is no possibility that the subject SEI is likely to be induced by the Project.

Table G.3.10 Result of IEE for Proving Environmental Impact,Samsun Regional Area

7. Samsun Regional Area(27 Areas)

Environmental Item	Number of Evaluation※					Total
	A	B	C	D	Excluded	
1. Planned residential settlement	0	0	0	27	0	27
2. Involuntary resettlement	0	0	0	27	0	27
3. Substantial changes in the way of life	0	0	2	25	0	27
4. Conflict among communities and people	0	0	1	26	0	27
5. Impact on native people	0	0	0	27	0	27
6. Population increase	0	0	0	27	0	27
7. Drastic change in population composition	0	0	0	27	0	27
8. Changes in bases of economic activities	0	0	1	26	0	27
9. Occupational change and loss of job opportunities	0	0	5	22	0	27
10. Increase in income disparities	0	0	0	27	0	27
11. Adjustment & regulation of water or fishing rights	0	2	1	24	0	27
12. Changes in social and institutional structures	0	0	5	22	0	27
13. Changes in existing institutions and customs	0	0	0	27	0	27
14. Increased use of agrochemicals	0	3	1	23	0	27
15. Outbreak of endemic diseases	0	0	0	27	0	27
16. Spreading of endemic diseases	0	0	0	27	0	27
17. Residual toxicity of agrochemicals	0	0	0	27	0	27
18. Increase in domestic and other human wastes	0	0	0	27	0	27
19. Impairment of historic remains and cultura assets	0	0	0	27	0	27
20. Damage to aesthetic sites	0	0	0	27	0	27
21. Impairment of buried assets	0	0	0	27	0	27
22. Changes in vegetation	0	0	0	27	0	27
23. Negative impact on important fauna and flora	0	0	0	27	0	27
24. Degradation of ecosystems with biological diversity	0	0	0	27	0	27
25. Proliferation of exotic and/or hazardous species	0	0	0	27	0	27
26. Destruction of wetlands and peat lands	0	0	0	27	0	27
27. Decrease of tropical rain forest and wild lands	0	0	0	0	27	27
28. Destruction or degradation of mangrove forests	0	0	0	0	27	27
29. Degradation of coral reefs	0	0	0	27	0	27
30. Soil erosion	0	0	0	27	0	27
31. Soil salinization	0	0	0	27	0	27
32. Deterioration of soil fertility	0	0	0	27	0	27
33. Soil contamination by agrochemicals and others	0	0	0	27	0	27
34. Devastation or desertification of land	0	0	0	27	0	27
35. Devastation of hinterland	0	0	0	27	0	27
36. Ground subsidence	0	0	0	27	0	27
37. Change in surface water hydrology	0	1	0	26	0	27
38. Change in ground water hydrology	0	2	0	25	0	27
39. Inundation and flooding	0	0	0	27	0	27
40. Sedimentation	0	0	0	27	0	27
41. Riverbed degradation	0	0	0	27	0	27
42. Impediment of inland navigation	0	0	0	27	0	27
43. Water contamination and deterioration of water quality	0	0	0	27	0	27
44. Water eutrophication	0	0	0	27	0	27
45. Sea water intrusion	0	0	0	27	0	27
46. Change in temperature of water	0	0	0	27	0	27
47. Air pollution	0	0	0	27	0	27
Total	0	8	16	1,191	54	1,269

※ SEI: Significant Environmental Impact

A: The subject SEI is unquestionably induced by the Project.

B: The subject SEI is likely to be induced by the Project.

C: The SEI is not fully known.

D: There is no possibility that the subject SEI is likely to be induced by the Project.

Table G.3.11Result of IEE for Proving Environmental Impact,Kastamonu Regional Area

8. Kastamonu Regional Area(14 Areas)

Environmental Item	Number of Evaluation※					Total
	A	B	C	D	Excluded	
1. Planned residential settlement	0	0	0	14	0	14
2. Involuntary resettlement	0	0	0	14	0	14
3. Substantial changes in the way of life	0	0	0	14	0	14
4. Conflict among communities and people	0	0	0	14	0	14
5. Impact on native people	0	0	0	14	0	14
6. Population increase	0	0	0	14	0	14
7. Drastic change in population composition	0	0	0	14	0	14
8. Changes in bases of economic activities	0	0	0	14	0	14
9. Occupational change and loss of job opportunities	0	0	0	14	0	14
10. Increase in income disparities	0	0	0	14	0	14
11. Adjustment & regulation of water or fishing rights	0	0	0	14	0	14
12. Changes in social and institutional structures	0	0	0	14	0	14
13. Changes in existing institutions and customs	0	0	0	14	0	14
14. Increased use of agrochemicals	0	0	12	2	0	14
15. Outbreak of endemic diseases	0	0	0	14	0	14
16. Spreading of endemic diseases	0	0	0	14	0	14
17. Residual toxicity of agrochemicals	0	0	0	14	0	14
18. Increase in domestic and other human wastes	0	0	0	14	0	14
19. Impairment of historic remains and cultura assets	0	0	0	14	0	14
20. Damage to aesthetic sites	0	0	0	14	0	14
21. Impairment of buried assets	0	0	0	14	0	14
22. Changes in vegetation	0	0	0	14	0	14
23. Negative impact on important fauna and flora	0	0	0	14	0	14
24. Degradation of ecosystems with biological diversity	0	0	0	14	0	14
25. Proliferation of exotic and/or hazardous species	0	0	0	14	0	14
26. Destruction of wetlands and peat lands	0	0	0	14	0	14
27. Decrease of tropical rain forest and wild lands	0	0	0	0	14	14
28. Destruction or degradation of mangrove forests	0	0	0	0	14	14
29. Degradation of coral reefs	0	0	0	14	0	14
30. Soil erosion	0	0	0	14	0	14
31. Soil salinization	0	0	0	14	0	14
32. Deterioration of soil fertility	0	0	0	14	0	14
33. Soil contamination by agrochemicals and others	0	0	0	14	0	14
34. Devastation or desertification of land	0	0	0	14	0	14
35. Devastation of hinterland	0	0	0	14	0	14
36. Ground subsidence	0	0	0	14	0	14
37. Change in surface water hydrology	0	0	0	14	0	14
38. Change in ground water hydrology	0	0	0	14	0	14
39. Inundation and flooding	0	0	0	14	0	14
40. Sedimentation	0	0	0	14	0	14
41. Riverbed degradation	0	0	0	14	0	14
42. Impediment of inland navigation	0	0	0	14	0	14
43. Water contamination and deterioration of water quality	0	0	0	14	0	14
44. Water eutrophication	0	0	0	14	0	14
45. Sea water intrusion	0	0	0	14	0	14
46. Change in temperature of water	0	0	0	14	0	14
47. Air pollution	0	0	0	14	0	14
Total	0	0	12	618	28	658

※ SEI: Significant Environmental Impact

A: The subject SEI is unquestionably induced by the Project.

B: The subject SEI is likely to be induced by the Project.

C: The SEI is not fully known.

D: There is no possibility that the subject SEI is likely to be induced by the Project.

Table G.3.12 Result of IEE for Proving Environmental Impact,Eskisehir Regional Area

9. Eskisehir Regional Area(26 Areas)

Environmental Item	Number of Evaluation※					Total
	A	B	C	D	Excluded	
1. Planned residential settlement	0	0	0	26	0	26
2. Involuntary resettlement	0	0	0	26	0	26
3. Substantial changes in the way of life	0	0	0	26	0	26
4. Conflict among communities and people	0	0	23	3	0	26
5. Impact on native people	0	0	0	4	22	26
6. Population increase	0	0	19	7	0	26
7. Drastic change in population composition	0	0	0	26	0	26
8. Changes in bases of economic activities	0	0	17	9	0	26
9. Occupational change and loss of job opportunities	0	0	0	26	0	26
10. Increase in income disparities	0	0	0	26	0	26
11. Adjustment & regulation of water or fishing rights	0	0	0	26	0	26
12. Changes in social and institutional structures	0	0	0	26	0	26
13. Changes in existing institutions and customs	0	0	0	26	0	26
14. Increased use of agrochemicals	0	0	20	6	0	26
15. Outbreak of endemic diseases	0	0	0	26	0	26
16. Spreading of endemic diseases	0	0	0	26	0	26
17. Residual toxicity of agrochemicals	0	0	0	26	0	26
18. Increase in domestic and other human wastes	0	0	19	7	0	26
19. Impairment of historic remains and cultura assets	0	0	0	26	0	26
20. Damage to aesthetic sites	0	0	0	26	0	26
21. Impairment of buried assets	0	0	1	6	19	26
22. Changes in vegetation	0	0	0	26	0	26
23. Negative impact on important fauna and flora	0	0	0	14	12	26
24. Degradation of ecosystems with biological diversity	0	0	0	26	0	26
25. Proliferation of exotic and/or hazardous species	0	0	0	26	0	26
26. Destruction of wetlands and peat lands	0	0	0	26	0	26
27. Decrease of tropical rain forest and wild lands	0	0	0	0	26	26
28. Destruction or degradation of mangrove forests	0	0	0	0	26	26
29. Degradation of coral reefs	0	0	0	0	26	26
30. Soil erosion	0	0	0	26	0	26
31. Soil salinization	0	0	0	26	0	26
32. Deterioration of soil fertility	0	0	0	26	0	26
33. Soil contamination by agrochemicals and others	0	0	0	26	0	26
34. Devastation or desertification of land	0	0	0	26	0	26
35. Devastation of hinterland	0	0	0	26	0	26
36. Ground subsidence	0	0	0	26	0	26
37. Change in surface water hydrology	0	0	0	26	0	26
38. Change in ground water hydrology	0	0	13	11	2	26
39. Inundation and flooding	0	0	0	26	0	26
40. Sedimentation	0	0	0	26	0	26
41. Riverbed degradation	0	0	0	26	0	26
42. Impediment of inland navigation	0	0	0	6	20	26
43. Water contamination and deterioration of water quality	0	0	0	26	0	26
44. Water eutrophication	0	0	0	26	0	26
45. Sea water intrusion	0	0	0	5	21	26
46. Change in temperature of water	0	0	0	26	0	26
47. Air pollution	0	0	0	26	0	26
Total	0	0	112	936	174	1,222

※ SEI: Significant Environmental Impact

A: The subject SEI is unquestionably induced by the Project.

B: The subject SEI is likely to be induced by the Project.

C: The SEI is not fully known.

D: There is no possibility that the subject SEI is likely to be induced by the Project.

Table G.3.13 Result of IEE for Proving Environmental Impact,Antalya Regional Area

10. Antalya Regional Area(18 Areas)

Environmental Item	Number of Evaluation※					Total
	A	B	C	D	Excluded	
1. Planned residential settlement	0	0	0	18	0	18
2. Involuntary resettlement	0	0	0	18	0	18
3. Substantial changes in the way of life	0	0	5	13	0	18
4. Conflict among communities and people	0	0	5	13	0	18
5. Impact on native people	0	0	7	11	0	18
6. Population increase	0	0	10	8	0	18
7. Drastic change in population composition	0	0	0	18	0	18
8. Changes in bases of economic activities	0	1	0	17	0	18
9. Occupational change and loss of job opportunities	0	0	0	18	0	18
10. Increase in income disparities	0	0	0	18	0	18
11. Adjustment & regulation of water or fishing rights	0	1	0	16	1	18
12. Changes in social and institutional structures	0	0	8	10	0	18
13. Changes in existing institutions and customs	0	0	6	12	0	18
14. Increased use of agrochemicals	0	17	0	1	0	18
15. Outbreak of endemic diseases	0	0	0	18	0	18
16. Spreading of endemic diseases	0	0	0	18	0	18
17. Residual toxicity of agrochemicals	0	17	0	1	0	18
18. Increase in domestic and other human wastes	0	0	0	18	0	18
19. Impairment of historic remains and cultura assets	0	0	0	18	0	18
20. Damage to aesthetic sites	0	0	0	18	0	18
21. Impairment of buried assets	0	0	0	18	0	18
22. Changes in vegetation	0	0	2	16	0	18
23. Negative impact on important fauna and flora	0	0	0	18	0	18
24. Degradation of ecosystems with biological diversity	0	0	0	18	0	18
25. Proliferation of exotic and/or hazardous species	0	0	2	16	0	18
26. Destruction of wetlands and peat lands	0	2	0	16	0	18
27. Decrease of tropical rain forest and wild lands	0	0	0	0	18	18
28. Destruction or degradation of mangrove forests	0	0	0	0	18	18
29. Degradation of coral reefs	0	0	0	0	18	18
30. Soil erosion	0	0	0	18	0	18
31. Soil salinization	0	0	0	18	0	18
32. Deterioration of soil fertility	0	0	0	18	0	18
33. Soil contamination by agrochemicals and others	0	17	0	1	0	18
34. Devastation or desertification of land	0	0	0	18	0	18
35. Devastation of hinterland	0	0	0	18	0	18
36. Ground subsidence	0	0	0	18	0	18
37. Change in surface water hydrology	0	0	0	18	0	18
38. Change in ground water hydrology	0	0	0	18	0	18
39. Inundation and flooding	0	0	0	18	0	18
40. Sedimentation	0	0	0	4	14	18
41. Riverbed degradation	0	0	0	0	18	18
42. Impediment of inland navigation	0	0	0	0	18	18
43. Water contamination and deterioration of water quality	0	0	0	18	0	18
44. Water eutrophication	0	0	3	0	15	18
45. Sea water intrusion	0	0	0	0	18	18
46. Change in temperature of water	0	0	3	15	0	18
47. Air pollution	0	0	0	18	0	18
Total	0	55	51	602	138	846

※ SEI: Significant Environmental Impact

A: The subject SEI is unquestionably induced by the Project.

B: The subject SEI is likely to be induced by the Project.

C: The SEI is not fully known.

D: There is no possibility that the subject SEI is likely to be induced by the Project.

Table G.3.14 Result of IEE for Proving Environmental Impact, Izmir Regional Area

11. Izmir Regional Area(32 Areas)

Environmental Item	Number of Evaluation※					Total
	A	B	C	D	Excluded	
1. Planned residential settlement	0	0	0	32	0	32
2. Involuntary resettlement	0	0	0	32	0	32
3. Substantial changes in the way of life	0	0	0	32	0	32
4. Conflict among communities and people	0	0	0	32	0	32
5. Impact on native people	0	0	0	32	0	32
6. Population increase	0	0	0	32	0	32
7. Drastic change in population composition	0	0	0	32	0	32
8. Changes in bases of economic activities	0	0	0	32	0	32
9. Occupational change and loss of job opportunities	0	0	0	32	0	32
10. Increase in income disparities	0	0	0	32	0	32
11. Adjustment & regulation of water or fishing rights	0	0	2	4	26	32
12. Changes in social and institutional structures	0	0	0	32	0	32
13. Changes in existing institutions and customs	0	0	0	32	0	32
14. Increased use of agrochemicals	18	9	1	4	0	32
15. Outbreak of endemic diseases	0	0	0	32	0	32
16. Spreading of endemic diseases	0	0	0	32	0	32
17. Residual toxicity of agrochemicals	0	0	0	32	0	32
18. Increase in domestic and other human wastes	0	0	0	32	0	32
19. Impairment of historic remains and cultura assets	0	0	0	0	32	32
20. Damage to aesthetic sites	0	0	0	32	0	32
21. Impairment of buried assets	0	0	0	32	0	32
22. Changes in vegetation	0	0	0	32	0	32
23. Negative Impact on important fauna and flora	0	0	0	32	0	32
24. Degradation of ecosystems with biological diversity	0	0	0	32	0	32
25. Proliferation of exotic and/or hazardous species	0	0	0	32	0	32
26. Destruction of wetlands and peat lands	0	0	0	0	32	32
27. Decrease of tropical rain forest and wild lands	0	0	0	0	32	32
28. Destruction or degradation of mangrove forests	0	0	0	0	32	32
29. Degradation of coral reefs	0	0	0	32	0	32
30. Soil erosion	0	0	0	32	0	32
31. Soil salinization	0	0	0	32	0	32
32. Deterioration of soil fertility	0	0	0	32	0	32
33. Soil contamination by agrochemicals and others	0	0	0	32	0	32
34. Devastation or desertification of land	0	0	0	32	0	32
35. Devastation of hinterland	0	0	0	32	0	32
36. Ground subsidence	0	0	0	32	0	32
37. Change in surface water hydrology	0	3	1	28	0	32
38. Change in ground water hydrology	0	0	5	27	0	32
39. Inundation and flooding	0	0	0	32	0	32
40. Sedimentation	0	0	0	32	0	32
41. Riverbed degradation	0	0	0	32	0	32
42. Impediment of inland navigation	0	0	0	0	32	32
43. Water contamination and deterioration of water quality	0	0	0	32	0	32
44. Water eutrophication	0	0	0	32	0	32
45. Sea water intrusion	0	0	0	0	32	32
46. Change in temperature of water	0	1	3	25	3	32
47. Air pollution	0	0	0	0	32	32
Total	18	13	12	1,208	253	1,504

※ SEI: Significant Environmental Impact

A: The subject SEI is unquestionably induced by the Project.

B: The subject SEI is likely to be induced by the Project.

C: The SEI is not fully known.

D: There is no possibility that the subject SEI is likely to be induced by the Project.

Table G.3.15 Result of IEE Proving Environmental Impact,Bursa Regional Area

12. Bursa Regional Area(14 Areas)

Environmental Item	Number of Evaluation※					Total
	A	B	C	D	Excluded	
1. Planned residential settlement	0	0	0	14	0	14
2. Involuntary resettlement	0	0	0	14	0	14
3. Substantial changes in the way of life	0	0	0	14	0	14
4. Conflict among communities and people	0	0	0	14	0	14
5. Impact on native people	0	0	0	14	0	14
6. Population increase	0	1	3	10	0	14
7. Drastic change in population composition	0	0	0	14	0	14
8. Changes in bases of economic activities	0	0	0	14	0	14
9. Occupational change and loss of job opportunities	0	0	0	14	0	14
10. Increase in income disparities	0	0	0	14	0	14
11. Adjustment & regulation of water or fishing rights	0	0	3	6	5	14
12. Changes in social and institutional structures	0	0	0	14	0	14
13. Changes in existing institutions and customs	0	0	0	14	0	14
14. Increased use of agrochemicals	7	4	3	0	0	14
15. Outbreak of endemic diseases	0	0	0	14	0	14
16. Spreading of endemic diseases	0	0	0	14	0	14
17. Residual toxicity of agrochemicals	0	0	0	14	0	14
18. Increase in domestic and other human wastes	0	0	0	14	0	14
19. Impairment of historic remains and cultura assets	0	0	0	0	14	14
20. Damage to aesthetic sites	0	0	0	14	0	14
21. Impairment of buried assets	0	0	0	14	0	14
22. Changes in vegetation	0	0	0	14	0	14
23. Negative impact on important fauna and flora	0	0	0	14	0	14
24. Degradation of ecosystems with biological diversity	0	0	0	14	0	14
25. Proliferation of exotic and/or hazardous species	0	0	0	14	0	14
26. Destruction of wetlands and peat lands	0	0	0	14	0	14
27. Decrease of tropical rain forest and wild lands	0	0	0	0	14	14
28. Destruction or degradation of mangrove forests	0	0	0	0	14	14
29. Degradation of coral reefs	0	0	0	0	14	14
30. Soil erosion	0	0	5	9	0	14
31. Soil salinization	0	0	0	14	0	14
32. Deterioration of soil fertility	0	0	0	14	0	14
33. Soil contamination by agrochemicals and others	0	0	0	14	0	14
34. Devastation or desertification of land	0	0	0	14	0	14
35. Devastation of hinterland	0	0	0	14	0	14
36. Ground subsidence	0	0	0	14	0	14
37. Change in surface water hydrology	0	0	1	13	0	14
38. Change in ground water hydrology	0	0	0	14	0	14
39. Inundation and flooding	0	0	0	14	0	14
40. Sedimentation	0	0	0	14	0	14
41. Riverbed degradation	0	0	0	14	0	14
42. Impediment of inland navigation	0	0	0	0	14	14
43. Water contamination and deterioration of water quality	0	0	0	14	0	14
44. Water eutrophication	0	0	0	14	0	14
45. Sea water intrusion	0	0	0	0	14	14
46. Change in temperature of water	0	5	3	6	0	14
47. Air pollution	0	0	0	0	14	14
Total	7	10	18	520	103	658

※ SEI: Significant Environmental Impact

A: The subject SEI is unquestionably induced by the Project.

B: The subject SEI is likely to be induced by the Project.

C: The SEI is not fully known.

D: There is no possibility that the subject SEI is likely to be induced by the Project.

Table G.3.16 Result of IEE for Proving Environmental Impact,Istanbul Regional Area

13. Istanbul Regional Area(3 Areas)

Environmental Item	Number of Evaluation ※					Total
	A	B	C	D	Excluded	
1. Planned residential settlement	0	0	0	3	0	3
2. Involuntary resettlement	0	0	0	3	0	3
3. Substantial changes in the way of life	0	0	0	3	0	3
4. Conflict among communities and people	0	0	0	3	0	3
5. Impact on native people	0	0	0	3	0	3
6. Population increase	0	0	0	3	0	3
7. Drastic change in population composition	0	0	0	3	0	3
8. Changes in bases of economic activities	0	0	0	3	0	3
9. Occupational change and loss of job opportunities	0	0	0	3	0	3
10. Increase in income disparities	0	0	0	3	0	3
11. Adjustment & regulation of water or fishing rights	0	0	0	0	3	3
12. Changes in social and institutional structures	0	0	0	3	0	3
13. Changes in existing institutions and customs	0	0	0	3	0	3
14. Increased use of agrochemicals	0	3	0	0	0	3
15. Outbreak of endemic diseases	0	0	0	3	0	3
16. Spreading of endemic diseases	0	0	0	3	0	3
17. Residual toxicity of agrochemicals	0	0	0	3	0	3
18. Increase in domestic and other human wastes	0	0	0	3	0	3
19. Impairment of historic remains and cultura assets	0	0	0	1	2	3
20. Damage to aesthetic sites	0	0	0	3	0	3
21. Impairment of buried assets	0	0	0	3	0	3
22. Changes in vegetation	0	0	0	3	0	3
23. Negative impact on important fauna and flora	0	0	0	3	0	3
24. Degradation of ecosystems with biological diversity	0	0	0	3	0	3
25. Proliferation of exotic and/or hazardous species	0	0	0	3	0	3
26. Destruction of wetlands and peat lands	0	0	0	3	0	3
27. Decrease of tropical rain forest and wild lands	0	0	0	0	3	3
28. Destruction or degradation of mangrove forests	0	0	0	0	3	3
29. Degradation of coral reefs	0	0	0	0	3	3
30. Soil erosion	0	0	0	3	0	3
31. Soil salinization	0	0	0	3	0	3
32. Deterioration of soil fertility	0	0	0	3	0	3
33. Soil contamination by agrochemicals and others	0	0	0	3	0	3
34. Devastation or desertification of land	0	0	0	3	0	3
35. Devastation of hinterland	0	0	0	3	0	3
36. Ground subsidence	0	0	0	3	0	3
37. Change in surface water hydrology	0	0	0	3	0	3
38. Change in ground water hydrology	0	0	3	0	0	3
39. Inundation and flooding	0	0	0	3	0	3
40. Sedimentation	0	0	0	3	0	3
41. Riverbed degradation	0	0	0	3	0	3
42. Impediment of inland navigation	0	0	0	0	3	3
43. Water contamination and deterioration of water quality	0	0	0	3	0	3
44. Water eutrophication	0	0	0	3	0	3
45. Sea water intrusion	0	0	0	0	3	3
46. Change in temperature of water	0	0	0	3	0	3
47. Air pollution	0	0	0	0	3	3
Total	0	3	3	112	23	141

※ SEI: Significant Environmental Impact

A: The subject SEI is unquestionably induced by the Project.

B: The subject SEI is likely to be induced by the Project.

C: The SEI is not fully known.

D: There is no possibility that the subject SEI is likely to be induced by the Project.

Table G.3.17 Evaluated Numbers of IEE in the Provinces

1. Ankara Regional Area

Province	Number of Evaluation					Total	Number of Survey
	A	B	C	D	Excluded		
Ankara	0	2	16	222	42	282	6
Bolu	0	0	3	38	6	47	1
Cankiri	0	0	9	73	12	94	2
Kirikkale	0	0	9	196	30	235	5
Total	0	0	37	529	90	658	14
(%)	0	tr.	6	80	14	100	

2. Konya Regional Area

Province	Number of Evaluation					Total	Number of Survey
	A	B	C	D	Excluded		
Konya	0	116	196	1,150	277	1,739	37
Aksaray	0	29	36	329	76	470	10
Karaman	0	24	37	252	63	376	8
Nigde	0	21	37	217	54	329	7
Total	0	190	306	1,948	470	2,914	62
(%)	0	7	11	67	15	100	

3. Adana Regional Area

Province	Number of Evaluation					Total	Number of Survey
	A	B	C	D	Excluded		
Adana	0	30	46	322	72	470	10
Icel	0	18	42	186	36	282	6
Hatay	0	12	11	133	32	188	4
Total	0	60	99	641	140	930	20
(%)	0	6	11	69	14	100	

4. Kayseri Regional Area

Province	Number of Evaluation					Total	Number of Survey
	A	B	C	D	Excluded		
Kayseri	0	0	37	323	110	470	10
Kirsehir	0	0	3	33	11	47	1
Nevsehir	0	0	7	66	21	94	2
Yozgat	-	-	-	-	-	-	0
Total	0	0	47	422	142	611	13
(%)	0	0	8	69	23	100	

5. Sivas Regional Area

Province	Number of Evaluation					Total	Number of Survey
	A	B	C	D	Excluded		
Sivas	0	0	51	648	194	893	19
Tokat	0	0	16	233	33	282	6
Total	0	0	67	881	227	1,175	25
(%)	0	0	6	75	19	100	

6. Trabzon Regional Area

Province	Number of Evaluation					Total	Number of Survey
	A	B	C	D	Excluded		
Trabzon	-	-	-	-	-	-	0
Artvin	0	0	0	360	16	376	8
Bayburt	0	0	4	176	8	188	4
Giresun	0	0	3	132	6	141	3
Gumushane	0	0	2	88	4	94	2
Rize	-	-	-	-	-	-	0
Total	0	0	9	756	34	799	17
(%)	0	0	1	95	4	100	

7. Samsun Regional Area

Province	Number of Evaluation					Total	Number of Survey
	A	B	C	D	Excluded		
Samsun	0	4	12	299	14	329	7
Amasya	0	0	3	492	22	517	11
Corum	0	4	1	400	18	423	9
Ordu	-	-	-	-	-	-	0
Total	0	8	16	1,191	54	1,269	27
(%)	0	tr.	1	95	4	100	

8. Kastamonu Regional Area

Province	Number of Evaluation					Total	Number of Survey
	A	B	C	D	Excluded		
Kastamonu	0	0	2	178	8	188	4
Zonguldak	-	-	-	-	-	-	0
Sinop	0	0	6	264	12	282	6
Karabuk	0	0	2	88	4	94	2
Bartin	0	0	2	88	4	94	2
Total	0	0	12	618	28	658	14
(%)	0	0	2	94	4	100	

9. Eskisehir Regional Area

Province	Number of Evaluation					Total	Number of Survey
	A	B	C	D	Excluded		
Eskisehir	0	0	48	528	82	658	14
Afyon	0	0	24	177	34	235	5
Kutahya	0	0	16	99	26	141	3
Usak	0	0	24	132	32	188	4
Total	0	0	112	936	174	1,222	26
(%)	0	0	9	77	14	100	

10. Antalya Regional Area

Province	Number of Evaluation					Total	Number of Survey
	A	B	C	D	Excluded		
Antalya	0	24	22	268	62	376	8
Burdur	0	27	21	266	62	376	8
Isparta	0	4	8	68	14	94	2
Total	0	55	51	602	138	846	18
(%)	0	6	6	71	17	100	

11. Izmir Regional Area

Province	Number of Evaluation					Total	Number of Survey
	A	B	C	D	Excluded		
Izmir	7	2	0	304	63	376	8
Aydin	0	3	1	189	42	235	5
Denizli	7	4	6	298	61	376	8
Manisa	3	1	3	188	40	235	5
Mugla	1	3	2	229	47	282	6
Total	18	13	12	1,208	253	1,504	32
(%)	1	1	1	80	17	100	

12. Bursa Regional Area

Province	Number of Evaluation					Total	Number of Survey
	A	B	C	D	Excluded		
Bursa	0	4	12	182	37	235	5
Balikesir	2	2	1	113	23	141	3
Bilecik	1	1	1	37	7	47	1
Canakkale	2	3	2	112	22	141	3
Yalova	2	0	2	76	14	94	2
Total	7	10	18	520	103	658	14
(%)	1	2	3	79	15	100	

13. Istanbul Regional Area

Province	Number of Evaluation					Total	Number of Survey
	A	B	C	D	Excluded		
Istanbul	-	-	-	-	-	-	0
Edirne	-	-	-	-	-	-	0
Kirklareu	0	3	3	112	23	141	3
Kocaeu	-	-	-	-	-	-	0
Sakarya	-	-	-	-	-	-	0
Tekirdag	-	-	-	-	-	-	0
Total	0	3	3	112	23	141	3
(%)	0	2	2	80	16	100	

Table G.3.18The Projects of Contents,having Significant Environmental Impact

The projects which have impact upon environment, are listed as following.

Province	Project code	Particular of influence
1.Ankara	01-06-008	· Soil erosion(B)
	01-06-068	· Conflict among communities and people(B)
2.Konya	02-42-001	· Increased use of agrochemicals(B) · Residual toxicity of agrochemicals(B) · Soil contamination by agrochemicals(B)
	02-42-002	· Ditto
	02-42-003	· Ditto
	02-42-004	· Destruction of wetlands and peatlands(B) · Soil contamination by agrochemicals(B)
	02-42-005	· Increased use of agrochemicals(B) · Residual toxicity of agrochemicals(B) · Soil contamination by agrochemicals(B)
	02-42-006	· Ditto
	02-42-007	· Ditto
	02-42-008	· Ditto
	02-42-010	· Ditto
	02-42-011	· Ditto · Destruction of wetlands and peatlands(B)
	02-42-012	· Increased use of agrochemicals(B) · Residual toxicity of agrochemicals(B) · Soil contamination by agrochemicals(B)
	02-42-013	· Ditto
	02-42-014	· Ditto
	02-42-015	· Ditto
	02-42-016	· Ditto
	02-42-017	· Ditto · Destruction of wetlands and peatlands(B)
	02-42-018	· Increased use of agrochemicals(B) · Residual toxicity of agrochemicals(B) · Soil contamination by agrochemicals(B)
	02-42-020	· Ditto
	02-42-021	· Ditto
	02-42-022	· Ditto · Destruction of wetlands and peatlands(B)
	02-42-023	· Increased use of agrochemicals(B) · Residual toxicity of agrochemicals(B) · Soil contamination by agrochemicals(B) · Destruction of wetlands and peatlands(B) · Adjustment & regulation of water right(B) · Changes in vegetation(B) · Degradation of ecosystems with biological diversity(B)
	02-42-024	· Increased use of agrochemicals(B) · Residual toxicity of agrochemicals(B) · Soil contamination by agrochemicals(B)
	02-42-025	· Ditto
	02-42-026	· Ditto
	02-42-027	· Ditto
	02-42-028	· Ditto

Province	Project code	Particular of influence
2.Konya Continued	02-42-029	· Ditto
	02-42-030	· Ditto
	02-42-031	· Ditto
	02-42-032	· Ditto
	02-42-033	· Ditto
	02-42-034	· Ditto
	02-42-035	· Ditto
	02-42-036	· Ditto
	02-42-037	· Ditto
	02-42-038	· Ditto
	02-42-039	· Ditto
3.Aksaray	02-68-039	· Increased use of agrochemicals(B) · Residual toxicity of agrochemicals(B) · Soil contamination by agrochemicals(B)
	02-68-040	· Ditto
	02-68-041	· Ditto
	02-68-042	· Ditto
	02-68-043	· Ditto
	02-68-044	· Ditto · Destruction of wetlands and peatlands(B)
	02-68-045	· Increased use of agrochemicals(B) · Residual toxicity of agrochemicals(B) · Soil contamination by agrochemicals(B)
	02-68-046	· Ditto
	02-68-047	· Increased use of agrochemicals(B)
	02-68-048	· Increased use of agrochemicals(B) · Residual toxicity of agrochemicals(B) · Soil contamination by agrochemicals(B)
4.Karaman	02-70-049	· Increased use of agrochemicals(B) · Residual toxicity of agrochemicals(B) · Soil contamination by agrochemicals(B)
	02-70-050	· Ditto
	02-70-051	· Ditto
	02-70-052	· Ditto
	02-70-053	· Ditto
	02-70-054	· Ditto
	02-70-055	· Ditto
	02-70-056	· Ditto
5.Nigde	02-51-061	· Increased use of agrochemicals(B) · Residual toxicity of agrochemicals(B) · Soil contamination by agrochemicals(B)
	02-51-062	· Ditto
	02-51-067	· Ditto
	02-51-070	· Ditto
	02-51-082	· Ditto
	02-51-085	· Ditto
	02-51-088	· Ditto
6.Adana	03-01-001	· Increased use of agrochemicals(B) · Residual toxicity of agrochemicals(B) · Soil contamination by agrochemicals(B)
	03-01-002	· Ditto
	03-01-003	· Ditto

Province	Project code	Particular of influence
6.Adana Continued	03-01-004	· Ditto
	03-01-005	· Ditto
	03-01-006	· Ditto
	03-01-007	· Ditto
	03-01-008	· Ditto
	03-01-009	· Ditto
	03-01-010	· Ditto
7.Icel	03-33-011	· Increased use of agrochemicals(B) · Residual toxicity of agrochemicals(B) · Soil contamination by agrochemicals(B)
	03-33-012	· Ditto
	03-33-013	· Ditto
	03-33-014	· Ditto
	03-33-015	· Ditto
	03-33-016	· Ditto
8.Hatay	03-31-020	· ncreased use of agrochemicals(B) · Residual toxicity of agrochemicals(B) · Soil contamination by agrochemicals(B)
	03-31-021	· Ditto
	03-31-022	· Ditto
	03-31-023	· Ditto
9.Samsun	12-55-003	· Change in surface water hydrology(B) · Change of ground water hydrology(B)
	12-55-007	· Change of ground water hydrology(B)
	12-55-008	· Increased use of agrochemicals(B)
10.Corum	12-19-022	· Increased use of agrochemicals(B)
	12-19-034	· Adjustment & regulation of water right(B)
	12-19-051	· Adjustment & regulation of water right(B)
	12-19-055	· Increased use of agrochemicals(B)
11.Antalya	15-07-001	· Increased use of agrochemicals(B) · Residual toxicity of agrochemicals(B) · Soil contamination by agrochemicals(B)
	15-07-002	· Ditto
	15-07-007	· Ditto
	15-07-008	· Increased use of agrochemicals(B) · Residual toxicity of agrochemicals(B) · Soil contamination by agrochemicals(B)
	15-07-016	· Ditto
	15-07-018	· Ditto
	15-07-035	· Ditto
	15-07-040	· Ditto
12.Burdur	15-15-050	· Increased use of agrochemicals(B) · Residual toxicity of agrochemicals(B) · Soil contamination by agrochemicals(B)
	15-15- 51	· Ditto
	15-15- 52	· Ditto
	15-15-053	· Ditto
	15-15-054	· Ditto · Adjustment & regulation of water right(B) · Changes in bases and economic activities(B)

Province	Project code	Particular of influence
12.Burdur Continued	15-15-055	· Increased use of agrochemicals(B) · Residual toxicity of agrochemicals(B) · Soil contamination by agrochemicals(B)
	15-15-066	· Ditto · Adjustment & regulation of water right(B)
	15-15-067	· Increased use of agrochemicals(B) · Residual toxicity of agrochemicals(B) · Soil contamination by agrochemicals(B)
13.Isparta	15-32-068	· Increased use of agrochemicals(B) · Residual toxicity of agrochemicals(B) · Soil contamination by agrochemicals(B) · Adjustment & regulation of water right(B)
14.Izmir	16-35-001	· Increased use of agrochemicals(A)
	16-35-002	· Ditto
	16-35-003	· Increased use of agrochemicals(B) · Change in temperature of water(B)
	16-35-004	· Increased use of agrochemicals(A)
	16-35-005	· Ditto
	16-35-006	· Ditto
	16-35-007	· Increased use of agrochemicals(A)
	16-35-008	· Ditto
15.Aydin	16-09-009	· Increased use of agrochemicals(B)
	16-09-012	· Ditto
	16-09-013	· Ditto
16.Deniz	16-20-014	· Increased use of agrochemicals(A)
	16-20-015	· Ditto
	16-20-016	· Ditto
	16-20-018	· Ditto
	16-20-019	· Increased use of agrochemicals(B) · Change in surface water hydrology(B)
	16-20-020	· Increased use of agrochemicals(A)
	16-20-021	· Ditto
17.Manisa	16-45-024	· Increased use of agrochemicals(B)
	16-45-025	· Increased use of agrochemicals(A)
	16-45-026	· Ditto
	16-45-027	· Ditto
18.Mugla	16-48-028	· Increased use of agrochemicals(B)
	16-48-033	· Increased use of agrochemicals(A)
	16-48-034	· Increased use of agrochemicals(B)
	16-48-035	· Ditto
19.Bursa	17-16-001	· Population increase(B) · Increased use of agrochemicals(B)
	17-16-002	· Increased use of agrochemicals(B)
	17-16-003	· Population increase(B) · Change in temperature of water(B)
20.Balikesir	17-16-001	· Increased use of agrochemicals(A) · Change in temperature of water(B)
	17-16-002	· Increased use of agrochemicals(B)
	17-16-003	· Increased use of agrochemicals(A)

Province	Project code	Particular of influence
21.Bilecik	17-11-009	· Increased use of agrochemicals(A)
		· Change in temperature of water(B)
22.Canakkale	17-17-010	· Increased use of agrochemicals(A) · Change in temperature of water(B)
	17-17-011	· Increased use of agrochemicals(A)
	17-17-012	· Ditto · Change in temperature of water(B)
23.Yalova	17-77-013	· Increased use of agrochemicals(A)
	17-77-014	· Ditto
24.Kirklareu	18-39-016	· Increased use of agrochemicals(B)
	18-39-017	· Increased use of agrochemicals(B)
	18-39-018	· Increased use of agrochemicals(B)

Note: *: A or B is shown evaluation of environmental impact.
A: The subject significant environmental impact is unquestionably induced by the Project.
B: The subject significant environmental impact is likely to be induced by the Project.

G.4 Soil in the Priority Project Areas

The Result of Soil Survey in the Priority Project Areas

1. The Hacilar Project in Kirikkale Province

(1) Date: 24, Jul., 1997
(2) Soil Group: Brown Soil mainly, Colluvial Soil
(3) Soil Texture: Loam, Sandy clay loam, Silty clay, Clay
(4) Soil Erosion Class: 1
(5) Land Capability Class: I , II
(6) Land Use: Wheat, Sunflower, Rain fed Orchard

Soil Description

NO.1 (Brown Soil)

0 - 30cm: Contain many gravels, 7.5YR4/4 (Brown, dry soil), 7.5YR4/4 (Brown, wet soil), Sandy clay loam. Shallow soil, Collect soil sample.

30 < cm : Parent material, weathered sand stone.

NO.2 (Colluvial Soil)

0 - 15cm: 10YR5/3 (Dull yellowish brown, dry soil), 10YR4/3 (Dull yellowish brown, wet soil). Silty clay, contain medium $CaCO_3$, Collect soil sample.

15 < cm : Very hard layer in dry season.

2. The Urunlu Project in Konya Province

(1) Date: 11, Aug., 1997
(2) Soil Group: Alluvial Soil
(3) Soil Texture: Sandy clay loam
(4) Soil Erosion Class: 1
(5) Land Capability Class: I , II
(6) Land Use: Bean, Sugar beet

Soil Description

0 - 30cm: Many gravels on the ground and surface, 1-10cm in diameter. 10YR6/3 (Brown, dry soil), 10YR4/4 (Dull yellowish orange, wet soil). Granular structure. Contain high $CaCO_3$,Sandy clay loam.Collect soil sample.

30 - 60cm: Many gravels, about 1cm in diameter. Massive. Contain high $CaCO_3$. Sandy clay loam.

60 - 90cm: Many gravels, about 1cm in diameter. Massive. Contain high $CaCO_3$. Sandy clay loam, Very deep soil.

3. The Kaleseklsl Project in Adana Province

(1) Date: 13, Aug., 1997
(2) Soil Group: Non Calcareous Brown Soil
(3) Soil Texture:Sandy loam, Sandy clay loam
(4) Soil Erosion Class: 4
(5)Land Capability Class: Ⅶ
(6)Land Use: Wheat, Cherry, Grape

Soil Description

0 - 30cm: 5YR4/6 (Reddish brown, dry soil), 5YR4/4 (Dull reddish brown, wet soil). Sandy clay loam. Collect soil sample.

30 < cm : Contain $CaCO_3$, Sandy and Clayey sist.

4. The Camlibel Project in Tokat Province

(1) Date: 1, Aug., 1997
(2) Soil Group: Alluvial Soil
(3) Soil Texture: Silty clay, Clay
(4) Soil Erosion Class: 1
(5) Land Capability Class: Ⅰ , Ⅱ and Ⅴ
(6) Land Use: Wheat, Sugar beet, Vegetables, Pasture

Soil Description

NO.1 (Alluvial Soil)

0 - 20cm : 7.5YR4/3 (Brown, dry soil), 7.5YR3/3 (Dark brown, wet soil), Stones scatters on the ground, Clay, Granular structure, Collect soil sample.

20 < cm: Contain gravels, very hard, Massive, Clay.

NO.2 (Alluvial Soil)

0 - 30cm : 10YR5/4 (Dull yellowish brown, dry soil), 10YR4/3 (Dull yellowish brown, wet soil). Clay, Salt accumulation on the ground, Blocky structure, Collect soil sample.

30 - 60 cm: Clay, wet.

60 - 90cm : Gley horizon, Contain Fe mottling, wet.

5. The Kozluk Project in Samsun Province

(1) Date: 29, Jul., 1997
(2) Soil Group: Alluvial Soil mainly, Brown Forest Soil
(3) Soil Texture: Loam, Clay loam, Clay
(4) Soil Erosion Class: Non - 1
(5) Land Capability Class: II , III
(6) Land Use: Hazelnuts, Maize, Wheat

Soil Description

NO.1 (Brown Forest Soil)

0 - 11cm : 10YR5/2 (Grayish yellow brown, dry soil), 10YR3/3 (Dark brown, wet soil), Sandy clay with course sand. Very hard, Collect soil sample.

11 - 35 cm: Contain many Mn mottlings, Clay.

35 - 70cm : Contain many Fe and Mn mottlings, Clay.

70 < cm: Contain gley mottling and Fe mottlings Deep soil.

NO.2 (Alluvial Soil)

0 - 25cm : 7.5YR4/4 (Brown, dry soil), 7.5YR3/2 (Brownish black, wet soil). Sandy loam, Many root, Contain Fe mottlings, Collect soil sample.

25 - 35 cm: Contain many Fe and Mn mottlings, Sandy loam.

35 < cm: Contain Mn concretion, Sand, Deep soil, Ground water table in 75cm depth.

6. The Kuskara Project in Kastamonu Province

(1) Date: 28, Jul., 1997
(2) Soil Group: Brown Forest Soil
(3) Soil Texture: Sandy clay loam, Clay loam
(4) Soil Erosion Class: 2
(5) Land Capability Class: II , III
(6) Land Use: garlic, Sugar beet, Maize, Sunflower, Wheat

Soil Description

NO.1 (Brown Forest Soil)

0 - 30cm : 10YR4/6 (Brown, dry soil), 10YR4/6 (Brown, wet soil), Sandy clay loam, Glanular structure, Contain medium $CaCO_3$,Contain gravels within 2cm in diameter, Collect soil sample.

30 < cm: Contain gravels within 2cm in diameter and $CaCO_3$, Very hard.

7. The Ozdenk Project in Eskisehir Province

(1) Date: 9, Aug., 1997
(2) Soil Group: Colluvial Soil mainly, Brown Soil
(3) Soil Texture: Sandy clay loam, Clay loam
(4) Soil Erosion Class: 1 - 3
(5) Land Capability Class: Ⅰ - Ⅳ
(6) Land Use: Sugar beet, Maize, Wheat Orchard, Vegetables

Soil Description

NO.1 (Colluvial Soil)

0 - 30cm : 10YR5/4 (Dull yellowish brown, dry soil), 10YR4/4 (Brown, wet soil), Clay loam,Contain high $CaCO_3$., Contain debris on the surface and in the layer, Collect soil sample.

30 - 65 cm: Contain many debris, Sandy clay loam.

65 < cm: Contain many debris, Sandy clay loam, Deep soil.

NO.2 (Brown Soil at hilly area)

0 - 30cm : 7.5YR5/4 (Dull brown, dry soil), 7.5YR4/4 (Brown, wet soil). Clay loam, Contain many debris on the ground, 1 - 30cm in diameter, Collect soil sample.

30 < cm: Contain high $CaCO_3$, Sandy soil, Parent material, sandstone.

8. The Aslanlar Project in Izmir Province

(1) Date: 6, Aug., 1997
(2) Soil Group: Alluvial Soil, Colluvial Soil
(3) Soil Texture:Sandy loam, Loam, Clay loam
(4) Soil Erosion Class: 1
(5)Land Capability Class: Ⅰ , Ⅱ
(6)Land Use: Wheat, Cotton, Maize, Olive, Clover, Vegetables

Soil Description

NO.1 (Alluvial Soil)

0 - 30cm: 10YR5/2 (Grayish yellow brown, dry soil), 10YR4/2 (Grayish yellow brown, wet soil). Blocky structure. Clay loam. Collect soil sample.

30 - 90cm: Massive. Contain iron mottling Loam, Insufficient drainage, Very deep soil.

NO.2 (Colluvial Soil)

0 - 60cm: 10YR5/2 (Grayish yellow brown, dry soil), 10YR4/2 (Grayish yellow brown, wet soil). Sandy loam/Loam. Well drainage, Collect soil sample, 0-30cm depth.

60 - 65cm: Very hard layer, Contain many stones, within 10cm in diameter.

65 < cm : Loam/Sandy loam, Very deep soil.

9. The Ilyaskoy Project in Yalova Province

(1) Date: 5, Aug., 1997
(2) Soil Group:Brown Forest Soil in hilly area
(3) Soil Texture: Sandy clay, Clay
(4) Soil Erosion Class: 2
(5) Land Capability Class: II , III
(6) Land Use: Wheat

Soil Description

NO.1 (Brown Forest Soil)

0 - 30cm : 10YR4/4 (Brown, dry soil), 10YR3/4 (Dark brown, wet soil), Clay, Collect soil sample.

30 - 85 cm: Contain weathered gravels, Clay, wet.

85 < cm: Contain many weathered gravels, Sandy clay, loam, Deep soil.

NO.2 (Brown Forest Soil)

0 - 50cm : 10YR5/3 (Dull yellowish brown, dry soil), 10YR4/4 (Brown, wet soil). Clay, Collect soil sample.

50 < cm: Contain $CaCO_3$, Clay.

10. The K.Karistiran Project in Kirklareli Province

(1) Date: 4, Aug., 1997
(2) Soil Group:Vertisole Soil
(3) Soil Texture:Clay
(4) Soil Erosion Class: 2
(5) Land Capability Class: II
(6) Land Use: Wheat, Sunflower, Water melon, Vegetables

Soil Description

0 - 30cm: 10YR3/2 (Brownish black, dry soil), 10YR2/1 (Black, wet soil). Granular structure. Clay. Collect soil sample.

30 - 60cm: Hard pan layer, Massive. Clay.

60 < cm : Parent materials layer, Marl and $CaCO_3$ stone.

Table G.4.1 Summary of Soil and Soil Limiting Factor

Name of Project	Soil Group	Slope (%)	Land Capability	Soil Depth (cm)	Soil Erosion	Soil Limiting Factor			
						Alkalinity	Salinity	Drainage	Gravel
Hacilar	Brown Soil	4-20	Moderate	Moderate	Moderate	Slight	Nothing	Nothing	Nothing
	Colluvial Soil	0-3	well	Moderate	Slight, Moderate	Slight	Nothing	Nothing	Nothing
Urunlu	Alluvial Soil	2>	Well	Deep	Slight	Slight	Nothing	Nothing	Moderate
Kalesekisi	Non Calcareous Brown Soil	18-30	Severe	Moderate	Severe	Nothing	Nothing	Nothing	Moderate
Camlibel	Alluvial Soil	0-3	Well, Severe	Deep	Slight	Slight	Nothing	Slight	Nothing
Kozluk	Alluvial Soil	2>	Well	Deep	Nothing	Nothing	Nothing	Slight	Nothing
	Brown Forest Soil	10	Moderate	Moderate	Slight	Nothing	Nothing	Nothing	Nothing
Kuskara	Brown Forest Soil	5-9	Well, Moderate	Moderate	Moderate	Nothing	Nothing	Nothing	Slight
Ozdenk	Colluvial Soil	0-6	Well	Deep	Slight	Nothing	Nothing	Nothing	Slight
	Brown Soil	4+	Well, Moderate	Moderate	Moderate	Nothing	Nothing	Nothing	Moderate
Aslanlar	Alluvial Soil	2+	Well	Deep	Slight	Nothing	Nothing	Nothing	Nothing
	Colluvial Soil	2+	Well	Deep	Slight	Nothing	Nothing	Nothing	Slight
Ilyaskoy	Brown Forest Soil	4-15	Well, Moderate	Moderate	Moderate, Severe	Nothing	Nothing	Nothing	Slight
K. Karistiran	Vertisole soil	3-5	Well	Moderate	Moderate	Nothing	Nothing	Nothing	Slight

Note: Soil limiting factor is divided into fore levels, nothing, slight, moderate and severe.

Table G.4.2 Some Properties of Surface/Subsurface Soils in the Priority Project Area

Name of Project	Soil Layer	Saturated pH(H_2O)	Organic Material (%)	Electric Conduct. (ECe, ms/cm)	$CaCO_3$ (%)	Field Capacity (%)	Particle Size Distribution			Soil Texture	Permeability (cm/hr.)
							Clay (%)	Silt (%)	Sand (%)		
Hacilar	Surface	7.20-7.90	-	-	1.1- 7.2	-	20-50	18-26	24-58	SL, SCL, CL, SiC, C	-
	Subsurface	7.40-7.80	-	-	7.8-11.2	-	20-52	18-28	20-60	SL, CL, SC, SiC, C	-
Urunlu	Surface	7.80-8.10	0.73-1.22	1.25-1.52	33.9-47.0	45-50	24-30	19-27	46-54	L, SCL	4.86-10.38
	Subsurface	8.10	-	1.25-1.52	42.8-52.0	55	32-34	25-27	38-42	SCL, CL	2.17- 7.73
Kalesekisi	Surface	7.35-7.55	1.81	-	1.9	50	11-23	24-27	49-65	SL, SCL	0.95-3.16
	Subsurface	7.55	-	-	1.9	50	15	22	63	SL	3.00
Camlibel	Surface	7.99-8.09	1.04-3.02	-	6.9-23.6	45- 68	-	-	-	SL, SCL, C	-
	Subsurface	7.88-8.36	1.71-4.33	-	7.6-29.1	66-100	-	-	-	SCL, CL, SiC, C	-
Kozluk	Surface	7.40	-	-	-	45	-	-	-	SL, L, CL	-
	Subsurface	7.65	-	-	-	40	-	-	-	SL, C	-
Kuskara	Surface	8.40-8.48	0.79-1.38	-	4.9-13.7	53-57	-	-	-	SL, SCL, CL	-
	Subsurface	8.46-8.48	0.79-0.99	-	4.9-15.2	55-64	-	-	-	SL, SCL, CL	-
Ozdenk	Surface	7.40-7.80	-	-	17.2-30.5	61-70	28-32	24-42	28-45	CL	3.10-5.50
	Subsurface	7.70-7.80	-	-	12.9-31.3	54-79	25-40	22-34	25-51	SCL, CL, C	3.90-8.20
Aslanlar	Surface	7.90-8.10	-	1.14-1.50	-	71-78	-	-	-	L, SiCL, CL	4.41- 5.37
	Subsurface	7.80-8.50	-	0.64-2.09	-	44-72	-	-	-	SL, SCL, SiC	2.83-12.43
Ilyaskoy	Surface	6.10-7.40	2.11-3.80	1.56	0.0-20.0	60-81	27-53	22-36	22-37	CL, C	-
	Subsurface	6.60-7.70	0.58-2.00	2.40-3.12	0.0-34.7	52-90	34-84	0-35	16-38	CL, C	-
K. Karistiran	Surface	5.80-7.35	1.21-2.29	0.11-0.23	0.0- 9.6	58-68	22-45	17-42	24-61	SL, SCL, CL, C	1.82-3.92
	Subsurface	6.70-7.30	0.81-1.98	0.09-0.19	0.0-10.4	50-70	33-53	21-41	21-32	SCL, CL, C	1.20-3.50

Note: The datas are from GDRS and shown as an extent. ECe means saturated extract Electric Conductivity in the soil.

Table G.4.3 (1) Chemical Properties of the Surface Soils in the Priority Project Areas

The chemical properties of the surface soils in the properties project areas were shown inthe Attachment.The analysis was done by JICA Study Team.
The followings can be pointed out from the analysis result.

- Soil pH is slightly acid to slightly alkaline
- Inorganic nitrogen contents are very low level
- Available phosphorus contentsare contained sufficiently,except colluvial soil of Aslanlar and Kalesekisi,Kuskara and Ilyaskoy project area
- Exchangeable basis was contained in very high contents in Turkey,especially calcium and potassium
- The salinity may become the problem at the Alluvial soil of Aslanlar and the part of Camlibel.In generally,salinity in the soil become more than 0.07 or 0.1%,Obstacle of plant grouwth may occur in ordinary crops.

Name of Project	Hacilar		Urunlu	Kalesekisi	Camlibel		Kozluk	
Location (Province)	Kirikkale		Konya	Adana	Tokat		Samsun	
Plot Number	NO.1	NO.2	NO.1	NO.1	NO.1	NO.2	NO.1	NO.2
Soil Group	Brown Soil	Colluvial Soil	Alluvial Soil	Non calcareous Soil	Alluvial Soil	Alluvial Soil	Brown Forest Soil	Alluvial Soil
Land Capability Class	III	II	I , II	VII	I , II	II , V	III	II
Soil Erosion Class	2	1 , 2	1	4	1	1	1	Non
Slope	4 - 8 %	2 - 3 %	Flat area	18 - 30 %	2 - 3 %	0 - 1 %	10 %	0 - 2 %
pH(H_2O)	6.5 - 7.0	7.0 - 7.5	7.5	7.0 - 7.5	7.0 - 7.5	7.5	6.5 - 7.0	6.5 - 7.0
pH(KCl)	6.0 - 6.5	7.0 - 7.5	7.0	6.0 - 6.5	6.5 - 7.0	7.0 - 7.5	5.0 - 5.5	5.5 - 6.5
NH_4-N, mg/100g soil ※	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
NO_3-N, mg/100g soil	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	1 - 5	0 - 1	0 - 1
Available P_2O_5, mg/100g soil	50 - 75	50 - 75	50 - 75	0 - 5	50 - 75	5 - 10	0 - 5	0 - 5
Exchangeable CaO, mg/100g soil	400 - 600	1000 <	1000 <	400 - 600	1000 <	600 - 1000	100 - 200	100 - 200
Exchangeable MgO, mg/100g soil	10 - 25	150 <	150 <	1 - 10	50 - 75	150 <	1 - 10	1 - 10
Exchangeable K_2O, mg/100g soil	100 - 150	100 - 150	70 - 100	100 - 150	100 - 150	150 <	70 - 100	35 - 70
Exchangeable Mn, ppm	0 - 5	10 - 25	25 - 50	5 - 10	0 - 5	25 - 50	25 - 50	5 - 10
Available Fe, ppm	0 - 5	0 - 5	0 - 5	0 - 5	0 - 5	0 - 5	10 - 25	25 - 50
Cl (indicate as NaCl), %	0.00	0.005-0.015	0.015 - 0.05	0.00	0.005 >	0.15 - 0.20	0.00	0.00

Note: ※ Air dried soil is used. Extraction solution is used Morgan liquid (10%Sodium Acetate, pH4.8).
The analysis was done by JICA Study Team.

Table G.4.3 (2) Chemical Properties of the Surface Soils in the Priority Project Areas

Name of Project	Kuskara	Ozdenk		Aslanlar		Ilyaskoy		K. Karistiran
Location (Province)	Kastamonu	Eskisehir		Izmir		Yalova		Kirklareli
Plot Number	NO.1	NO.1	NO.2	NO.1	NO.2	NO.1	NO.2	NO.1
Soil Group	Brown Forest Soil	Colluvial Soil	Brown Soil	Alluvial Soil	Colluvial Soil	Brown Forest S.	Brown Forest S.	Vertisole Soil
Land Capability Class	II, III	I, II	III, IV	II	II	II	III	II
Soil Erosion Class	2	1	2, 3	1	1	2	3	2
Slope	5 - 9 %	0 - 6 %	4+ %	2+ %	2+ %	4+ %	4 - 15 %	3 - 5 %
pH(H_2O)	6.5 - 7.0	7.5	7.0 - 7.5	7.0 - 7.5	7.0 - 7.5	6.5 - 7.0	7.0 - 7.5	7.0 - 7.5
pH(KCl)	5.0 - 5.5	6.5	7.0 - 7.5	7.0 - 7.5	7.0 - 7.5	7.0 - 7.5	7.0 - 7.5	6.5 - 7.0
NH_4-N, mg/100g soil ※	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
NO_3-N, mg/100g soil	0 - 1	0 - 1	0 - 1	10 - 20	0 - 1	0 - 1	0 - 1	0 - 1
Available P_2O_5, mg/100g soil	25 - 50	50 - 75	50 - 75	25 - 50	0 - 5	0 - 5	0 - 5	25 - 50
Exchangeable CaO, mg/100g soil	1000 <	1000 <	1000 <	1000 <	200 - 400	200 - 400	1000 <	400 - 600
Exchangeable MgO, mg/100g soil	1 - 10	150 <	25 - 50	50 - 75	1 - 10	25 - 50	100 - 150	10 - 25
Exchangeable K_2O, mg/100g soil	100 - 150	100 - 150	70 - 100	35 - 70	100 - 150	70 - 100	70 - 100	100 - 150
Exchangeable Mn, ppm	10 - 25	25 - 50	10 - 25	25 - 50	0 - 5	5 - 10	25 - 50	0 - 5
Available Fe, ppm	0 - 5	0 - 5	0 - 5	0 - 5	0 - 5	0 - 5	0 - 5	0 - 5
Cl (indicate as NaCl), %	0.005 - 0.015	0.005 - 0.015	0.005 - 0.015	0.05 - 0.10	0.00	0.00	0.005 - 0.015	0.00

Note: ※ Air dried soil is used. Extraction solution is used Morgan liquid (10%Sodium Acetate, pH4.8).
The analysis was done by JICA Study Team.

G.5 Agricultural Materials Used in the priority project Areas

1. Hacilar Project Area in Kirikkale Province

(Weight per Decare)

Crop	N fertilizer	P fertilizer	K fertilizer	Herbicides	Insecticides	Fungicides
	N Kg	P_2O_5 Kg	K_2O Kg	gram	gram	gram
Wheat	10	20	-	20	-	
Watermelon	25	-	-	-	500	-
Chick pea	-	-	-	-	-	-

2. Urunlu Project Area in Konya Province

(Weight per Decare)

Crop	N fertilizer	P fertilizer	K fertilizer	Herbicides	Insecticides	Fungicides
	N Kg	P_2O_5 Kg	K_2O Kg	gram	gram	gram
Wheat(1)	20	20	-	-	-	-
Wheat(2)	20	20	20	210	-	-
Sugar beet(1	45	75	-	-	-	-
Sugar beet(2	50	50	50	210	-	-
Watermelon	20	20	20	-	-	-
Melon	20	20	20	-	-	-
Beans	20	20	20	-	-	-

3. Kalesekisi Project Area in Adana Province

(Weight per Decare)

Crop	N fertilizer	P fertilizer	K fertilizer	Herbicides	Insecticides	Fungicides
	N Kg	P_2O_5 Kg	K_2O Kg	gram	gram	gram
Grape	50	50	-	-	-	1330
Cherry(1)	35	35	-	-	-	-
Cherry(2)	50	50	50	60	500	-
Straw berry	50	50	-	-	-	-
Watermelon	25	-	-	-	500	-

4. Camlibel Project Area in Tokat Province

(Weight per Decare)

Crop	N fertilizer	P fertilizer	K fertilizer	Herbicides	Insecticides	Fungicides
	N Kg	P_2O_5 Kg	K_2O Kg	gram	gram	gram
Wheat	10	10	-	150	-	-
Barley	10	10	-	-	-	-
Sugar beet	50	50-75	-	-	150-200	-
Alfalfa	20	-	-	-	-	-
Oat	8	-	-	-	-	-
Cow vetch	7	-	-	-	-	-
Vegetables	5-10	-	-	-	-	-

5. Kozluk Project Area in Samsun Province

(Weight per Decare)

Crop	N fertilizer	P fertilizer	K fertilizer	Herbicides	Insecticides	Fungicides
	N Kg	P_2O_5 Kg	K_2O Kg	gram	gram	gram
Rice	50	-	-	-	-	-
Maize(1)	50	-	-	-	-	-
Maize(2)	25	20	-	-	-	-
Maize(3)	20-25	50-60	-	-	-	-
Hazelnut(1)	-	250-300 g/tree	-	-	-	-
Hazelnut(2)	20	30	-	-	2500	-
Hazelnut(3)	50	15	-	-	150-200	-
Vegetables(1	20	-	-	-	-	-
Vegetables(2	2 tons by manure	-	-	-	-	-

6. Kuskara Project Area in Kastamonu Province

(Weight per Decare)

Crop	N fertilizer	P fertilizer	K fertilizer	Herbicides	Insecticides	Fungicides
	N Kg	P_2O_5 Kg	K_2O Kg	gram	gram	gram
Wheat	35	35	-	-	-	-
Maize	25	60	-	100	-	-
Sugar beet	100-150	50	-	360-450	-	-
Garlic	0.1-0.13	0.03	-	300-600	50-650	250-300

7. Ozdenk Project Area in Eskisehir Province

(Weight per Decare)

Crop	N fertilizer	P fertilizer	K fertilizer	Herbicides	Insecticides	Fungicides
	N Kg	P_2O_5 Kg	K_2O Kg	gram	gram	gram
Wheat(1)	15-20	15-20	-	125	100	-
Wheat(2)	15	15	-	110	-	-
Wheat(3)	20	15	-	130	-	-
Barley	15-20	15-20	-	125	100	-
Sugar beet(1	30-45	75	-	-	-	-
Sugar beet(2	35	80	-	-	600	-
Dry peas	-	-	-	-	-	-
Alfalfa(1)	-	-	-	-	-	-
Alfalfa(2)	-	20	-	-	-	-

8. Aslanlar Project Area in Izmir Province

(Weight per Decare)

Crop	N fertilizer	P fertilizer	K fertilizer	Herbicides	Insecticides	Fungicides
	N Kg	P_2O_5 Kg	K_2O Kg	gram	gram	gram
Cotton	35-40	35	-	250	100	-
Watermelon	35	50	-	200	-	-
Tomato	30	70	-	330	-	-
egg plant	50	50	-	150	-	-
Pepper	40	50	-	250	-	-

9. Ilyaskoy Project Area in Bursa Province

(Weight per Decare)

Crop	N fertilizer	P fertilizer	K fertilizer	Herbicides	Insecticides	Fungicides
	N Kg	P_2O_5 Kg	K_2O Kg	gram	gram	gram
Wheat	11	12	-	200	-	-
oat	11	12	-	200	-	-
Barley	11	11	-	200	-	-
Sunflower	4.5	11.5	-	-	-	-
apple	0.6/tree	0.6/tree	0.6/tree	-	200	200
Peach	0.6/tree	0.6/tree	0.6/tree	-	200	200

10. K. Karistiran Project Area in Kirlareli Province

(Weight per Decare)

Crop	N fertilizer	P fertilizer	K fertilizer	Herbicides	Insecticides	Fungicides
	N Kg	P_2O_5 Kg	K_2O Kg	gram	gram	gram
Wheat	15	5	-	170	100	20
Maize	11	6	-	100	-	-
Sunflower	9	5	-	150	-	-
Sugar beet	16	19	-	-	100	-
Alfalfa	-	50	-	100	400	-
Tomato	10	10	-	-	100	150
Potato	10	10	-	-	100	150
Beans	10	10	-	-	100	100

Table G.5.1 Use Form of Agricultural Materials(1)

Crop	N fertilizer	P fertilizer	K fertilizer	Herbicides	Insecticides	Fungicides
Wheat	- Urea(N:45%) - CAN(N:26%) - DAP(N:18%)	- DAP($P_2O_{5:46\%}$)	- Compound fertilizer	○	○	○
Barley	- CAN(N:26%) - DAP(N:18%)	- DAP($P_2O_{5:46\%}$)		○	○	
Oat	- CAN(N:26%)			○	○	
Maize	- CAN(N:26%) - DAP(N:18%)	- DAP($P_2O_{5:46\%}$)		○		
Sugar beet	- Urea(N:45%) - Compound fertilizer (N:8%) - DAP(N:18%)	- Compound fertilizer ($P_2O_{5:24\%}$) - DAP($P_2O_{5:46\%}$)	- Compound fertilizer	○	○	
Beans	- CAN(N:26%) - DAP(N:18%)	- DAP($P_2O_{5:46\%}$)	- Compound fertilizer		○	○
Cow vetch	- CAN(N:26%)					
Alfalfa	- CAN(N:26%)	- Compound fertilizer	- Compound fertilizer		○	○
Sunflower	- DAP(N:18%)	- DAP($P_2O_{5:46\%}$)		○		

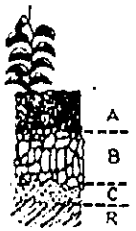
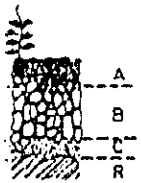
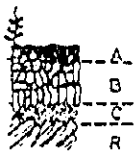
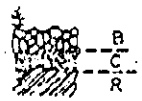
Table G.5.1 Use Form of Agricultural Materials (2)

Crop	N fertilizer	P fertilizer	K fertilizer	Herbicides	Insecticides	Fungicides
Watermelon	- CAN(N:26%) - DAP(N:18%)	- DAP($P_2O_{5:46\%}$)	- Compound fertilizer	○	○	
Melon	- CAN(N:26%) - DAP(N:18%)	- DAP($P_2O_{5:46\%}$)	- Compound fertilizer			
Vegetables	- CAN(N:26%) - Ammonium Sulfate (N:21%)	- Compound fertilizer		○	○	○
Grape	- Compound fertilizer (N:15%)	- Compound fertilizer ($P_2O_{5:15\%}$)				○
Cherry	- Compound fertilizer (N:15%)	- Compound fertilizer ($P_2O_{5:15\%}$)	- Compound fertilizer (K_2O:15%)	○	○	○
Apple	- Compound fertilizer (N:15%)	- Compound fertilizer ($P_2O_{5:15\%}$)	- Compound fertilizer (K_2O:15%)		○	○
Peach	- Compound fertilizer (N:15%)	- Compound fertilizer ($P_2O_{5:15\%}$)	- Compound fertilizer (K_2O:15%)		○	○
Hazelnuts	- CAN(N:26%) - DAP(N:18%)	- DAP($P_2O_{5:46\%}$)			○	

Note: CAN means nitrogen fertilizer of Ammonium Nitrate with lime. DAP is compound fertilizer. ○ shows use of agrochemical.

G.6 Environmental Recommendation

Table G.6.1 Proposed Measures for Erosion Control

Degree of Erosion	Soil Profiles Representing Erosion Degree	Proposed Measures for Erosion Control
1	 Slightly Eroded	-Contour farming -Strip cropping -Terracing
2	 Moderately Eroded	-Strip cropping -Terracing
3	 Severely Eroded	-Terracing and plantation if soil is sufficiently deep -Otherwise permanent vegetation
4	 Very Severely Eroded	-Permanent vegetation is needed -Grazing should be done under strict control

Source: Erosion Map of Turkey, Ministry of Village Affairs and Cooperatives General Directorate of Topraksu, 1981

Table G.6.2 Characteristics of saline, saline-alkali, alkali soils and their reclamation

Salt Condition	Common Term	Salt index	Sodium index	Hydrogen ion index *	Reclamation
		Conductivity of Saturation extract (ms/cm)	Exchangeable sodium percentage	PH	
Saline	White alkali	>4	<15	<8.5	Leaching
Saline-alkali		>4	>15	generally about 8.5	Leaching necessary and possible, but the sodium must be replaced to prevent dispersion of soil particles and reduction of permeability.
Alkali	Black alkali **	<4	>15	generally between 8.5 and 10.0	Low permeability due to dispersion of soil by the sodium requires replacing the sodium to improve the permeability so that leaching can proceed.

Note:

* : Since a pH of 7 is neutral, pH values less than 7 indicate an acid soil, which is common in the non-arid regions.

Note that the larger the pH, the less the concentration of hydrogen ions, since pH is the logarithm of the reciprocal of the hydrogen ion concentration.

**: A black crust forms on the surface of an alkali soil only if organic matter is present. Hence, the term may be misleading for soils of low organic matter.

Source Israelsen & Hansen (1962).

Table G.6.3 General outline of crop and soil requirements

Crop	Soil texture			Minimum rooting depth (cm)			Soil fertility		Salt tolerance			pH range	Tolerance to short Periods of water-Logging (a)	Min. depth of ground-water level during growth period (cm) (b)
	Heavy	Medium	Light	Deep (90)	Medium (60-90)	Shallow (30-60)	High	Medium	Good	Moderate	Poor			
Cereal												5.5-8.0	medium	60
Barley		×	×		×		×		×			6.0-7.5	medium	60
Wheat	×	×			×		×			×		4.0-7.5	high	no limitation
Rice	×					×	×			×		5.5-7.5	low	75
Maize		×			×		×				×	4.5-8.5	medium to high	50
Sorghum	×	×	×		×			×			×			
Root												4.5-6.0	low	30
Potato		×			×		×			×				
Oil			×								×	6.0-8.0		
Groundnut		×	×		×			×				5.5-7.0	low (c)	50
Soybean		×	×		×			×		×		5.5-6.5	medium (d)	50
Safflower		×	×		×		×				×	5.5-7.0	medium to low	75
Sesame		×	×		×		×				×	6.0-7.5	medium to low	100
Sunflower		×			×			×		×			medium	75
Pulses			×									5.5-7.5		
Bean		×	×		×			×			×	5.5-7.5	medium to low	30-50
Cowpea		×			×			×			×		medium to low	40
Sugar												5.0-8.0		
Sugar-cane	×	×		×			×					6.0-7.0	medium (e)	40
Sugar-beat	×	×			×		×		×				medium to high	45
Vegetables												5.0-7.0		
Tomato		×			×		×				×	6.5-7.5	low	50
Cucumber		×			×		×				×	6.0-7.5	low	50
Cabbage		×				×	×			×		6.0-7.5	low	50
Onions		×				×	×				×		low	50
Fruit			×									5.5-7.0		
Cashew				×				×		×	×	5.0-8.0	low	80
Citrus		×		×			×				×	6.0-7.0	low	130
Grape	×	×	×	×				×				7.0	-	—
Olive				×				×		×			-	—
Fibre												6.0-7.5		
Cotton	×	×			×		×		×				medium to low	100
Beverage			×								×	4.0-6.5		
Tea		×	×	×			×				×	5.0-7.0	low	100
Tobacco					×			×					low	100
Fodder			×								×	6.5-7.5		
Alfalfa		×			×			×					low	50

(a) : Tolerance to short periods of waterlogging applies to rain-fed conditions on heavy clay soils or to flooding by rivers, etc.
(b) : For this depth yields are approximately 75% of those for optimal drainage conditions.
(c) : Highly permeable soils in high rainfall areas: when irrigated or in low rainfall areas also on heavy soils.
(d) : When grown during periods with high groundwater level the top-layers should be permeable.
(e) : In young stage only low resistance to waterlogging.