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## South-Eastern Anatolia Project: Impacts of the Atatürk Dam

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### Introduction

The South-eastern Anatolia Project (GAP), as it is presently conceived, is a \$32 billion, multi-sectoral, integrated regional development programme. Its main objective is to strengthen the economic, social, and institutional aspects of human development in this economically disadvantaged region by raising the existing living standards and quality of life of its people. With proper planning and management, water is expected to be the engine for the sustainable development of this region in the coming decades.

The GAP region covers the provinces of Adiyaman, Batman, Diyarbakir, Gaziantep, Kilis, Mardin, Siirt, Şanlıurfa, and Şirnak which represent approximately 10 per cent of the area of Turkey. The region also accounts for nearly 10 per cent of the country's total population (6.1 million inhabitants according to the 1997 census). According to the present plan, by the year 2010, the GAP is expected to generate 27 billion kilowatt-hours (kWh) of hydroelectric energy annually, and irrigate 1.7 million hectares (ha) of land, accounting for nearly one-fifth of the irrigable land of Turkey. This would be accomplished through the construction of twenty-two dams, nineteen hydropower plants with a total installed capacity of 7500 megawatts (MW), and extensive irrigation and drainage networks. The project is expected to almost double the existing area of artificial lakes to 228,136 ha in the country.

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The irrigated land would increase from 2.9 per cent to 22.8 per cent of the total area of the region, and concurrently rain-fed agriculture would decrease from 34.3 per cent to 10.7 per cent (Biswas and Tortajada, 1997).

On the basis of currently available anecdotal evidence, the disparities between the GAP region and Turkey as a whole are slowly reducing in terms of several socio-economic indicators. Some indicators of the improvement in the lifestyle of the population in the area are literacy (which increased from 55 per cent in 1985 to 67 per cent in 1997); infant mortality (which decreased from 111 per 1,000 in 1985 to 62 per 1,000 in 1995); landless population (which fell from 40 per cent in 1985 to 25 per cent in 1997); rural and urban water supply (which rose from 57 per cent and 15 per cent to 67 per cent and 57 per cent, respectively), decrease in emigration and very significant improvement in the regional economy (Unver, 2000a). While these are all encouraging statistics, further detailed studies have to be conducted to determine to what extent the GAP Project per se has been responsible for improving these socio-economic indicators, especially as only part of this project has been implemented.

Regarding infrastructural development, one of the seven GAP schemes on the Euphrates River is the Lower Euphrates Project. It consists of projects like the Atatürk Dam and Hydroelectric Power Plant (HEPP), Birecik Dam and HEPP, Şanlıurfa Tunnels, Şanlıurfa-Harran irrigation, Mardin-Ceylanpınar irrigation, Siverek-Hilvan pumped irrigation and Bozova pumped irrigation (DSI, 2000; Unver, 1997). In 2000, the Birecik Dam and HEPP was completed through a private sector build, operate, and transfer (BOT) project. The magnitude and complexity of the GAP can be seen from Table 8.1.

The construction of the Atatürk Dam was started in 1983, and it was completed in 1992. Its height from foundation is 169 metres (m), with a maximum water elevation of 542.0 m above mean sea level (msl). The volume of the reservoir is 48.7 billion m<sup>3</sup>, and it has an area of 817 km<sup>2</sup>. The construction of the diversion tunnels was initiated in November 1983 and was completed in January 1986. The diversion of water through the tunnels started in June 1986. The impoundment of the reservoir was started in January 1990 and was completed in August of the same year. With the construction of the Atatürk Dam, some 81,700 ha of land were inundated (GAP Administration, 1999a).

Table 8.1: Water and land resources development projects in the GAP Region

	Euphrates River	Tigris River	Total	
Installed capacity:	5,304 MW	2,172 MW	7,476 MW	
Energy production:	20,098 GWh	7,247 GWh	27,345 GW	
Irrigated area:	1,091,203 Ha	601,824 Ha	1,693,027 Ha	
Number of dams:			22	
Number of HEPPs:			19	
Project	Installed capacity (MW)	Energy production (GWh)	Irrigated area (Ha)	Status
I. Karakaya Project	1,800	7,354		
Karakaya Dam and HEPP	1,800	7,254		OP
II. Lower Euphrates Projects	2,450	9,024	706,281	
* Atatürk Dam and HEPP	2,400	8,900		OP
* Şanlıurfa HEPP	50	124		OP+U/C
a) Şanlıurfa-Harran Irrigation			140,000	OP
b) Mardin-Ceylanpınar Grav. Irrigation			185,639	M/P+U/C
c) Mardin-Ceylanpınar Pump Irrigation			149,000	M/P
* Siverek-Hilvan Pump Irrigation			160,105	Rec.
* Bozova Pump Irrigation			69,702	Rec.
III. Border Euphrates Project	852	3,168		
* Birecik Dam and HEPP	672	2,516		U/C
* Karkamış Dam and HEPP	180	652		U/C

(Contd.)

Table 8.1 Contd.

Project	Installed capacity (MW)	Energy production (GWh)	Irrigated area (Ha)	Status
IV. Suruç- Yaylak Project			146,500	
* Yaylak Plain Irrigation			18,322	U/C
* Suruç Plain Irrigation			128,128	Rec.
V. Adıyaman-Kahta Project	195	509	77,824	
* Çamgazi Dam and Irrigation			6,536	U/C
* Gömikan Dam and Irrigation			7,762	M/P
* Koçali Dam and HEPP	40	120	21,605	M/P
* Sırmtaş Dam and HEPP	28	87		M/P
* Fatopaşa HEPP	22	47		M/P
* Büyükçay Dam, HEPP and Irrigation	30	84	12,322	M/P
* Kahta Dam and HEPP	75	171		M/P
* Pumped Irrigation from Atatürk Reservoir			29,599	M/P+U/C
VI. Adıyaman-Göksu	7	43	71,598	
* Çataltepe Dam Irrigation				M/P
* Erkenek HEPP	7	43		M/P
VII. Gaziantep Project			89,000	
* Hancıoğlu Dam and Irrigation			7,330	O/P
* Kayacık Dam and Irrigation			13,680	U/C
* Kemlin Dam and Irrigation			1,969	M/P

(Contd.)

Table 8.1 Contd.

Project	Installed capacity (MW)	Energy production (GWh)	Irrigated area (Ha)	Status
* Pumped Irrigation from Birecik Reservoir			53,415	M/P
* Belkis-Nizip Irrigation			11,925	U/C
VIII. Tigris-Kralkızı Project	204	444	126,080	U/C
* Kralkızı Dam and HEPP	94	146		U/C
* Tigris Dam and HEPP	110	298		U/C
* Tigris Rights Bank Grav. Irrigation		54,279		U/C
* Tigris Rights Bank Pump Irrigation		71,801		U/C+D/D
IX. Batman Project	198	483	37,744	U/C
* Batman Dam and HEPP	198	483		U/C
* Batman Left Bank Irrigation			18,758	U/C
* Batman Right Bank Grav. Irrigation			18,758	U/C
X. Batman-Silvan Project	240	964	257,000	Rec.
* Silvan Dam and HEPP	150	623		Rec.
* Kayser Dam and HEPP	90	341		Rec.
* Tigris Left Bank Grav. Irrigation			200,000	Rec.
* Tigris Left Bank Pump Irrigation			57,000	Rec.
XI. Garzan Project	90	315	60,000	Rec.
* Garzan Dam and HEPP	90	315		Rec.
* Garzan Irrigation			60,000	Rec.

(Contd.)

Table 8.1 Contd.

Project	Installed capacity (MW)	Energy production (GWh)	Irrigated area (Ha)	Status
XII. Ilisu Project	1,200	3,833		
* Ilisu Dam and HEPP	1,200	3,833		Imp.
XIII. Cizre Project	240	1,208	121,000	
* Cizre Dam and HEPP	240	1,208	89,000	Imp.
* Nusaybin-Cizre Irrigation			32,000	Rec.
* Silopi Plain Irrigation				Rec.
Individual Projects on the Euphrates River				
OP	14.4	42	60,440	
M/P			6,353	
Nusaybin Irrigation			7,500	OP
Çağ Çağ HEPP	14.4	42		OP
Akçakale, groundwater			15,000	OP
Ceylanpınar, groundwater			27,000	OP
Hacıhıdır Project			2,080	OP
Dumluca Project			1,860	OP
Suruç groundwater			7,000	OP
Besni Dam and Irrigation			2,820	M/P
Ardıl Dam and Irrigation			3,535	M/P

(Contd.)

Table 8.1 Contd.

Project	Installed capacity (MW)	Energy production (GWh)	Irrigated area (Ha)	Status
Individual Projects on the Tigris River				
Devegeçidi Project			7,500	OP
Silvan I and II Irrigation			790	OP
Nerdlis Irrigation			2,740	OP
Çinar-Göksu Project			3,582	OP
Garzan-Kozluk Irrigation			3,700	OP

*Legends:* OP: In operation

U/C: Under construction

D/D: Detailed design completed

M/P: Master Plan

Rec.: Reconnaissance

Imp.: On Implementation Programme

*Note:* Individual projects are not included in grand total.

*Source:* General Directorate of State Hydraulic Works, *DSI in Brief*, Ministry of Energy, 2000.

The Atatürk Dam generates 8.9 billion kWh of energy annually. By September 1999, the cumulative energy production in the region (Karakaya and Atatürk Dams) was 155 billion kWh, representing a revenue of \$9.3 billion. Expressed in terms of alternative sources of commercial energy, it corresponds to the import of about 39 million tons of fuel oil or 30 billion m<sup>3</sup> cubic metres of natural gas (GAP Administration, 1999b).

Water reaches the Şanlıurfa-Harran plain through the Şanlıurfa tunnel system, which consists of two parallel tunnels, each 26.4 km long and 7.62 m diameter (DSI, 2000). One of these two tunnels was completed in 1995, and the other by the end of 1998. Irrigation in the Harran Plain covered 90,000 ha of land with economic returns of around \$85 million (GAP Administration, 1999b). The Şanlıurfa main irrigation canal is expected to irrigate 43,000 ha of land by gravity and 5,000 ha by pumping. The Harran main irrigation canal is expected to irrigate 98,500 ha of land by gravity (Unver, 1997).

In addition to the benefits of such large infrastructural development projects at the national level in terms of electricity, and to the region in terms of increased agricultural production through irrigation, it is of fundamental importance to identify the benefits of the projects at the local level, and also review the nature of the beneficiaries. Assessment of the social, economic, and environmental impacts of different water projects, both positive and negative, should be undertaken so that specific policy decisions can be taken in a timely manner, which will maximize the positive benefits and minimize the adverse social and environmental costs. This knowledge, based on an objective assessment, is especially necessary to ensure that expected benefits from the project accrue as planned. It can also be used to improve the planning, construction, and management of similar water development projects in the future in the regions concerned, as well as elsewhere.

### **GAP Regional Environmental Management**

Since the GAP is a large-scale, multi-sectoral regional development project, an integrated approach is essential to achieve its targets and objectives. It is evident that the irrigation and other infrastructures that have already been constructed, and would be built in the future, would contribute significantly to rapid economic growth and social changes. All these changes, in turn, would unquestionably have discernible environmental impacts, both positive and

negative, which need to be carefully managed to ensure the sustainability of the project and to improve the quality of life of the local people.

In Turkey, the legislation for environmental impact assessment (EIA) was enacted in 1993. Since then, EIA studies have been prepared for all water projects, including dams. However, it was in 1992, even before this legislation, that the EIA guidelines for water development projects in Turkey were developed by the DSI, with financial support from the United Nations Food and Agriculture Organization (FAO) (Akkaya, 2001).

Due to the construction of the Atatürk Dam, and the ensuing advantages in economic activities, some urban areas (for example, Şanlıurfa) face an influx of population, with the attendant need for more housing, water, education, health services, employment opportunities, and more efficient transportation systems. If these changes cannot be properly managed, environmental degradation in terms of water, soil, and air pollution could become a serious problem. With such a multiplicity of problems, it is important to identify specific priorities, policies, and actions needed to address the most immediate issues related with sustainable urban development, including the necessary social and technological infrastructures.

A number of environmental studies have been carried out for some of the projects in the GAP region. These include potential environmental impacts of irrigation schemes: hydrology, pollution, seismic, sedimentation, ecology, human health, socio-economic conditions, and cultural heritage (Chamber of Agricultural Engineers of Turkey, 1993; Development Foundation of Turkey, 1994; GAP Administration, 1995, 1998; Harmancioglu et al., 2001; METU 1994a, 1994b, 1993; Sociology Association, 1994). The main environmental benefits of the GAP that have been identified are the control and use of flood waters mainly for energy and agricultural purposes, availability of a regular supply of high-quality water for human and industrial needs, preservation of the natural flora, increase in the aquatic fauna, creation of recreation areas, etc. On the other hand, some of the adverse impacts are considered to be inundation of natural and cultural areas; modification of hydrological patterns; changes in land use; contamination of soil and surface and groundwater; salinity, waterlogging, sedimentation, and erosion; increase in the use of fertilizers and pesticides; increase in the incidence of water-borne diseases, etc. (Harmancioglu et al., 2001).

In the specific case of irrigation activities, some of the mitigation measures proposed include the increased efficiency of irrigation systems, including

drainage canals, improvement in irrigation techniques, and reuse of the irrigation return flow and urban water in irrigation (Harmancioglu et al., 2001).

Environmental considerations need to be integrated within the physical planning projects of the GAP region for the protection of the natural resources of the region. Experiences from other parts of the world indicate that big rural and urban public investment projects, when not properly implemented, could adversely affect the ecosystems, and thus contribute to increased environmental degradation. Accordingly, the formulation of regional strategies to manage water, land, and biotic resources need the integration and implementation of land use policies and practices for both urban and rural areas that could be affected by the development projects.

The existing environmental conditions in the GAP region, as well as the potential positive and negative impacts which could result from the different developmental activities, would have to be carefully analysed and managed within an integrated sustainable framework in order to maximize the total benefits and minimize the overall costs that could accrue to the society. A regional environmental management study is thus an essential prerequisite for sustainable development. Accordingly, adequate baseline information is necessary, with which future changes could be compared, and then appropriate steps could be taken for their management. A methodology is currently being developed for preparing reliable environmental profiles, that would be most appropriate for the region. The results could be effectively used for planning, decision making, and overall management of the region.

### **Atatürk Dam: Assessment of the Economic, Social, and Environmental Impacts**

In order to understand and appreciate the changes that the construction and operation of the Atatürk Dam would bring to the people of the region through economic and social development, a study was carried out some eight years after the construction was completed. The study proposed to objectively determine the extent and magnitude of the actual social, economic, and environmental impacts of the dam and the reservoir on the region. The emphasis of the study was on economic, social, and environmental issues, both direct and indirect, over the short to medium terms, which could be objectively estimated and evaluated with reasonable accuracy. It included the evaluation

of the direct impacts (positive and negative) on the people living in the two provinces affected directly—Adiyaman and Şanlıurfa—as well as on the region as a whole. The evaluation of the impacts of the dam at the national level was not included in this analysis (Tortajada, 2000), primarily because of the absence of data.

The assessment carried out included extensive fieldwork and intensive discussions, both in Ankara and the project area, with the staff members from the GAP Administration and from other different planning and implementing institutions, especially the DSI, the State Planning Organization, the General Directorate of Rural Affairs, the Middle East Technical University, etc. The interviews were carried out with senior members of national and international institutions from within and outside the region, numerous representatives of the affected population at different locations, concerned private sector institutions, and non-governmental organizations (NGOs). The members of the local population were selected at random.

After the initial set of discussions, it was decided to focus on issues like new economic activities and employment generation during the construction of the dam, the reservoir, and the associated hydraulic structures. Studies were conducted on farms using pumped irrigation directly from the reservoir, and how their agricultural yields, and thus incomes, may have changed. The resettlement process due to inundation caused by the reservoir was reviewed *vis-à-vis* their impacts on health and education and overall changes in the quality of life of the population living in the project area.

During the process of carrying out the studies, it was evident that the social, economic, and environmental impacts of the construction of the Atatürk Dam and its reservoir on the region were substantial through a variety of pathways. Both the dam and the reservoir have acted as the engine for economic growth and integrated regional development in a historically underdeveloped area. The benefits that are now accruing to the country by the increased electricity generation alone are very substantial. Equally, for the population living in the project area, and especially for the majority of people living near and around the reservoir, the benefits can be counted mainly in terms of infrastructural development (health and educational infrastructures), transportation and communication networks, capacity building, etc.

The areas around the dam were primarily rural, with limited infrastructural facilities. Before the dam was constructed, the transportation

and communication networks between the various population centres near and around the dam site were limited. When the construction of the dam started, a good road network was constructed, which significantly improved the communication in the area. It became much easier and less time consuming for people and goods to move from one place to another. Commercial activities increased. For example, before the dam was constructed, there was not even a drugstore in the area. People had to travel to larger urban centres to obtain drugs and receive medical attention. Shortly after the construction started, one of the engineers working in the dam site opened a drugstore, which ensured that the local people could obtain drugs without having to travel long distances. The transportation network constructed also ensured that schools became more accessible to boys and girls. All these new facilities improved the social milieu of the local people.

According to the studies carried out on the impact of the construction of the Atatürk Dam, the way of living of the local population has changed. Employment opportunities have increased and working conditions have improved significantly. Expanded economic activities have encouraged migration from the rural to the urban areas within the region in many cases. In other words, rural migration to major urban centres in Turkey, like Istanbul or Ankara, were reduced. People migrated from the rural areas to the centres of the region, which started to grow significantly because of the new economic activities and employment opportunities. Thus, new urban growth poles are developing, like in Şanlıurfa, which has helped somewhat in balancing the national urbanization process.

The following aspects were identified as the main changes generated by the construction of the Atatürk Dam in the project area and beyond.

### *Employment Generation*

#### Construction of the Atatürk Dam, Hydropower Plant, and Tunnels

Employment opportunities in the GAP region have been historically limited because of the limited economic opportunities. High population growth, economic stagnation, limited agricultural activities, untrained labour force, and political instability have all contributed to the underdevelopment of the region during the pre-1990 period. This situation started to change with the

beginning of the construction of the Atatürk Dam and the associated hydraulic infrastructures by the DSI. The area became a magnet for people seeking employment in the construction activities from both within and outside the region. The private sector companies, which carried out all the construction suddenly opened up a new vista for employment for skilled and non-skilled personnel, the extent and magnitude of which had never been witnessed in the region earlier.

For the construction of the Atatürk Dam and the hydropower plant, the main contractor was ATA Insaat Sanayi ve Ticaret A.S. In August 1983, the contract value of the dam was TL 102,842,062,500, which was later increased to TL 171,085,000,000 because of additional costs. The contract was signed on 28 October 1983, and the construction of the dam started immediately thereafter, on 4 November 1983. Although the duration of the work was initially estimated to be 108 months, the actual construction period had to be extended up to December 1997, a total period of 169 months. The payment was TL 214,293,000,000,000 at 1997 prices, including value added tax (VAT) equivalent of \$1,916,437,700,000 (at January 1997 exchange rate of \$1.00 = TL 111,818.40).

On the basis of information collected for the present analysis from the ATA Construction Company, the construction of the dam started in November 1983 with only eighty-nine workers (Figure 8.1). The total number of workers employed during the construction of the dam was 16,431, of which 466 were technical staff, and the rest were skilled and unskilled workers (nearly 1,000 of them were sub-contracted). Between November 1983 and May 1996, there was an average of 3,100 person-months of work.

The technical and skilled staff came to the region from other parts of Turkey, since local people neither had the knowledge nor the skill to construct such a large and complex structure. Most of the skilled workers who migrated to the dam site had gained their knowledge and experience during the construction of other similar structures like the Keban and Karakaya dams earlier. Local people represented 95 per cent of all the workers employed, but all of them were initially recruited as unskilled labourers. During the course of the construction of the Atatürk Dam, many unskilled personnel were trained. They later worked as drivers, machinery operators (light, medium, and heavy), carpenters, turners, metal workers, etc. Following the completion of the hands-on training period, the unskilled workers gradually became skilled workers.

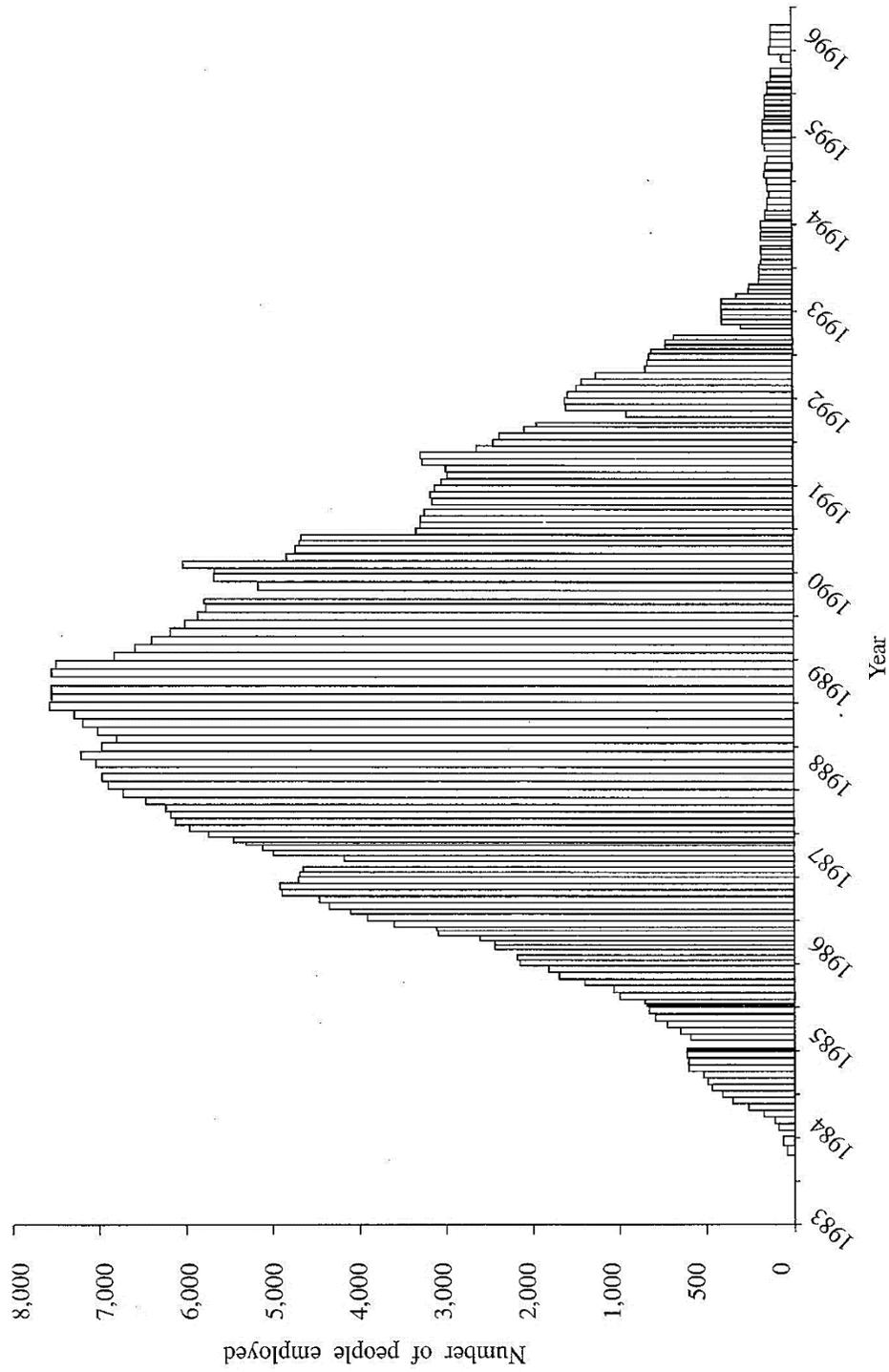


Figure 8.1: Number of people employed at the Atatürk Dam site, 1983–96

Source: ATA Construction Company (1996), Number of People Employed at Atatürk Dam Site, 1983–1996, Turkey.

As can be seen from Figure 8.1, the number of people working on the construction of the dam steadily increased with time. As noted earlier, the number of employees in November 1983, when the construction started was eighty-nine, but a year later, by October 1984, the number had increased to more than 1,000 workers. At the peak of construction, which was reached in October 1988, the number of workers was 7,688. The number started to decline steadily thereafter, and had decreased by half in about two years. By May 1996, the number had declined to only 281 workers.

The contractor for the construction of the tunnels of the Atatürk Dam was Dogus Insaat ve Ticaret A.S. The construction of the tunnels started in October 1981, when the cost was estimated at 9,500,000,000 TL. The original contract value was 5,671,849,025 TL. The final payment was 10,386,000,000,000 TL (\$92,882,700 at January 1997 exchange rate of \$1.00= 111,818.40TL).

The Akpinar Construction Company was one of the sub-contractors for the construction of the diversion tunnels. According to its records, sixty-six skilled and unskilled workers were employed directly by the company in January 1985. Peak employment was 186, and was reached in August 1991. This number declined to seventy by September 1997. Based on interviews carried out with the Akpinar Construction Company, the payments were based on minimum wages. Unfortunately, the information available at present from this company does not make any distinction between the salaries paid to skilled and unskilled workers; there is just one gross average wage per person per month for all employees. Furthermore, the records indicate that employees of the Akpinar Construction Company were earning only about one-third of that of the ATA Construction Company. However, since detailed employment records are no longer available, it was not possible to make any comparison between the salaries paid by the two companies to their skilled and unskilled workers.

The actual salaries of the workers of the Akpinar Construction Company, for the technical staff as well as for the skilled and unskilled workers, varied tremendously over the months, and also over the years. The high rate of inflation in Turkey was an important factor for this variation. As can be seen from Figure 8.2, the salaries increased steadily between 1985 and 1992, when the average annual salary was \$1,290. However, the wages decreased dramatically from 1993. In fact, by 1997, the workers were receiving less than what they had earned in 1990, at least when converted into US dollars at the then prevailing exchange rates.

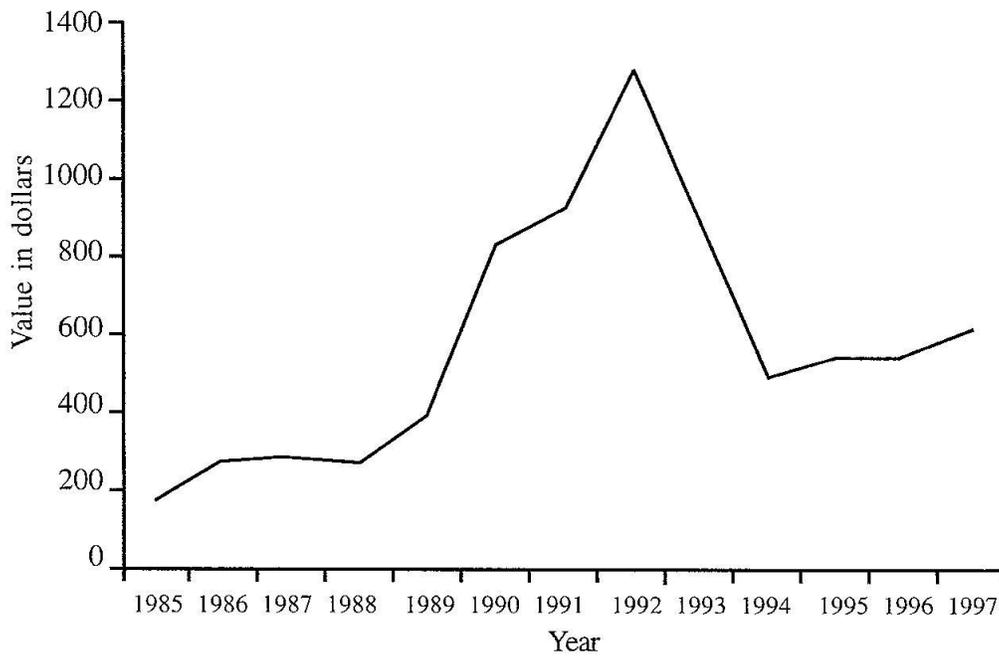


Figure 8.2: Annual gross salaries for personnel working for the Akpinar Construction Company, 1985–97

*Source:* Akpinar Construction Company (1997), Annual Gross Salaries for Personnel Working at Akpinar Construction Company, Turkey.

Figure 8.3 shows the gross salaries paid by the ATA Construction Company, but only to unskilled workers. The salaries have been calculated per month, based on ten and a half working hours per day and thirty working days per month. Considering the high inflation rate of the country, the monthly salaries of the unskilled workers increased from \$113.79 to \$138.52 in US dollar terms, between 1984 and 1987. However, between 1988 and 1989, there was an increase of almost 170 per cent (from \$163.79 to \$274.69). This increase in the salary was somewhat similar to what was awarded to all the workers in Turkey. In the case of the workers of ATA Construction Company, it also resulted from the fact that the coffer dam was completed in 1989. The workers realised that most of the work for the project was completed, and from then onwards the number of people needed would start to decline radically. In view of the fact that most of the people would lose their jobs, the workers demanded an additional increase in their salaries. In 1988, contrary to expectations, salaries declined by 10 per cent, compared to the preceding year. From 1992 to 1994, the salaries increased again, but during 1995 and

1996, the salaries were similar to what were paid in 1989, at least in dollar terms.

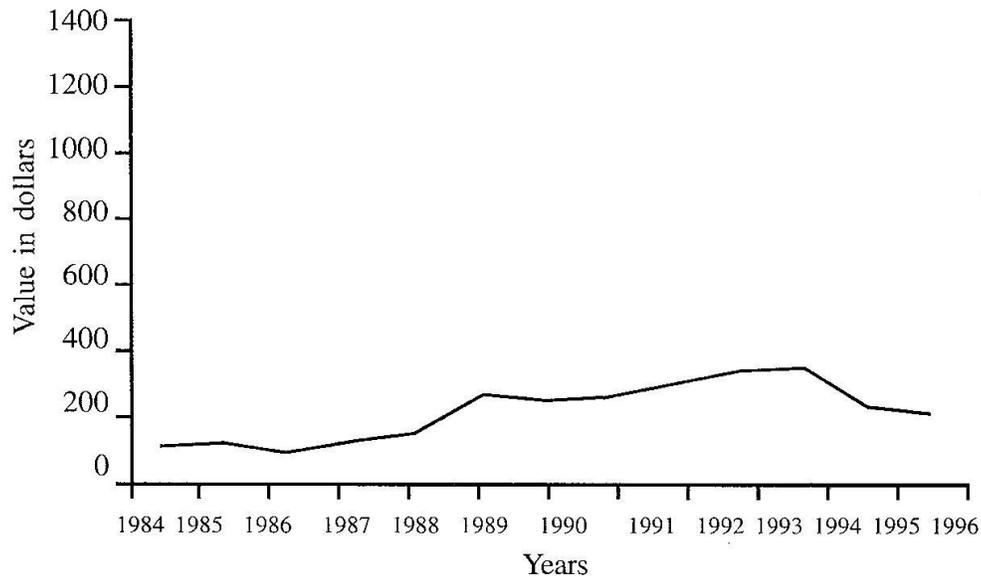


Figure 8.3: Monthly gross salaries of unskilled workers at the Atatürk Dam, ATA Construction Company, 1984–96

*Source:* ATA Construction Company (1996), Monthly Gross Salaries of Unskilled Workers at the Atatürk Dam, 1984–96, Turkey.

It should be noted that nearly 100 per cent of the unskilled workers employed by the different companies during the construction of the dam and the associated hydraulic structures were recruited from among the people living in the GAP region. The estimated number of people hired during the construction of the Atatürk Dam was 16,400. If this number is multiplied by a factor of seven (the average number of persons per family in south-east Turkey), some 114,800 people living in the region were sustained by the income generated due to the employment created during the construction of the Atatürk Dam.

While the number of people supported is a small percentage of the total number of people living in this region, the fact still remains that the construction activities supported 114,800 people, which is not a negligible figure. The incomes they obtained were unquestionably beneficial to them since their living conditions generally would have been worse without such incomes.

The benefits that accrued to the local people who worked during the construction of the Atatürk Dam, at least in the case of the ATA Construction Company, went far beyond the high salaries paid to them. As noted earlier, thousands of local unskilled workers received training in different activities, thus enabling them to gain knowledge, experience, and skills in different areas. As a result of this training, many workers who were unskilled and mostly unemployed and unemployable earlier received marketable skills, and thus an opportunity to get both permanent and seasonal jobs in various construction companies after the work on the Atatürk Dam was completed. Furthermore, since the construction of the dam continued over several years, many employees were entitled to retirement pensions. The workers received additional social benefits as well during the time they worked for the ATA Construction Company, including social insurance for the employees and their families, as well as health services. The ATA Construction Company employed four doctors, and five nurses, and had four ambulances to provide medical services to the workers and their families, as well as to the local people. These were important social and medical benefits which were basically unavailable to the local people before the construction began. Clearly, these developments had beneficial impacts on the lifestyles of the local population.

The ATA Construction Company noted that of the hundreds of students who were trained at the Şanlıurfa Vocational School of Industry, many were hired by the company after their graduation. The manager of the ATA Construction Company estimated during an interview that approximately 25 per cent of the skilled people working on the Atatürk Dam were hired later for construction projects in other parts of the country.

#### *New Economic Activities Due to the Construction of the Atatürk Dam and Reservoir*

It was natural that several new economic activities were generated during the construction and operation of the Atatürk Dam and the associated hydraulic infrastructures. Among these activities were fishing and fishing-related industry (boat building, fish-net construction and repair, and fish processing and marketing), agricultural production through pumped irrigation directly from the reservoir, tourism, developments in the agro-industrial and industrial sectors, and the like.

## Fishing and Fishing-related Industries

The south-east of Turkey is a semi-arid region. Accordingly, most of the agriculture practised was rain-fed, and fishing and fishing-related activities were basically unknown to most people before the construction of the dam and the reservoir. It is important to note that the Atatürk Dam lake is the longest reservoir in Turkey, and is one of the largest man-made lakes of the world. Thus, properly planned and managed, it could have significant fishing potential.

The GAP Administration and the DSI are aware of the economic, social, and environmental impacts, both positive and negative, that may directly occur due to the construction of water projects in general. Thus, both institutions are carrying out activities whose objectives are to enhance the positive impacts and mitigate the negative ones.

One of the important tasks of the DSI as a planning and implementing agency is to advise the local populations as to how best to take advantage of the newly available water resources for their own benefits as well as those of other communities concerned. The DSI is also the institution responsible for carrying out activities related to water conservation and maximizing the economic benefits that could accrue from the water projects. These activities include income-generating activities, improvements in water supply and sanitation facilities, crop diversification and increase in agricultural yields, promotion of fishery, and the use of new varieties of food that were not locally available earlier (Safak et al., 1999).

The DSI and the General Directorate of Rural Affairs, have signed a protocol governing the water products-related activities in the reservoirs of the DSI. This protocol defines the responsibilities of each of the two parties. It also establishes that once the studies on fisheries are completed, the estimated leasing prices and fishing periods have to be determined. Afterwards, the reservoirs are to be leased to local cooperatives and to the private sector by the Ministry of Finance (Safak et al., 1999).

Fishery-related activities in reservoirs developed by the DSI have been carried out since 1959. In general, these include limnological research, breeding and feeding activities in hatcheries, stocking of reservoirs, stock assessment and cage-culture activities. In reservoirs which are under operation, fish production from commercial fishing, cage-culture project application, and sport fishing are encouraged by the DSL. By the end of 1998,

the DSI had carried out limnological studies in 180 reservoirs and restocking studies in 160 reservoirs and 191 ponds (Safak et al., 1999).

The financial contribution of fishery production in Turkey from reservoirs is estimated at approximately \$6 million per year. Additionally, the fishing activities in the reservoirs have provided new jobs to approximately 20,000 local people. However, some of the experiences of the DSI are that the reservoirs in the country generally have fishes that are either not marketable or have low economic value. Thus, the DSI notes that in order to improve the economic production from the reservoirs, the existing hatcheries need to be improved significantly. Additionally, the fry production capacity for restocking and cage-culture projects should be increased with species with higher economic value (Safak et al., 1999).

The fisheries activities carried out by the DSI in the country up to 1998 are shown in Table 8.2.

In the case of the Atatürk Dam, the department of operations and maintenance, water products branch of the DSI, prepared an 'Assessment of Water Products and Fishing Ground in the Atatürk Dam Lake' (Safak et al., 1994). Among the main objectives of this assessment were the definition of the characteristics of the lake, study of the flora as well as any structure that would be covered by the water in the reservoir, limnological studies, estimation of the fish production potential of the reservoir (including stock assessment and feeding requirements), establishment of a water products station, and provision of necessary support to establish a cooperative for fishermen. The fieldwork on which the assessment was based was carried out between May 1992 and March 1993. Laboratory work was conducted between July and November 1993, and the report was completed in 1994.

*Water Products.* Limnological studies concluded that fishes of economic importance were not present in the reservoir. The stock of the existing species was very low, and there were considerable problems in terms of hatching. Accordingly, it was decided to introduce large fish populations (especially carps) in the reservoir, using 5–6 cm fingerlings from the Elazığ-Keban Water Products Centre. In 1991, 200,000 carp fingerlings were released into the lake. The number of fingerlings released increased subsequently to 600,000 in 1992, and then to 2,000,000 each year in 1993 and 1994. Table 8.3 shows fish species that existed in the lake, as well as their percentage compositions.

Table 8.2: Fishery activities conducted by the DSI

Years	Limnological studies	Restocked reservoirs			Fish Fry produced (1000 nos.)	Restocked fish (1000 nos.)	Reservoirs in operation	Annual production (tons)
		Dam lakes	Regulated natural lakes	Ponds				
Before 1980	55	34	3	14	1,274	1,203	14	4,700
1980	58	40	3	18	2,124	1,903	19	5,000
1985	78	56	3	39	8,294	8,253	51	5,700
1990	116	98	6	48	16,584	16,253	73	4,400
1995	153	133	8	130	59,634	59,067	97	4,900
1996	162	145	8	145	75,634	74,367	103	5,300
1997	169	151	8	162	93,634	91,556	105	5,320
1998	180	160	8	191	110,134	108,056	108	5,350

Source: Safak et al., DSI, Turkey, 'Reservoir Fisheries in Turkey', in M. Turfan (ed.) *Benefits of and Concerns about Dams, Case studies*, 1999.

Table 8.3: Existing fish species in the Atatürk Dam lake

Fish species	Turkish name	Percentage
<i>Barbus raganorum</i>	Bizir	27
<i>Carasobarbus luteus</i>	Egrez baligi	26
<i>Vimba vimba</i>	Sis baligi	21
<i>Aspius vorax</i>	Kultur sazani	8
<i>Cypinius carpio</i>	Tatli su kefali	8
<i>Tor grypus</i>	Sabut	5
<i>Silurus triostegus</i>	Mezopotamya yayini	3
<i>Alburnus alburnus</i>	In baligi	2
<i>Capoeta sp.</i>	Siraz	*
<i>Chondrostoma regium</i>	Kababurun	*
<i>Mastacembelus simack</i>	Firat Yılanbaligi	*
<i>Chalcalburnus mossulensis</i>	Musul kolyozu	*
<i>Cyprinion tanuiradius</i>	Biyikli balik	*

Note: \*These species are present in very small percentages.

Source: Safak et al., 1994 *Assessment of the stock of water Products and Fishing Grounds in the Atatürk Dam Lake*, DSI, Turkey.

Species like *Carasobarbus luteus*, *Tor grypus*, *Silurus triostegus*, *Vimba vimba*, and *Cyprinion tanuiradius* also are present in the reservoirs of the lower Euphrates river system, in both Syria and Iraq.

Based on the data, it appears that the density of fish in the Atatürk Reservoir is less than what have been observed in Karakaya and Keban. This is to be expected and is primarily due to the fact that the Atatürk Reservoir is new and thus the amount of nutrients available for fish production is low. According to the investigations carried out by the DSI, the fish stock in the Atatürk Reservoir was about 850 tons/year when the assessment referred to earlier was carried out. This stock comprised mainly varieties like biyikli, bizir, in, sis, cultured carp, fresh water scud, and bass.

According to this report, there are many bays in Adiyaman at present in the Atatürk Reservoir. The report noted that it should be possible to successfully establish cage fishing in these bays. In fact, cage fishing is considered to be an important potential economic activity for people living near the reservoir. However, this may have some implications on the quality of water which need to be considered carefully.

*Fishing Activities.* The data included in the assessment of the stock of water products and fishing grounds in Atatürk Dam lake (Safak et al., 1994) is based on the discussions the DSI staff carried out with the fishermen living in the project area as well as on the basis of questionnaire surveys conducted in 1993 in the villages surrounding the lake. According to this report, there were about 900 fishermen in the districts around the reservoir, who had 153 fishing boats. The average fish catch was 2,390 kg/day in both Adiyaman and Şanlıurfa (Table 8.4).

Table 8.4: Fishing activities in the Atatürk Reservoir

Province-District	No. of fishermen	No. of boats	Average fish yield (Kg/day)
Adiyaman, Kahta	165	23	500
Adiyaman, Gerger	70	13	320
Adiyaman, Centre	333	50	1,100
Adiyaman, Samsat	45	6	90
Şanlıurfa, Hilvan	45	14	100
Şanlıurfa	244	47	280
Total	902	153	2,390

*Source:* Safak et al., 1994, *Assessment of the Stock of Water Products and Fishing Grounds in the Atatürk Dam Lake*, DSI, Turkey.

Based on information available (Safak et al., 1994), it is not clear whether the people referred to were already fishermen before the dam was constructed, or whether they decided to become fishermen once they realized the economic potential of fishing activities of the newly constructed reservoir. Nor is it possible to determine at present if the fish catch indicated was for a specific year, or if it was an average over several years. Information is also not available as to whether fish caught were sold, or consumed by the fishermen themselves. If they were sold, it would be desirable to know how much was sold, at which locations, and what were the market prices. Accordingly, on the basis of information available, it is not possible to estimate the economic potential of fishing-related activities for the local population living near to the lake in any definitive manner. Nor is it possible to estimate the nutritional aspects of the fish catch on the local population.

A cooperative for the fisherman has already been established to facilitate fishing activities. The General Directorate of Organization and Support of the

Ministry of Agriculture is responsible for assisting the fishermen in establishing the cooperatives, and provide further assistance to its members in terms of its efficient running as and when necessary.

When the Atatürk Dam was constructed, 146 villages (43,198 ha of land) were expropriated: eighty-four in Adiyaman, forty-nine in Şanlıurfa, and thirteen in Diyarbakir. Since the reservoir affected three different provinces, and ten administrative districts, it was necessary to divide the reservoir into several fishing grounds so that the cooperatives could be properly established. The fishing grounds were identified by the DSI, General Directorates of Agricultural Production and Development, Conservation and Control, and Organization and Support, Ministry of Agriculture, on a combined basis. The fishing grounds were established based on a number of factors, which included their areas in hectares, geographical boundaries, state of expropriation, and studies carried out by the DSI which included fish stocks and ongoing production activities in various locations. The established fishing cooperatives are likely to require some support in the short and medium terms, if they are to be viable commercial operations.

Nine fishing grounds were initially established:

- a) Adiyaman. Four fishing grounds covering a total of 51,200 ha: Central (15,400 ha), Samsat (16,800 ha), Kahta (15,200 ha), and Gerger (3,800 ha);
- b) Şanlıurfa. Three fishing grounds covering a total of 29,400 ha: Bozova (15,000 ha), Hilvan (7,500 ha), and Siverek (6,900 ha); and
- c) Diyarbakir. Two fishing grounds covering a total of 1,100 ha: Cermik (800 ha) and Cungus (300 ha).

The different ministries concerned with fishery-related activities have agreed that the Ministry of Agriculture should train its own staff working in the fishing areas and also organize the fishermen into cooperatives. The rent that the individual fishing cooperatives would pay would be determined on the basis of a variety of factors, like the nature and extent of rural settlements, poverty in the area, employment opportunities, information available on fishing activities, local consumption of fish, marketing, etc.

According to the information available from the GAP Administration on the project area, the nine original fishing grounds were subdivided into twenty-one by 1996. There were 290 fishermen in Adiyaman (compared to

613 fishermen noted by the DSI in the 1994 report, and 172 in Şanlıurfa (compared to 285 reported by the DSI). At this stage, it is not possible to identify the reasons for discrepancies between the statistics of the DSI and that of the GAP Administration. There are two possibilities. First, the DSI and/or the GAP Administration did not accurately enumerate the fishermen. Second, both the statistics are correct, but during the intervening years some fishermen decided to pursue alternate employment opportunities for certain reasons. Most probably, however, the discrepancy could be accounted for because of incorrect data collection in one of the studies.

Both the DSI report (Safak et al., 1994), which was based on information collected through interviews with the Department of Fisheries, and the report by the GAP Administration, noted that fishing cooperatives were still not properly organized in the project area. The only cooperative that was active in 1994 was the one in the Bozova district. The rest of the fishing districts were either in the process of being established, in the bidding process, or there were no viable activities at all. As of October 1997, all the fishermen who did not belong to any specific cooperative were still fishing, even though this was not possible under the existing legislation. In addition, and according to the provincial agricultural directorate, no cooperative was organized in Diyarbakir, and there were no data on either the number of fishermen or their catch.

The assessment of fishing activities carried out by the DSI in 1992–93 pointed out that no marketing of products could be discerned from the fishing activities. However, on the basis of data collected by the GAP Administration, fish products were already being packed in Adiyaman and Şanlıurfa, and sold to fish traders for consumption in Gaziantep, Adana, Izmir, and Manisa. However, neither the prices of the fish products nor the amounts marketed were noted.

Data available from the GAP Administration and the DSI, as well as the interviews carried out as part of this study with the local population, indicated that fishing boats are not being constructed in the project area.

The Directorate of Agriculture in Şanlıurfa provided information on quantities and market values of freshwater fish that were caught in Şanlıurfa and Adiyaman from 1993 to 1997. These data are shown in Tables 8.3 and 8.4, and Figures 8.4 and 8.5. There are no data from 1 April to 1 July for any year, since no fishing is legally permissible during these months.

The Directorate further advised not to consider any information available for the periods January–March 1993, 1994, and 1995, because ‘it simply did not exist officially’. The implications of this advice were not very clear. It could mean that fishing activities existed during these periods even though these were not legally permissible, or that there were no reliable records in the Directorate.

### Adiyaman

The Directorate of Agriculture in Adiyaman provided information on the quantities and market values of freshwater fish caught during January–March 1993. However, since the Directorate of Agriculture from Şanlıurfa had advised not to consider the statistics for these months, these were not included in the present analysis. Similarly, the information for January–March, 1993–5, were not considered as well.

Based on statistics available, and if the production for January–March is ignored as advised by the Directorate, more than 370,000 kg of fish were sold in 1994, for a total market value of \$38,742.

In 1995, the revenues decreased dramatically because only 105,000 kg of fish were sold during three months (July–September) of the year. The total market value was \$10,512. This represented a decrease of more than 70 per cent in revenue from the earlier year.

In contrast, in 1996, about 365,000 kg of fish were sold, similar to the amount sold in 1994. However, the fish sold in 1996 was over a nine-month period compared to a similar catch over only six months in 1994. The revenue in 1996 was 13 per cent higher than that of 1994.

In 1997, the amount of fish sold until September appears to be very low compared to the previous year. Only 13,300 kg of fish was sold for a total market value of \$16,000 (Figure 8.4, Table 8.5).

### Şanlıurfa

The market values of the fish sold varied significantly between 1993 and 1994. In 1993, 24,000 kg of fish were sold, which had a market value of about \$35,000. In 1994, 20 per cent of this amount (less than 5,000 kg) were sold for 65 per cent more. In 1995, within six months, 30,000 kg of fish were sold for almost \$90,000. However, nine months of fishing activities in 1996 resulted in

41 per cent more of fish being sold, but the market value increased by only 15 per cent. In January-March 1997, 5,000 kg of fish were sold for a market value of more than \$30,000. Data on fish sold for January–March 1995 were not considered (Figure 8.5, Table 8.6). There were no data available from July to September 1997.

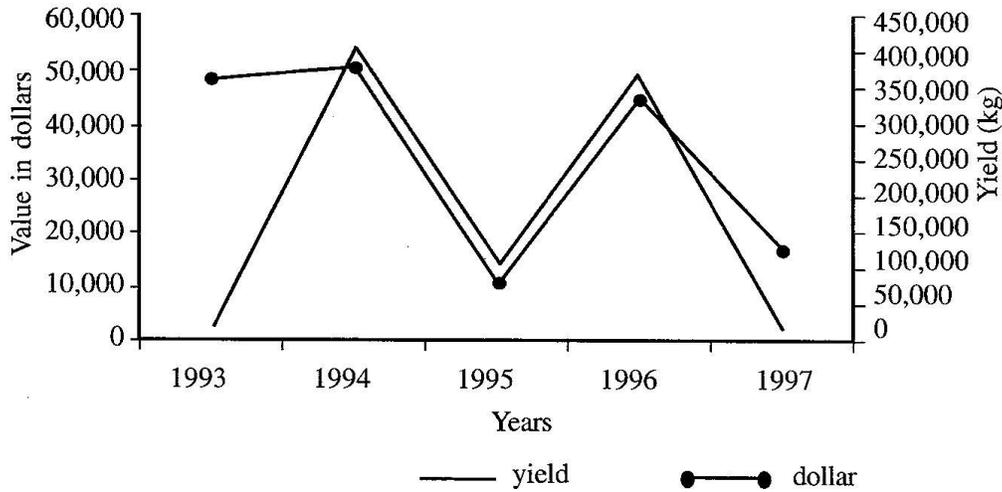


Figure 8.4: Freshwater fish yield in Adıyaman, 1993–7

Table 8.5: Freshwater fish yield in Adıyaman, 1993–7

Date	Quantity sold (Kg)	Value	
		X1000 TL	Dollars
1993			
January*	5,700	130,000	14,952
February*	6,400	148,000	16,387
March*	7,300	159,000	16,957
Total	19,400	437,000	48,296
1994			
January*	8,500	65,000	4,286
February*	9,500	65,000	3,671
March*	10,000	65,000	3,157
April	—	—	—

(Contd.)

Table 8.5 Contd.

Date	Quantity sold (Kg)	Value	
		X1000 TL	Dollars
May	—	—	—
June	—	—	—
July	33,500	160,000	5,166
August	36,000	165,000	5,211
September	35,200	160,000	4,717
October	80,100	215,000	6,163
November	91,800	285,000	7,860
December	97,650	360,000	9,625
Total	402,250	1,540,000	49,742
1995			
January*	—	—	—
February*	—	—	—
March*	—	—	—
April	—	—	—
May	—	—	—
June	—	—	—
July	33,500	160,000	3,607
August	36,000	165,000	3,458
September	35,200	160,000	3,357
October	—	—	—
November	—	—	—
December	—	—	—
Total	104,700	485,000	10,512
1996			
January	27,000	400,000	6,634
February	274,000	430,000	6,730
March	28,000	460,000	6,754
April	—	—	—
May	—	—	—
June	—	—	—
July	5,500	262,500	3,627
August	6,150	339,750	4,011
September	8,000	455,000	5,134
October	5,882	282,500	3,024
November	4,382	324,750	3,305
December	6,383	490,000	4,698
Total	365,297	3,444,500	43,917

(Contd.)

Table 8.5 Contd.

Date	Quantity sold (Kg)	Value	
		X1000 TL	Dollars
1997			
January*	0	0	0
February*	100	40,000	336
March*	150	60,000	481
April	—	—	—
July	1,800	360,000	2,355
August	4,200	710,000	4,356
September	7,050	1,485,000	8,748
Total	13,300	2,655,000	16,276

Note: \*Data from January, February, and March 1993–5 do not exist 'officially'.

Table 8.6: Freshwater fish yield in Şanlıurfa, 1993–7

Date	Quantity sold (Kg)	Value	
		X1000 TL	Dollars
1993			
July	1,710	155	13
August	1,500	155	13
September	1,740	155	13
October	6,370	155,000	12,416
November	7,200	155,000	11,610
December	5,790	160,000	11,400
Total	24,310	470,465	35,465
1994			
January	—	—	—
February	—	—	—
March	—	—	—
April	—	—	—
May	—	—	—
June	—	—	—
July	495	260,000	8,395
August	490	260,000	8,211
September	520	260,000	7,665
October	1,000	415,000	11,897
November	1,140	415,000	11,445
December	1,225	415,000	11,095
Total	4,870	2,025,000	58,708

(Contd.)

Table 8.6 Contd.

Date	Quantity sold (Kg)	Value	
		X1000 TL	Dollars
1995			
March	—	—	—
April	—	—	—
May	—	—	—
June	—	—	—
July	3,330	550,000	12,402
August	3,400	550,000	11,827
September	8,830	645,000	13,535
October	4,040	815,000	16,341
November	4,675	840,000	16,075
December	5,370	930,000	16,434
Total	29,645	4,330,000	86,614
1996			
January*	2,530	820,000	13,600
February*	3,180	940,000	14,712
March*	3,550	970,000	14,242
April	—	—	—
May	—	—	—
June	—	—	—
July	3,230	890,000	10,788
August	1,600	890,000	10,508
September	8,830	975,000	11,001
October	5,950	1,150,000	12,310
November	6,075	1,150,000	11,706
December	7,050	1,170,000	11,217
Total	41,995	8,955,000	110,084
1997			
January	1,740	1,210,000	10,821
February	1,435	1,330,000	11,185
March	2,160	1,230,000	9,874
April	—	—	—
May	—	—	—
June	—	—	—
July	No data	No data	No data
August	No data	No data	No data
September	No data	No data	No data

Note: \*Data from January, February, and March 1993–1995 do not exist 'officially'.

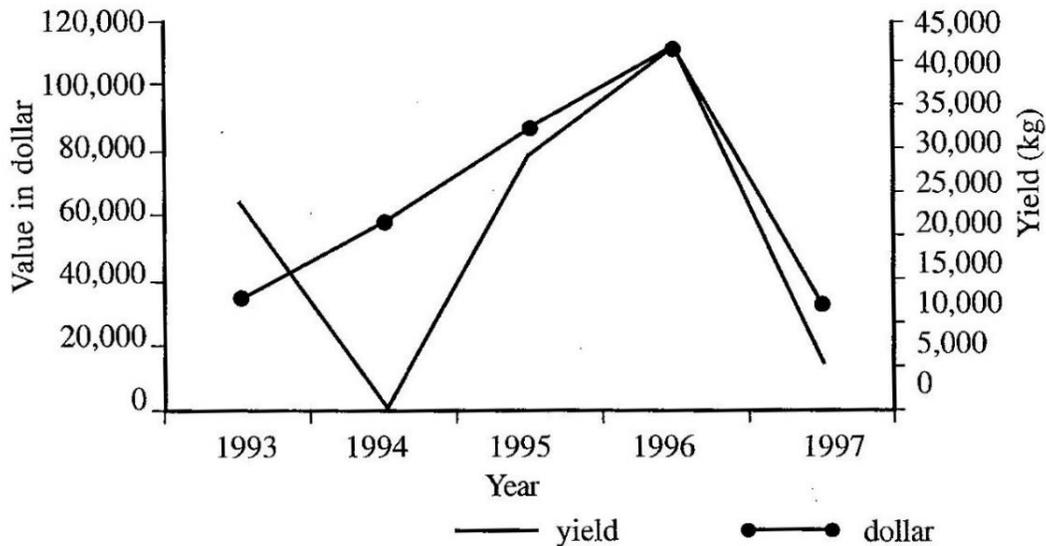


Figure 8.5: Freshwater fish yield in Şanlıurfa, 1993–7

If the data available are correct, it has to be concluded that fishing activities do not appear to be an attractive business proposition. Total fish catches varied widely from one year to another. Equally, the market value of fish varied tremendously over time. The general consensus appeared to be that fishing is a relatively new economic activity in the area for most of the population, and thus, not surprisingly, people had very limited knowledge as to how best the incomes from this activity could be maximized through an appropriate management process. If this hypothesis is correct, and if fishing is to be made an attractive income-generating activity which could also be socio-economically beneficial to the region, considerable effort has to be made to develop training and educational activities in the area. Fishing could definitely be an alternative profession for some people, but the population concerned, at least during the initial years, should be supported in terms of technical knowledge, economic and marketing skills, and equipment.

#### Tourism and Recreational Activities

On the basis of available evidence and site visit, no significant increase in tourism and recreational activities can be noted around the Atatürk Lake. This is to be expected since this area has not been considered in the past as a tourist spot and thus infrastructure like hotels, restaurants, and holiday camps have

to be developed, and events which could attract tourists have to be organized. The GAP Administration is aware of this issue, and thus has been organizing an annual water festival in recent years, in which the main attractions are various types of water sports in the reservoir.

While this has been a good beginning, additional consideration needs to be given as to how to attract more people for longer periods. National and international meetings could be organized in conjunction with the water festival on a regular basis each year. One possibility could be to expand the water festival to an annual occasion for discussions on various aspects related to water as a focus for regional development and integrated water and land resources management. Such a dual process of water festival and technical meetings has considerable potential to boost economic activities in the region.

#### Agricultural Production Through Pumped Irrigation Directly from the Reservoir

Based on information available from the DSI and from personal interviews conducted with people living around the reservoir area, only a limited number of people are practising irrigation with water pumped directly from the reservoir. These are mostly small-scale farmers. The main advantage of this type of farming has been that it could be practised as soon as the reservoir was ready: it was not necessary to wait for irrigation to start and all canal infrastructures to be constructed.

#### Irrigated Agriculture

The main objective of the GAP project is to transform the region into an export base for its agricultural products. Irrigation is expected to increase crop yields and diversification very substantially, which in return would contribute to infrastructural development and increased economic activities. This is expected to further accelerate development of the agro-industry and other agricultural services.

A sustainable agricultural development requires not only conservation, reuse, minimization of the various environmental damages, but also suitable production practices, appropriate technology, profitability, enforcement of laws and regulations, incentives, and appropriate investment plans.

Before irrigation started, the main crops of the region were wheat and barley. In 1995, about 30,000 ha were irrigated with cotton as the main crop. By the end of 1998, approximately 90,000 ha were irrigated with economic returns of around \$85 million. Increase in cotton production has already spurred development in cotton-related agro-industries, like cotton ginning, manufacture of cotton-seed oil, cloth mills, etc.

Additionally, rain-fed agriculture is practised to produce crops such as wheat, barley, lentils, chickpeas, and sesame as well as horticultural crops like pistachios and grapes (Altinbilek, 1997).

The production of many secondary crops has increased as well. Double and even triple cropping has been achieved due to the irrigation activities. For example, maize cultivation has increased from about 500 decares of maize in 1995, to about 4,000 decares in 1997 (10 decares = 1ha). The private sector buys this production to feed livestock.

#### Industrial Activities

As a direct result of developments stemming from the construction of the Atatürk Dam, industrial and commercial activities are accelerating rapidly in the region. The urban centres of the region have witnessed explosive growth in immigration because of enhanced employment potential, including self-employment like traders, vendors, providers of services like childcare, transportation, etc.

Construction activities have increased substantially, as have commercial activities in both formal and informal sectors. Transportation and communication links within the region, as well as between the region and the rest of Turkey have opened up new potentials for economic and industrial activities which simply did not exist earlier. Because of increasing demands, frequency of commercial flights between the urban centres of the GAP region and the rest of Turkey has expanded exponentially in recent years. Such increased and improved transportation and communication linkages are likely to enhance the socio-economic development of the region at an accelerated rate in the coming years.

A good example of industrial and commercial development is Şanlıurfa. The city has already established an industrial zone which is now almost full, as a result of which a second zone of about 11,000 decars is now being developed. A free zone for exports and imports will be organized in this area.

The first zone is mainly occupied by agro-based industries that are cotton-related, for example, cotton ginning, manufacture of textiles, production of cotton-seed oil, etc. Prior to the construction of the Atatürk Dam, these activities were extremely limited. These agro-industries are not only generating employment, which is improving the living conditions of the people, but are also providing a major value-added service, which was not available earlier. In the process, merchants or industrial concerns are buying the raw materials from the farmers, which further boosts the economy of the region. A secondary benefit of the new agro-industrial development is that the workers employed need housing, markets, and other services which are further boosting the employment conditions of the region. The Atatürk Dam has thus directly contributed to the creation of a 'win-win' situation, whose socio-economic benefits now encompass not only the GAP region but also the rest of the country through a variety of direct and indirect linkages and pathways.

The GAP region is now at an early phase of industrial development. The levels of education and training that now exist in the region are still significantly below the national average, though in recent years the gaps between the two have been closing. While at present a very significant number of unskilled labourers can be absorbed in the labour force, the region will increasingly need more and more skilled labour, if the conditions for the generation of employment are to be sustained and employment is to be generated. Many of the unskilled labourers are progressively learning new skills, which increases their salaries and employment opportunities. However, more needs to be done if the current expectations are to be fulfilled. The potential of higher income through better-paying jobs are of course strong incentives for the people to learn new skills.

In spite of some advances, however, it is now clear that the region is already suffering from a shortage of skilled workers. As new industries are established and existing ones are modernized, demand for skilled labour is going to accelerate. This demand can be fulfilled by increasing the training facilities available in the region, and by migration of skilled workers from other parts of Turkey to the GAP area. The latter is likely to put inflationary pressures on wages for skilled labour in the country, which could reduce one of the important economic advantages the country has at present. Equally, dependence on skilled workers from outside the area will assure that the workers of the region will be increasingly restricted to low-paying and

undesirable jobs. This could create social tension between the low-paid local workers and highly paid employees coming from outside the area. Thus, viewed from any direction, the best solution would be to take appropriate and timely steps that would help increase the education levels and skills of the local workers.

While increasing industrialization has ensured many benefits to the people of the region, it has also brought in its wake certain social and environmental costs. The main concern at present is the negative environmental and social impacts of wastewater management practices. Proper wastewater treatment by any industry in the region is now an exception rather than the norm. The situation is serious for the industrial zone in Şanlıurfa because of the high concentration of the industrial activities in the area. None of the industries treat their waste water, and all the wastewater is now discharged on the land adjoining the industries.

Even though the Şanlıurfa industrial estate is fifteen kilometres away from the city, the discharge of wastewater could have major social and health costs in the coming years. First, groundwater of the area may become contaminated with industrial wastewater over the years. Depending on the gradient of the flow, the groundwater of the region may become contaminated with industrial waste products, not only in Şanlıurfa but also in the different cities where similar industrial developments are being encouraged.

Second, the industrial estate is located near some villages and a stream, which serves as a source for water for many people. The people and the ecosystems of the nearby villages are likely to bear the first adverse health and environmental impacts from the existing wastewater discharges from these new industrial developments.

In the short term, monitoring the quality of the wastewater discharges and groundwater near the estate is necessary. Over the short to medium term, it is necessary to prepare a plan for treatment of waste water for the industrial zone, and then implement it. Because of the lack of data on the quantity and quality of wastewater generated, it is difficult to make specific comments on the quality of water. However, *prima facie*, there appears to be a good case to construct a communal wastewater plant for treating the discharges from the industrial estate as soon as possible.

A strategy for wastewater management for the industrial estate of Şanlıurfa should now receive attention. This is because a second zone is now

in the process of being established which is likely to increase the magnitude of the overall problem.

The experience with the Şanlıurfa industrial zone project indicates that any new similar project in the region must consider a wastewater and solid wastes management plan from the very beginning of the planning process. Environmental management needs to receive a higher priority than at present.

### **Resettlement and Rehabilitation**

In Turkey, the designated executing agency for water and land development projects is the DSI. The General Directorate of Rural Affairs is responsible for resettlement and rehabilitation. Like in most other countries, expropriation of land and the subsequent resettlement and rehabilitation activities are regulated by law (Altinbilek et al., 1999a, 1996b).

The levels of compensation for the people who have to be resettled depend on several factors like the nature and size of the properties, elements which could increase the value of the properties, taxes paid on the properties, etc. The levels of compensations for all properties are decided by an independent valuation commission composed of technical experts and representatives of the affected population. The DSI transfers the amount needed to a special resettlement fund that is then managed by the General Directorate of Rural Affairs. When the values of the expropriated properties exceed the compensations offered, the differences are paid back to the owners. However, when it is the reverse, the owners are given a five-year moratorium on the debt, followed by a twenty-year interest-free repayment period (Altinbilek, 1999a). Table 8.7 shows the population which has been resettled due to the construction of large dams in Turkey between 1990 and 1997.

People have the option to decide whether they would like to be resettled in rural or in urban areas. For those families who opt for rural areas, each household is entitled to housing, farm land, credit for animal husbandry, etc. The law further stipulates that the farmers who are to be resettled must receive training on new agricultural production methods from the government. All rural resettlement units have to be provided with a health centre, a doctor, a nurse, and a midwife. For urban resettlement, the people receive a house and needed commercial facilities, as well as credits for commercial activities.

Table 8.7: Resettlement of population due to the construction of the Atatürk Dam

Year	Present location		Number of families to be resettled		Number of families already resettled		Type of Settlement		Resettlement area		
	Province	District	Village	families	families	Rural	Urban	Province	District	Village	
1988	Adiyaman	Various	Various	185	185	-	185	Adiyaman	Y.Samsat	-	
1988	Adiyaman	Various	Various	34	34	34	-	Aydin	Soke	Yalikoy	
1989	Adiyaman	Various	Various	42	42	42	-	Aydin	Soke	Yalikoy	
1989	Şanlıurfa	Various	Various	20	20	20	-	Aydin	Soke	Yalikoy	
1989	Diyarbakır	Cermik	Dilekpinar	3	3	3	-	Aydin	Soke	Yalikoy	
1989	Adiyaman	Kahta	Geldibuldu	1	1	-	1	Burbur	Bucak	-	
1989	Adiyaman	Centre	Hacihalil	1	1	1	-	Şanlıurfa	Ceylanpınar	-	
1989	Diyarbakır	Cermik	Dilekpinar	1	1	1	-	Diyarbakır	Centre	-	
1989	Adiyaman	Samsat	Various	6	6	-	6	Adiyaman	Y. Samsat	-	
1989	Adiyaman	Centre	Karicik	1	1	-	1	Ordu	Unye	-	
1989	Adiyaman	Kahta	Adali	2	2	2	-	Aydin	Soke	Denizkoy	
1990	Adiyaman	Various	Various	18	18	18	-	Hatay	Reyhanli	Vazvaza	
1990	Adiyaman	Kahta	Geldibuldu	1	1	1	-	Konya	Sarayumu	Kayıoren	
1990	Adiyaman	Kahta	Bostanlı	2	2	2	-	Cankiri	Cerkes	Akhasan	
1991	Adiyaman	Various	Various	2	2	2	-	Hatay	Reyhanli	Vazvaza	
1993	Adiyaman	Various	Various	18	18	-	18	Adiyaman	Y. Samsat	-	
1993	Şanlıurfa	Bozova	Dikili	1	1	1	-	Hatay	Kirikhan	Karatas	

(Contd.)

Table 8.7 Contd.

Year	Present location		Number of families to be resettled				Type of Settlement			Resettlement area			
	Province	District	Village	resettled	families already resettled	Rural	Urban	Province	District	Village	Province	District	Village
1997	Adiyaman	Various	Various	6	6	6	-	Hatay	Centre	Hasanli	Hatay	Centre	Hasanli
	Adiyaman	Various	Various	369	-	369	-	Hatay	Hassa	Gurpinar*	Hatay	Hassa	Gurpinar*
	Adiyaman	Various	Various	416	-	-	416	Adiyaman	Y.Samsat**		Adiyaman	Y.Samsat**	
Total				1,129	344	502	627						

Notes: \* The General Directorate of Rural Affairs stopped the construction of the houses (regulations of 27.3.1997).

\*\* The land to construct the houses was given by the government, the population did not pay for it.

Source: General Directorate of Rural Affairs.

In many cases, major landowners with large properties prefer to receive cash compensation, and then use the compensation received to establish small industries or commercial activities in the cities. It is fairly common to find that part of a family whose land was expropriated moves to the city, but the rest prefers to stay in the rural area. Experiences indicate that the second generation of these families who decided to resettle in the cities and invested their money successfully, became entrepreneurs.

Overall, the main problem in the relocation of populations is the scarcity of land and not money. Experiences from different water development projects from other parts of Turkey indicate that many people prefer to take the appropriate financial compensations and then organize their own resettlement in areas of their choice. The GAP region was no exception to this practice.

People from the rural areas, often non-skilled and not familiar with the various investment opportunities have not managed the expropriation funds received properly. Accordingly, many of them have not used the funds received wisely and have ended up with no house, no land, no job, and no money. Thus, within a limited period of time, they have ended up as destitutes, with economic and living conditions significantly worse than before because of poor investment decisions and inappropriate financial management. This is an important problem for Turkey in terms of the efficiency and social acceptability of the resettlement practices. This is a national problem, not limited to the GAP region, for which proper solutions, like intensive information and communication services, have to be provided which could enhance the social and economic conditions of the people who are to be resettled.

For the current analysis, the information on resettlement was collected from the DSI and from the directorate of rural affairs. The information that the XVI Regional Directorate of the DSI provided included the status of urban and rural resettlement as of 1993, and also the status of expropriation as of 1996. The DSI data did not include information on resettlement after 1993.

On the basis of the information collected from the DSI and the Directorate of Rural Affairs, as of 15 September 1997, the expropriation of properties up to the height of 542m has been completed. The total cost has been 13,057 trillion TL at 1995 prices. By the end of 1995, and by decision of the courts, 2,979 trillion TL (at 1995 prices) have been paid to settle disputes with the resettled population.

The Directorate of Rural Affairs has estimated that 1,129 families had to be displaced due to the construction of the Atatürk Dam Project during the period 1988-97. Out of this number, 44 per cent were to be resettled in rural areas, and the balance of 56 per cent in urban areas. By 1998, only 30 per cent of the population had been resettled (344 families), and 70 per cent still had to be resettled (369 families in rural areas, and 416 families in urban areas) (Tables 8.8 and 8.9).

However, the records of the DSI do not include the total number of families that have had to be resettled. The records only note that the number of families that were involuntarily resettled from 1988 to 1997 was 344 (133 in rural areas, and 211 in urban areas).

By 1999, 375 families affected by the dam were still living in rented houses waiting to be resettled in rural areas (Altinbilek et al., 1999a, 1999b).

According to the DSI (Bayram, 2000), by July 2000, thirty-six more families had been resettled in Ayrancilar village and six more families had decided not to wait any longer to receive the support of the government. The General Directorate of Rural Affairs is planning to resettle the remaining 333 families in the Van province, but the necessary land has still not been allocated by the Treasury. Due to the delay, several families are considering resettlement in urban areas. The Kahta district of the Adiyaman province is one possibility, according to the officers from the Rural Affairs Department. However, Rural Affairs still has not carried out any detailed study related to this resettlement.

In order to obtain a clearer picture of the efficacy of the resettlement process from the perspective of the people who were affected, extensive series of discussions were conducted with the project-affected people in several villages in Adiyaman and Şanlıurfa. Collective meetings with the people who were resettled were organized in a few selected villages. All the meetings included the *mukhtar* (head of the village) and all the heads (men) of each family living in each town. The men finally selected for detailed interviews were chosen at random. In all cases, at least 50 per cent of the heads of the households affected were interviewed in one form or another.

The main issues that were discussed during all these interviews and meetings were the effectiveness of the resettlement process, status and levels of compensations paid, quality of housing and services provided, as well as the impacts of the construction of the Atatürk Dam on their lives, the lives of their families, and their villages.

The three villages studied in detail were New Samsat, Akpınar and Kızılçapınar. An overall picture of the resettlement process from the perspective of the resettlers, by the villages, is discussed next.

Table 8.8: Resettlement of population due to the construction of the Atatürk Dam

Name of the project	Location		Name of the area affected	What was affected		To what extent
	Province	District		Settlement	Land	
Atatürk dam	Şanlıurfa	Bozova	Dutluca Village		Land	Partially
			Yaslica Village		Land	Partially
			Cınarlı Village	Settlement		Completely
			İğdeli Village	Settlement		Completely
			Geçitbasi Village	Settlement		Completely
			Dikili Village	Settlement		Completely
			Kasımkuyu Village		Land	Partially
			Tavuk Hamlet	Settlement		Completely
			Baglica Village		Land	Partially
			Odulalan Hamlet	Settlement		Completely
			Yukarıcatak Village	Settlement		Partially
			Tatar Hoyuk Village	Settlement		Completely
			Bahceli Village		Land	Partially
			Tekağac Village		Land	Partially
			Asağıcatak Village	Settlement		Completely
			Yığınak Village		Land	Partially
			Acıkıyel Hamlet	Settlement		Completely
Akyatır Hamlet	Settlement		Completely			
Arikok Village		Land	Partially			
Kucuktulmen Village		Land	Partially			

(Contd.)

Table 8.8 Contd.

Name of the project	Location		Name of the area affected	What was affected		To what extent
	Province	District		Settlement	Land	
			Azikli Village		Land	Partially
			Kalemlı Village	Settlement		Completely
			Kuşlogöl Village		Land	Partially
			Kayalı Village		Land	Partially
			Divan Village		Land	Partially
			Narlıkaya Village		Land	Partially
			Bürüncek Village		Land	Partially
			Tasikara Village		Land	Partially
			Büyükkoba Village		Land	Partially
			Bekçeri Village		Land	Partially
			Kavalık Village		Land	Partially
			Çaylarbaşı Sub-district		Land	Partially
	Adıyaman	Centre	Bebek Village		Land	Partially
			Araplar Hamlet	Settlements		Completely
			Mazılık Hamlet	Settlements		Completely
			Çobandede Village		Land	Partially
			Çat Hamlet	Settlements		Completely
			Bağpınar Sub-district		Land	Partially
			Akdere Village		Land	Partially

(Contd.)

Table 8.8 Contd.

Name of the project	Location		Name of the area affected	What was affected		To what extent
	Province	District		Settlement	Land	
			Balcılar Village	Settlement	Land	Completely
			Sütbulak Village	Settlement	Land	Completely
			Kovanoluk Village	Settlement	Land	Completely
			Tapeönü Village	Settlement	Land	Completely
			Bayirli Village			Partially
			Nalgevür Hamlet	Settlement	Land	Completely
			Bağarası Village		Land	Partially
			Doganca Village		Land	Partially
			Kilisik Hamlet	Settlement		Completely
			Götlarla Village		Land	Partially
			Gülpinar Village		Land	Partially
			Kirmacik Village		Land	Partially
			Bizbeyan Hamlet	Settlement		Completely
			Yarimbag Village		Land	Partially
			Örentaş Village		Land	Partially
			Uzuntepe Village		Land	Partially
			Taskuyu Village		Land	Partially
			Çiçek Village		Land	Partially
			Belenli Sub-district		Land	Partially
			Çakireşme Sub-district	Settlement	Land	Completely

(Contd.)

Table 8.8 Contd.

Name of the project	Location		Name of the area affected	What was affected		To what extent
	Province	District		Settlement	Land	
			Dardağan Village		Land	Partially
			Gurri Mah.	Settlement	Land	Completely
			Eskitaş Village		Land	Partially
			Ulupınar Village		Land	Partially
			Yığınak Village		Land	Partially
			Arlı Village		Land	Partially
			Çaybasi Village		Land	Partially
			Belören Village		Land	Partially
			Sarıdana Village		Land	Partially
			Güzelçay Village		Land	Partially
			Seyhbaba Village		Land	Partially
			Erikdere Village		Land	Partially
			Gölgeli Village		Land	Partially
			Büyükbag Village		Land	Partially
			Oluklu Village		Land	Partially
			Güdülge Village		Land	Partially
			Akincılar Sub-district		Land	Partially
			Geldibuldu Village	Settlement		Completely
			Adalı Village	Settlement		Completely
			İkizce Village		Land	Partially

(Contd.)

Table 8.8 Contd.

Name of the project	Location		Name of the area affected	What was affected		To what extent
	Province	District		Settlement	Land	
			Bostanlı Village	Settlement		Completely
			Narsirti Village	Settlement		Partially
			Dut Village		Land	Partially
			Kahta Centre		Land	Partially
			Kilic Village		Land	Partially
			Besgöze Village		Land	Partially
			Korulu Village		Land	Partially
			Gumuşkaşık Village		Land	Partially
			Köklüce Village		Land	Partially
			Beybostan Village		Land	Partially
			Yagmurlu Village		Land	Partially
			Kesertas Village		Land	Partially
			Yayladalı Village		Land	Partially
			Açma Village		Land	Partially
			Dağdeviren Village		Land	Partially
			Budaklı Village		Land	Partially
			Üçkaya Village		Land	Partially
			Gönen Village		Land	Partially
			Gözpınar Village		Land	Partially

(Contd.)

Table 8.8 Contd.

Name of the project	Location		Name of the area affected	What was affected		To what extent
	Province	District		Settlement	Land	
			Geçitli Village		Land	Partially
			Konacik Village		Land	Partially
			Ortaca Village		Land	Partially
			Cevizpinar Village		Land	Partially
			Saltepe Village		Land	Partially
			Ceylan Village		Land	Partially
			Pamuklu Village		Land	Partially
			Karakaya Village		Land	Partially
			Çukurelma Village		Land	Partially
			Armağantasi Village		Land	Partially
			Dilekpinar Village		Land	Partially
			Konaklı Village		Land	Partially
			Şeyhandede Village		Land	Partially
			Adalar Village		Land	Partially
			Kömürçüler Village		Land	Partially
			Bayat Village		Land	Partially

Table 8.9: Number of families resettled due to the construction of large dams in Turkey, 1970-97

Year	Name of the dam	Original location			Number of families resettled	Type of settlement		New location		
		Province	District	Village		Rural	Urban	Province	District	Village
1985	Altinkaya	Samsun	Bafra	Several	25	-	25	Bursa	Gemlik	Centre
1986	Altinkaya	Sinop	Duragan	Kaplangi	41	41	-	Hatay	Reyhanli	Horlak
1986	Altinkaya	Samsun	Several	Several	130	130	-	Hatay	Reyhanli	Horlak
1988	Altinkaya	Sinop	Duragan	Several	81	-	81	Sinop	Duragan	-
1989	Altinkaya	Sinop	Duragan	Several	6	-	6	Sinop	Duragan	-
1990	Altinkaya	Sinop	Duragan	Several	155	155	-	Hatay	Reyhanli	Vazvaza
1990	Altinkaya	Samsun	Vezirkopru	Several	11	11	-	Hatay	Reyhanli	Vazvaza
1990	Altinkaya	Sinop	Several	Several	5	-	5	-	Duragan	-
	Total				454	337	117			
1970-1983	Hasan-Suat Ugurly				39	39	-	Samsun	Carsamba	Demirli
1985	Hasan-Suat Ugurly	Ordu	Akkus	Cokek	17	-	17	Ordu	Unye	Centre
1985	Hasan-Suat Ugurly	Samsun	Carsamba	Several	100	-	100	Samsun	Carsamba	Kirazlicay
1987	Hasan-Suat Ugurly	Samsun	Carsamba	Several	134	-	134	Samsun	Carsamba	Kirazlicay
1987	Hasan-Suat Ugurly	Ordu	Akkus	Several	38	-	38	Samsun	Carsamba	Kirazlicay
	Total				328	39	289			
1986	Karakaya	Malatya	Several	Several	132	132	-	Konya	Centre	Yaglibayat
1986	Karakaya	Malatya	Several	Several	62	62	-	Aydin	Soke	Kirikici
1986	Karakaya	Elazig	Several	Several	33	33	-	Aydin	Soke	Kirikici
1987	Karakaya	Malatya	Several	Several	20	20	-	Aydin	Soke	Kirikici
1989	Karakaya	Malatya	Centre	Meydanci	1	1	-	Aydin	Soke	Yalikoy

(Contd.)

Table 8.9 Contd.

Year	Name of the dam	Original location			Number of families resettled	Type of settlement		New location				
		Province	District	Village		Rural	Urban	Province	District	Village		
											Malatya	Centre
1990	Karakaya				2	2	-					
	Total				250	250						
1988	Atatürk	Adiyaman	Several	Several	34	34	-	Aydin	Soke	Yaliko		
1988	Atatürk	Adiyaman	Several	Several	185	-	185	Adiyaman	Y. Samsat	-		
1989	Atatürk	Adiyaman	Several	Several	6	-	6	Adiyaman	Y. Samsat	-		
1989	Atatürk	Adiyaman	Several	Several	42	42	-	Aydin	Soke	Yaliko		
1989	Atatürk	Sanliurfa	Several	Several	20	20	-	Aydin	Soke	Yaliko		
1989	Atatürk	Diyarbakir	Cermik	Dilekpinar	3	3	-	Aydin	Soke	Yaliko		
1989	Atatürk	Adiyaman	Kahta	Geldibuldu	1	-	1	Burdur	Bucak	-		
1989	Atatürk	Adiyaman	Centre	Hacihalil	1	1	-	Sanliurfa	Ceylanpinar	-		
1989	Atatürk	Diyarbakir	Cermik	Dilekpinar	1	1	-	Diyarbakir	Centre	-		
1989	Atatürk	Adiyaman	Centre	Karicik	1	-	1	Ordu	Unye	-		
1989	Atatürk	Adiyaman	Centre	Ovakuyu	1	1	-	Aydin	Soke	Denizcoy		
1989	Atatürk	Adiyaman	Kahta	Adali	1	1	-	Aydin	Soke	Denizcoy		
1990	Atatürk	Adiyaman	Several	Several	18	18	-	Hatay	Reyhanli	Vazvaza		
1990	Atatürk	Adiyaman	Kahta	Geldibuldu	1	1	-	Konya	Sarayonu	Kaytoren		
1990	Atatürk	Adiyaman	Kahta	Bostanli	2	2	-	Cankiri	Cerkes	Akhasan		
1991	Atatürk	Adiyaman	Several	Several	2	2	-	Hatay	Reyhanli	Vazvaza		
1993	Atatürk	Adiyaman	Several	Several	18	-	18	Adiyaman	Y. Samsat	-		
1993	Atatürk	Sanliurfa	Bozova	Dikili	1	1	-	Hatay	Kirikhan	Karatas		

(Contd.)

Table 8.9 Contd.

Year	Name of the dam	Original location		Village	Number of families resettled	Type of settlement		New location		
		Province	District			Rural	Urban	Province	District	Village
1997	Atatürk	Adiyaman	Several	Several	6	6	-	Hatay	Centre	Hasanlı
	Total				344	133	211			
1993	Kayraktepec	Icel	Mut	Evren	1	1	-	Hatay	Kirikhan	Karatas
	Total				1	1	-			
1970-1983	Keban				159	93	-	Diyarbakır	Centre	Yolboyu
	Total					40	-	Elazığ	Centre	Golkoy
						26	-	Tunceli	Pertek	Bicmekaya
	Total				159	159	-			
1970-1983	Gokcekaya				43	-	43	Eskisehir	Centre	-
	Total				43	-	43			
	Grand Total				1,604	919	685			

Source: DSI, 1999, *Dams and Hydroelectric Power Plants in Turkey*, Ministry of Energy and Natural Resources, Turkey.

*New Samsat*

Due to the construction of the Atatürk Dam, one administrative district and its centre, twenty-seven villages and seventy-three arable fields (sub-village) were totally inundated, and eight villages and ten arable fields were partially inundated (Altınbilek et al., 1999a).

The district centre of Samsat was rebuilt above the reservoir level and most of the 5,000 people of the town, as well as some people living nearby had to be relocated to a new village called New Samsat. The new place was established about eight kilometres away from the old town. The population recognized the main differences between the old and the new towns, and between their old and new lifestyles. The people who were interviewed stated that Old Samsat was an unplanned city, their houses were small, and generally made of mud. Transportation and communication networks were not well developed. Access to health, education, and electrical facilities were also highly unsatisfactory. The main economic activity of the old village was agriculture, and the main products were cereals and cotton. In contrast, in New Samsat, infrastructure facilities like roads, energy, water, and communication were excellent. This, unquestionably, was a significant improvement compared to what the population had access to earlier. In addition, their new houses were built with cement, and the people had televisions, refrigerators, telephones, and washing machines in their houses, which were earlier considered to be luxury items. People also now have running water, electrical connections, and better sanitation facilities in their houses. On the negative side, the people felt their current income was lower than before since they now mainly cultivate tobacco because of a lack of water for irrigation.

The local population also pointed out that Old Samsat did not have any medical personnel or medical facilities. The absence of medical facilities and poor transportation facilities, made access to proper health care difficult for the sick, the aged, and pregnant women. This contributed to much suffering. The situation in the new town was totally different. New Samsat currently has three doctors in the town on a permanent basis and there is also a small hospital. There are also two primary school and one high school in New Samsat while earlier there was only one primary school. When the present study was carried out, another primary school was under construction.

When the population moved to New Samsat, the DSI encouraged fishing as a new commercial activity. Fish larvae were provided. However, people did

not appear to be interested in pursuing fishing as a profession. Accordingly, there were only a few fishermen. The fish that are caught are primarily used for household consumption. Some of the reasons for the unpopularity of the fishing profession could be inadequate catch, lack of stock and/or proper fishing gear, lack of commercialization, or the fact that people are not aware of the potential of the fishing profession since it is a new activity in the area.

In Old Samsat, the rate of emigration was low, probably because people had steady jobs. At the new location, however, many people are migrating to other cities to get better jobs. Some of the inhabitants appear to have migrated to Şanlıurfa to work in the cotton fields. Tobacco grown in New Samsat is sold to the government. The farmers currently receive technical advice from the Department of Agriculture on various aspects of tobacco farming.

Overall, the people interviewed agreed that their quality of life is better in New Samsat compared to what they had before. This is primarily because the conditions under which they live are better at present than before in many significant ways. However, the people insisted that from an economic viewpoint, the conditions were better earlier. It was not possible to determine if the deterioration in their economic conditions was real, or if it was a complaint made by the people in the hope that doing this could bring them additional new economic benefits from the government.

### *Akpınar*

Akpınar is an old village. Many people from this village worked on to the construction of the Atatürk Dam as non-skilled workers. With the incomes obtained during this construction process, people constructed new houses with better materials (cement, brick, etc.) compared to before (primarily mud), and bought consumer goods like refrigerators, television sets, etc. Some people also bought tractors, or established mall shops. Many farmers supplemented their incomes by working at the dam site as a secondary job. There were some fishermen in the town, but the catch was primarily for their own consumption.

The economic and social conditions of the people have improved. This is because before the Atatürk Reservoir was built, they had to grow tobacco under rain-fed conditions. The new reservoir has proved to be a source of irrigation. The farmers currently grow mainly cotton, which has increased their incomes appreciably. Thus, not surprisingly, an overwhelming

percentage of people feel that the construction of the dam has been beneficial to the community, although there are some unemployed people who are looking for jobs. One of the benefits of having a higher income has been that the children (including girls, according to the people interviewed) are now being sent to schools, even though most of the population of the town attended only primary school. Absence of higher education and training has meant that most of the people from this village who worked during the construction of the dam were non-skilled. However, since the construction of the Atatürk Dam extended over a period of several years, it was possible for many of the villagers to train as drivers, motor mechanics, etc. With new skills, some of the people are now working as skilled labourers at different infrastructure development projects all over the country, and a few even abroad.

Even though the town has access to water for agricultural activities, it did not have access to drinking water at the time of the study. Their only source of drinking water was a pipe which ran constantly. Drainage at the pipe outlet was a problem, especially in terms of health. The problem could be solved easily either by the local technicians or by the appropriate municipal authority. The villagers had requested the government for help to rectify the situation, but no help was forthcoming when the study was undertaken. The villagers also had taken no initiative to solve this simple problem themselves.

#### *Kizilcapinar Village*

This is a village with about fifteen families from Caili village who were still waiting to be resettled in rural areas. They are still living in rented houses paid for by the government. They work as sharecroppers, primarily growing tobacco, which is the same activity they used to carry out before they were displaced. Even though they had limited resources, most of the villagers interviewed mentioned that their children were attending schools in Adiyaman.

On the basis of the interviews and meetings, it appears that the vast majority of the people that had to be resettled due to the construction of the Atatürk Dam were not aware of the overall process of resettlement. Nor did they have much knowledge of the resettlement or expropriation laws or their entitlements under the laws. Some people who are yet to be resettled mentioned that they tried to obtain information several times from the Directorate of Rural Affairs, but without any success. Basically they wanted to

know where they were likely to be resettled and when this might take place. They were told that they would be informed when their houses would be ready, and they could move. The government officials had informed them that they were likely to be resettled 'in the future' in Hatay, which did not appear to be the situation as of October 1997. Even though six families were resettled in Hatay in 1996, the information provided by the Directorate of Rural Affairs was that the construction of these houses in Hatay had to be stopped because of social disturbances and unrest. The inhabitants of Hatay did not want people from Kizilcapinar to be resettled there. It seems that the main constraint to resettle the people was the lack of appropriate land. The population in Kizilcapinar had not been informed of this situation, and accordingly, were still expecting to be relocated to Hatay at the time of this study.

## **Conclusion**

During the studies carried out, it was evident that the magnitude and extent of the social and economic impacts generated by the Atatürk Dam and its reservoir have been positive not only for the region but also for the country as a whole. The benefits that are now accruing to the country by the increased electricity generation alone are substantial. Equally, lifestyles of the population living in the project area, and especially of the majority of people living near and around the reservoir have improved very significantly. In retrospect, based on data currently available, the construction of the main infrastructural project in the GAP area, the Atatürk Dam, has acted as the engine for economic growth and integrated regional development in a historically underdeveloped area. The dam and the reservoir system have changed the way of living of the local people, significantly increasing the employment opportunities and improving working conditions. Expanded economic activities have encouraged migration from the rural to the urban areas.

The region has flourished and employment has been generated both during the construction and the operation of the dam. Many of the labourers who initially were unskilled and who were trained during the construction of the dam, became skilled workers, and many became entrepreneurs after the construction was over. Many of them are now working in the construction of

dams all over the country. The resulting incomes come back to the region, since they send their incomes back to their families who live in this region.

The benefits of irrigation are visible mainly in Şanlıurfa, where both formal and informal jobs have increased exponentially. However, the construction of the dam did not result only in benefits in terms of employment. The daily exposure of the villagers to the different traditions of 'outsiders' during more than a decade of construction, resulted in the population expressing their ambitions in terms of increased and better housing, transportation, food and health habits, higher education, the decision of the local population to send their children (including girl children) to school, demand for information and communication, etc. The lifestyle of the population has thus started to change in the region, which can result in a better quality of life for the people of the region.

While the construction of this dam and the associated hydraulic structures have contributed significantly to the improvement of the lifestyle of the people of the region, they have had some direct and indirect adverse social and environmental impacts as well. For example, they have led to the resettlement of a large number of people from the inundated area, impoverishment of those who did not manage their expropriation funds properly, loss of productive agricultural land, and an increase in environmental contamination due to accelerating industrialization. The population affected, however, has generally been fairly compensated for their losses.

Interestingly, but perhaps not surprisingly, the overall benefits and costs of the dam were viewed differently at the local level depending upon whether the people were from Adiyaman or Şanlıurfa. Several towns of Adiyaman were affected by the construction of the dam and the reservoir. In the villages visited, the people did not have access to water for irrigation purposes. Thus, they felt that their lands had been expropriated and they were not receiving benefits from the reservoir in terms of irrigation, even though they confirmed that their lifestyles had improved in general compared to what it was before. They felt this was unfair. In contrast, the people living in Şanlıurfa appeared to have a very positive attitude towards the dam and the reservoir.

Since the socio-economic and educational levels of the people who had to be resettled varied widely, it is not possible to draw uniform and universally acceptable conclusions. However, among the positive impacts were improvements in the economic condition and lifestyles of the people who managed their expropriation funds properly. Education of children (including

girls) received a significant boost, and fertility rates have started to decline. Fragmentation of families was the main adverse impact with the resettlement processes, when several members of extended families decided to settle down in different places. Impoverishment was a serious issue for those who could not manage their expropriation funds properly.

If the GAP succeeds in achieving its objectives, the development requirements of the region are likely to increase very significantly. However, if these significant and rapid social, economic, and environmental changes cannot be properly managed, environmental degradation in terms of water, soil, and air pollution could become serious problems in several urban communities, which in turn could have an adverse impact on the sustainability of the project, and on the health of the local people and the ecosystems. With such a multiplicity of opportunities and problems, it is important to identify specific priorities, policies, and actions that are needed to address the most immediate and critical issues related to sustainable urban development, including the development and facilitation of appropriate social and technological infrastructures.

Although not easy, the integration of environmental considerations within the planning processes of the region would certainly result in better living conditions for the population and in the protection of its natural resources. Experiences from other parts of the world indicate that large rural and urban public investment projects, when not properly implemented and managed, can adversely affect ecosystems and, in the long term, the socio-economic development of the region. Regional strategies to manage water, land, air, and biotic resources need the formulation, integration, and implementation of appropriate land use policies and practices for both urban and rural areas that could be affected by the development projects. While formulation of rational land use policies should be possible, global experiences indicate that generally they are very difficult to implement even under the best of circumstances. This could thus be a potential problem for the GAP region.

No large-scale infrastructure development project is possible anywhere in the world which has only positive impacts. However, even though some negative impacts are unavoidable, social and environmental impacts should be looked at in an organized way so that they can be mitigated properly. Accordingly, projects and activities must be selected such that the positive impacts significantly outweigh the negative costs.

Overall, the main problem in the relocation of populations is the scarcity of land where a group of people can be resettled, and not the availability of funds for compensation. Experiences from different water development projects from different parts of the world indicate that many people prefer to receive the appropriate financial compensation and then plan and organize their own resettlements in areas of their choice. However, this creates the problem of unskilled rural people unfamiliar with money and investment matters being unable to make proper use of the compensation funds received. They often end up in conditions worse than before. In view of the long-term economic efficiency and social acceptability of the process of resettlement, this issue needs to be seriously considered. This problem, however, is not limited to Turkey alone, but also affects nearly all developing countries, for which proper solutions have to be found. In the final analysis, people who are to be resettled must enjoy better conditions than what they had before since they are involuntarily affected by the development projects. In fact, with the increasing scarcity of land necessary for resettlement processes, governments will have to develop appropriate information and communication strategies to educate people on how to invest their expropriation funds, and make them aware of the risks of managing them unwisely.

When properly planned and implemented, resettlement programmes can become part of an overall strategy to reduce poverty in any country. Well-planned investments in new infrastructure and services (water, electricity, schools, hospitals, roads, etc.) represent an opportunity to improve the living standards of the populations directly affected by the development projects. Since the rejection of any project because of involuntary resettlement is unrealistic, it is essential to improve the knowledge base for its planning and the implementation phases in order that the entitlements of those affected are assured and their lifestyles are improved. Resettlement should be approached as a development opportunity, which it is, and not as a neglected stage of an infrastructural construction project. This, although difficult, is not impossible, especially if there are policies and resources, and also an understanding of the complexities, and the benefits and costs, of the resettlement processes from the social, cultural, economic, and ecological viewpoints.

In Turkey, there does not seem to be any negative attitude towards the construction of infrastructural projects because of their impacts on the people and the environment. The projects are understood and appreciated for what they are: essential parts of the development of the country which will improve

the lifestyle of the people. There is a concern and a demand, however, that social and environmental issues be taken into consideration in the projects in order to avoid increased poverty for large number of people, unwanted migratory movements, degradation of the environment, and the like.

In Turkey, the institutional framework, as well as the practices for resettlement and rehabilitation are being improved in order to ensure better coordination between the concerned agencies during the planning and implementation stages of resettlement, as well as the rehabilitation processes. Additionally, the sustainability of each dam that is to be constructed is being objectively assessed in order to assure that it would be a win-win solution from the social, economic, environmental, and cultural viewpoints. Those projects which were to be implemented, but were later not considered to be optimal for the sustainable development of any region, have been postponed indefinitely.

The need for the reform of development policies is becoming increasingly apparent and urgent with the passage of time. The present thinking is that development policies should be formulated within a much broader and integrative framework than has been the case in the past. It should be realised that exclusive reliance on techno-economic aspects cannot provide all the necessary conditions which could ensure that the fruits of development policies are enjoyed by all the people concerned in an equitable and sustainable manner. They must go beyond techno-economic considerations and must include social and environmental factors, as well as an objective review of the capacities of the institutions that are likely to implement them.

The GAP Project, if properly planned and implemented, represents an opportunity for the development of one-tenth of the population of Turkey. In order to succeed in such a major and challenging task, development planning and implementation should explicitly consider improvements in the quality of life of the people of the region, fulfilment of their needs and expectations at the national, regional, and local levels, and preservation of the environment.

Meeting the social goals of a country has set a challenging agenda for development at the global level. The GAP Project, by meeting the economic, social, and environmental goals of the south-eastern Anatolia region, has the potential to become an excellent example of people-centred integrated regional development.

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