



WATER RESOURCES MANAGEMENT CROSSCUTTING ISSUES

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9. The Effects of Large Dams on Environment and Human Welfare: The Experience of Southeastern Anatolia Project, Turkey

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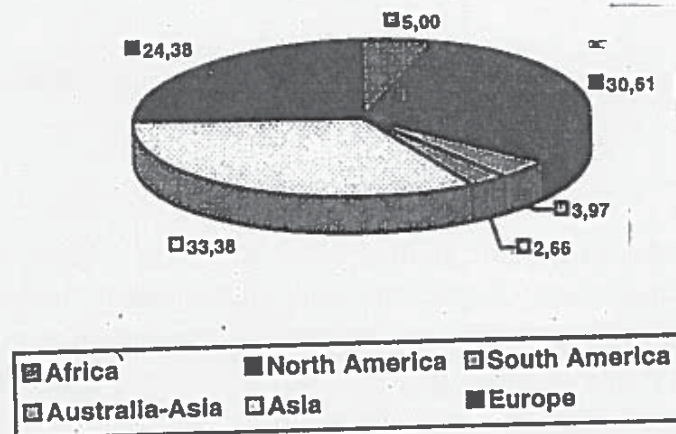
1.0 Introduction

Water is not just a basic human need, it is also a basic constituent for development, management, restoration and enhancement of eco-systems, of which people and their cultures are just one component. In many parts of the world, the sustainability of development is threatened by the imbalance between the demands and available supplies of water, food and energy. In this paper, we shall review the overall world water scenario and the attempts to meet the water scarcity and increase food and energy production by building large dams. The positive and negative effects of these water harvesting structures on human and natural environment will also be examined with special reference to Southeastern Anatolia Project.

2.0 Large Dams – World-Wide Experience

The planet earth could better have been called Planet Water; because 3/4th of it is covered under water. Water available on the earth is abundant enough to cover it by a 3000 metres thick layer of water. However, 97.3% of this is sea water and hardly 2.7% is fresh water. Out of this fresh water again, 2.4% is in the form of icebergs in polar regions and only 0.3% is available as surface runoff. The global per capita renewable availability is about 7000 m³, but the inter-continent variation ranges from more than 70,000 m³ in Australia to around 3400 m³ in Asia. Global per capita fresh water withdrawal is about 570 m³ (total 3400 km³). This has gone up more than 35 folds over the past 300 years, although the population has gone up by 8 folds. The rate of increase accelerated remarkably after 1940 and again after 1980. On an average, the global water use pattern shows that agriculture, industry and domestic use is 69%, 23% and 8% respectively, but in Asia more than 85% of water use is for agriculture. 40% of the global food production comes from the 17% irrigated area.

World-wide attempts of addressing water scarcity range from inter-national, inter-basin transfers to micro water harvesting structures. For almost 5000 years, dams have served to ensure an adequate supply of water and prevention/mitigation of floods. There are about 45,000 large dams (higher than 15 m) throughout the world. While, some are more than 2,000 years old, about 73% have been built in the last 50 years. The reservoirs formed by these dams store some 36000 km³ of usable water. Continent-wise distribution of these dams presents a high degree of variation (Figure 1). In USA, there are 75,187 dams, 19 higher than 150 m and 71 dams with height between 100-149 m.



Source: Jacques Lecornu, Dams and Water Management, International Conference on Water and Sustainable Development, Paris, March 1998

Figure 1. Distribution of Dams (%) as per Continents

Although, both large dams and small dams have been built by various countries, the comparison is really interesting. In Britain, the total volumes of the 327 smallest reservoirs in the British Register of Large Dams would be needed to replace the volume of the largest, called Quoich. Their total submerged area would be 3.5 times Quoich. Similarly, in South Africa, the 422 smallest reservoirs in the Register would be needed to replace Gariep's volume. In that case, the submergence area would be 2.22 times larger.

In spite of spectacular water resources development, challenges ahead outweigh the achievements. It is estimated that between 2000 and 2025, total food grains demand in the world will increase by 37%, from 1937 Million tons to 2655 Million tons, at an annual rate of 1.27%. The world energy consumption is expected to be double by 2025. With dwindling supplies of fossil fuel coupled with pollution problems, it is imperative to develop economically feasible hydro power potential of 6400 TWh/year. Current hydro power potential in operation varies from 39.3% in North & Central America to 6.8% in Africa. About 40%

(1,00,000 per year) of all fatalities from natural catastrophes world-wide are caused by flooding.

In the high water consumption countries with rich resources and a highly developed technical infrastructure, many ways of conserving, recycling and re-using water may more or less suffice to curb further growth in supply. In developing countries, however, water availability is generally critical to any further development and even to the mere survival of the rapidly growing population (Vyas, 2001).

3.0 Large Dams in Turkey

175 dams and hydro power stations have been built in Turkey during the last 45 years, and out of 8.5 million ha of land that can be irrigated, already 4.5 million ha (53% of the total potential) is under irrigation. At present, Turkey is using only about 30% of its hydro power potential, which is expected to increase to nearly 40% with the completion of the projects that are currently under construction. The Government of Turkey, through the General Directorate of State Hydraulic Works (DSİ, Devlet Su İşleri -the Turkish acronym), plans to increase the total number of hydro power projects to 493 (Altınbilek et al., 1999a). The DSİ is the main executive agency in Turkey for the planning, execution and operation of the water projects of the country.

4.0 Large Dam Controversies

A large dam, essentially redistributes the waters of a basin, and hence ensures sustenance of the source as well as fruits for development. Within the range of variation in availability, appropriate withdrawals are designed to import sustained supplies and hence sustain productivity. Its inter-linkages with human society have been subjected to a great deal of controversies on the issues like compatibility with sustainable development, involuntary resettlement, environmental consequences, technical problems like sedimentation, water logging, reservoir induced seismicity etc.

The proponents of large dams insist that sustainable development is compatible with large scale, ambitious, centrally controlled schemes which are capable of mitigating the effects of natural catastrophes and meeting the increasing needs of growing economy for food, water and energy. This dominant interventionist model of development based on manipulative view of sciences and techno-managerial view of human welfare makes state and technology as two wheels of development chariot.

For opponents of large dam projects, sustainable development is not 'top-down' but 'bottom-up' (Fisher, 1997). It requires that development efforts be decentralised and requires the involvement of local people at all levels of the design, appraisal and implementation of the projects. They do not significantly question the need to address the problems of drought-prone areas and to increase the irrigation, but for them sustainable development should be as concerned with justice and equity, as it is with ecologically sustainable use of resources. From the perspective advocated by these critics, large scale centrally controlled schemes are incompatible with sustainable development. The State's role as a guarantor of national and international capitalist interests makes it inappropriate as the guardian of the interests of the poorest people in the society. Critics of development from this perspective argue that since interventionist development efforts emerged from the existing structures of power, they necessarily serve to maintain and support those structures. For those holding this point, development efforts, despite lofty and humanitarian rhetoric that accompanies them and despite instances of local effectiveness, serve as instruments of oppression in so far as they either help to maintain or fail to ameliorate economic and political inequality. Thus, changes or corrections in the implementation of development projects are ineffective unless they address fundamental problems in the political and economic structures that underlie decisions about development interventions. There is also sometimes a hint in the new radicalism that State, being the real or ultimate enemy, must be overcome by the 'people'. The 'people' are being invoked to struggle against the 'anti-people' projects like Sardar Sarovar etc. (in India) that symbolise the 'State', 'elites' and a development path that is held to be wicked (Verghese, 1994).

But the fact remains that because of the time tested role of large dams in human life and their inherent benefits like carry over storage, hydro power generation, fisheries development, flood control, less submergence and cost per unit volume of water etc., they continue to be a viable alternative for managing water crisis. It would not be fair if a generalised conclusion is drawn from some specific reports of water logging etc. W. Pircher clarified this as "a 'no dams' policy is not a realistic solution. It fails to take account of the need of the world and the people around us. The only lesson that can be drawn from shortcomings and mistakes in water resources development projects with dams in the past is not 'no dams' but, as always, 'better projects'" (Pircher, 1993).

5.0 Environmental Impact Assessment of Water Projects

The interest in environmental management at the global level has resulted in both developed and developing countries' establishment of legal and institutional frameworks, as well as economic, social and environmental policies

and instruments, which, at least in terms of expectations, promote simultaneously economic development, social welfare and environmental protection (Tortajada, 2001).

During the past three decades, EIA has gradually been considered to be a policy and management instrument for planning and decision making of development projects. The EIA process is expected to identify, predict and evaluate the potential impacts, both favourable and unfavourable, of development projects, from an interdisciplinary perspective. The evolution of EIA is presented in Table 1.

Table 1: The Evolution of Environmental Assessment

Date and phase	Trends and innovations
Prior to 1970, Pre-EIA	Project review based on engineering and economic study, e.g. benefit-cost analysis; limited consideration of environmental impacts.
1970-1975 Methodological development	EIA interdicted in some developed countries, initially focused on identifying, predicting and mitigating biophysical effects; opportunity for public involvement in major reviews.
1975-1980 Social dimension included	Multidimensional EIA, incorporating SIA and risk analysis; public consultation as integral part of development planning and assessments; increased emphasis on issues of justification and alternatives in project review.
1980-1985 Process and procedural redirection	Efforts to integrate project EIA with policy planning and follow-up phases; research and development focusing on effects of monitoring, on EIA audit and process evaluation, and on mediation and dispute resolution approaches; adoption of EIA by international aid and lending agencies and by some developing countries.
1985- 1990 Sustainability paradigm	Scientific and institutional framework for EIA begins to be rethought in response to sustainability ideas and imperatives; search begins for ways to address regional and global environmental changes and cumulative impacts; growing international co-operation on EIA research and training.
1990-1999	Strategic environmental assessment (SEA) of policies, programmes, and plans introduced in some developed countries; international convention on transboundary EIA; UNCED places new demands on EIA for expanded concepts, methods, and procedures to promote sustainability (e.g. through sustainable development strategies)

Source: Sadler, 1994

EIA, when properly conducted, provides a whole range of alternatives for the development processes, since it can be used to review policies, programmes and project proposals. It also has the potential to integrate these proposals with other instruments available for environmental planning, such as land use planning, economic instruments, environmental regulations, environmental auditing, etc. One of the important aspects of EIA is that, at least in theory, economic, social and environmental considerations are given the same weight, within the same timeframe for decision making purposes (Tortajada, 1999 a, b). It has been claimed that EIA is "one approach to integrating environmental issues into economic decision making and, as such, may prove to be a valuable tool for planning sustainable development." (MacDonald, 1994), or that it "is usually applied in support of policies for the sustainable and equitable use of natural resources and the prevention of environmental degradation" (Wramner, 1992). Furthermore, assessment of the contributions of a project to sustainability would require an analysis of the role of the project within an economic, environmental and social context (Sadler, 1994).

Regarding water development projects, sustainability may depend on how economic, social and environmental issues are approached during the planning, construction and operation of the projects. In order to ensure that the environment and the well being of the populations are protected, or even enhanced, because of present and future projects, EIA studies have to be prepared for all development projects. However, it has not been easy to define how and when water projects could be considered to be sustainable or unsustainable because of many reasons, among which is the difficulty to define sustainability in operational and quantitative terms.

Routine policies, highly centralised decision making, lack of appreciation of the social and environmental impacts of water projects, and the limitations imposed by near-total engineering mind-sets of the managers, all conspire to reduce the overall positive impacts of the water development projects. Thus, since the EIA studies are not appropriately conducted, and the senior managers have limited interest in such studies, there is limited recognition of the overall environmental and social consequences of the water development projects. In addition, heavy centralisation, absence of environmental expertise in the water ministries, lack of realisation of the senior management of the importance and relevance of environmental and social issues, absence of clear administrative processes, lack of modalities for social participation, etc., have all contributed to the poor implementation of the laws, even when they exist.

Absence of multidisciplinary approach is likely to result in the identification of only certain impacts, the magnitudes and distributions of which over the project area may not be accurate. As a result, an integrative approach to

EIA still remains prescribed primarily in the literature, rather than applied in practice (Sadler, 1994).

In other words, the environmental and social concerns could be internalised in the project planning process. Public participation and involvement is an important requirement for the environmental sustainability of water development projects. Stakeholders should be aware of the social, economic and environmental impacts of the proposed projects on their lives and the surrounding environment. Public awareness of the potential impacts of a project is essential. This awareness should be based on the consensus that all people affected by a project must benefit from it, and the environment must be protected. Public participation and environmental awareness are necessary to create a constructive atmosphere, within which the pros and the cons of any water development projects could be discussed (Thanh and Tam, 1992). The public participation could be passive or active, formal or informal. It could use methods like surveys, meetings, hearings, workshops, etc. However, unless the water ministries concerned believe in the relevance and importance of public participation, the whole process is likely to be superficial.

6.0 Southeastern Anatolia Project (GAP)

6.1 Characteristics of GAP Region

The Southeastern Anatolia Region of Turkey has been historically a low-productive plateau lying at the foot of the Taurus Mountains and drained by the Euphrates and the Tigris rivers. The region is rich in water, land and human resources. In terms of water, both the Euphrates and the Tigris rivers represent more than 28% of the surface waters of the country. The region has more than 20% of all economically irrigable land at the national level. According to the 1997 census, the ratio of working age population living in the area is above 48%. However, irrespective of all these strengths, the GAP region has lagged far behind the rest of the country in terms of development indicators such as per capita income, life expectancies, infant mortality rates, literacy rates, manufacturing activities and health and infrastructure facilities. As can be seen in Table 2, the region of Southeastern Anatolia remains at the bottom of the list in terms of Average Household Income (AHI). In other words, AHI in this region is far below other regions, rural sector and national averages.

Table 2. Average Household Income (1994) (000) Turkish Lira

	Household Percentiles (%)					
	Total	1 st 20%	2 nd 20 %	3 rd 20 %	4 th 20%	5 th 20%
TURKEY	165089	40095	71221	104089	157057	452984
Urban	202471	48915	82878	120133	181196	579231
Rural	117203	32668	59430	86709	127687	279523
Marmara Region	239787	51968	89508	128181	196046	733229
Aegean Region	146085	39349	70786	102936	152620	364737
Mediterranean Region	146279	38382	66211	96775	143261	386766
Central Anatolia	142171	36015	64743	97909	155616	356573
Black Sea Region	140000	35876	66255	96372	141094	360402
Eastern Anatolia	132151	41657	74585	107045	152792	284673
Southeastern Anatolia	99579	35268	55493	74192	103237	229703
Gaziantep	101991	40673	59067	80821	115120	214273
Diyarbakır	107073	36999	53810	70927	102654	270977

Source: State Institute of Statistics, 1994

Considering that household size is, on an average, larger in Southeastern Anatolia, it becomes apparent that the situation in per capita terms is even worse. Another indicator that supports this view is per capita GDP. The per capita GDP in the GAP region increased at the rate of 15.86%, slightly higher than the national average, at fixed prices in the period 1995-1998. 1994 Household Income Survey shows that Diyarbakır is one of the provinces where income distribution pattern is most distorted. In Diyarbakır, the average household income is 3,657 \$ at the exchange rate of the year 2000 (national figure is 5,503 \$) and the highest 20% of the population has a share of 51% in the total income of the province. In short, the per capita GDP of Eastern and Southeastern Anatolia at fixed prices is far below the country average in both 1995 and 1998 surveys (Table 3).

Table 3. Per Capita GDP in GAP Provinces According to State Planning Organisation and State Institute of Statistics Sources (at 1998 prices)

	1995	1998	CHANGE 1995-1998 (%)
TURKEY	1587953	1829754	15.23
Marmara Region	2355568	2667003	13.22
Aegean Region	1990537	2280039	14.54
Mediterranean Region	1506426	1712882	13.71
Central Anatolia	1484672	1708810	15.10
Black Sea Region	1099269	1366704	24.33
Eastern Anatolia	626339	673339	7.50
Southeastern Anatolia	854164	989641	15.86
Adiyaman	783250	808715	3.25
Diyarbakır	923766	997531	7.98
Gaziantep	1223659	1447224	18.27
Mardin	690868	827362	19.76
Siirt	655126	666821	1.79
Şanlıurfa	717702	877410	22.25
Batman	817617	1091508	33.50
Şırnak	345591	456412	32.07
Kilis	-	1718495	

Source: Report of the Social Working Group, New Regional Development Plan, GAP-RDA, 2001

According to a report (UNICEF, 2000), the group of provinces represented by Diyarbakır is the lowest and most slowly growing of all 14 sub-regions. Depending upon the province concerned, 21.8% to 44.7% of households in the region live under the line of poverty.

A comparative analysis (Table 4) shows that the most disadvantaged region of Turkey is Southeastern Anatolia, in terms of per capita and per household minimum food expenditures and per capita cost of basic needs (Erdoğan, 1997).

Table 4. Daily Poverty Lines and Poor Households in Terms of per Capita and per Household Minimum Food Expenditures and Cost of Basic Needs

	1	Average no. of HH members	Ratio of poor HHs %	2	Ratio of poor individuals %	3	Average no. of HH members	Ratio of poor HHs %
TURKEY	4.6	4.66	11	1.0	15	6.6	4.46	31
Marmara	4.4	4.15	5	1.1	7	7.3	4.15	29
Aegean	3.5	4.82	3	0.9	4	6.9	4.82	24
Mediterranean	4.2	4.52	7	0.9	11	8.5	4.52	29
Central	3.6	4.28	10	0.8	12	5.7	4.28	30
Black Sea	4.8	4.69	13	1.0	19	6.5	4.69	34
E. Anatolia	4.8	5.56	18	0.9	25	6.3	5.56	33
Southeastern	4.4	5.78	18	0.8	24	6.5	5.78	37

Source: Erdoğan, 1997

- 1) Poverty line by the cost of minimum food expenditures per HH, daily, US \$
- 2) Poverty line by the cost of per capita minimum food expenditures, daily, US \$
- 3) Poverty line by cost of basic needs per HH, daily, US \$

1994 State Institute of Statistics Income Survey pointed out that, among all regions, Southeastern Anatolia is the one where food security is lowest. According to another survey by State Planning Organisation (1996), the ranks of GAP provinces are (altogether 76 provinces); Gaziantep (25), Diyarbakır (57), Şanlıurfa (59), Adıyaman (61), Batman (65), Mardin (66), Siirt (68) and Şırnak (75). Kilis is out of this ranking since it was given provincial status after this survey. What is more important than these data is that there are some significant disparities among the provinces of the region as well (Table 5).

Table 5. Ranking of GAP Provinces in Terms of Their Socio-economic Development Status

Province	District	Ranking
Adiyaman	Centre	170
	Gölbasi	299
	Sincik	854
Batman	Centre	155
	Kozluk	711
	Sason	837
Diyarbakir	Centre	62
	Ergani	513
	Kocaköy	849
Gaziantep	Metropolitan Area	13
	Kilis	246
	Nurdağı	748
Mardin	Centre	179
	Kızıltepe	576
	Savur	834
Siirt	Centre	186
	Aydinlar	547
	Pervari	853
Şanlıurfa	Centre	105
	Birecik	458
	Harran	830
Şırnak	Centre	582
	Cizre	386
	Güçlükonak	857

Source: State Planning Organisation, 1996

As can be clearly seen in Table 5, the GAP region does not display a uniform character in socio-economic development. First of all, there is some differentiation on the basis of provinces having 'irrigable' and 'non-irrigable' land. Social-structural analysis points out to the existence of different sub-regions. Using the yardstick HDI (Human Development Index) we find that Gaziantep lost its place (25) and dropped to 42 after Kilis, formerly its district, was given provincial status (UNDP, 2000). Among all provinces, Kilis stands out as the one whose "income index" is highest while its "education index" remains at the bottom of the list. Looking at GDI (Gender Development Index), Gaziantep moves up from 42 to 41 and Kilis from 25 to 19. Among others, Şanlıurfa drops from 67 to 68 and Batman from 68 to 70 by the same index (UNDP, 2000).

Even though its economy is based largely on rain-fed agriculture, the productivity of the area has historically been low as a result of high unemployment, with seasonal agricultural out-migration and continued rural to urban migration (Ünver, 2000). Additionally, a major inhibiting factor for the economic development of this area has historically been the non-uniform distribution of rainfall (Harmancıoğlu et al., 2001). The highly erratic flows of the rivers have limited their utilisation, since a low monthly flow is only one-ninth of a maximum monthly flow, and a dry yearly flow is only one-third of a wet year flow (Altınbilek, 1997).

6.2 Water as an Engine of Development

However, it was the vast development potential of both the Euphrates and Tigris rivers which in the 1960s contributed to the idea of harnessing their water for irrigation and hydro power generation. Towards the end of the 1970s, the State Hydraulic Works (DSİ) planned a series of land and water resources development projects on these two rivers under the name of Southeastern Anatolia Project. DSİ, under the Ministry of Energy and Natural Resources, is the institution responsible for managing and developing water resources projects in Turkey. It is responsible for irrigation development, flood control, hydro power generation, provision of drinking water to the large cities of Turkey, and other associated water-related activities. According to the present plan, by the year 2010, the GAP Project is expected to generate annually 27 billion kilowatt-hours of hydroelectric energy, and irrigate 1.7 million ha of land, accounting for nearly one-fifth of the irrigable land of Turkey. This would be accomplished through the construction of 22 dams, 19 hydro power plants with a total installed capacity of 7500 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. The irrigated land would increase from 2.9% to 22.8% of the total area of the region, and concurrently rain-fed agriculture would decrease from 34.3% to 10.7%.

In 1989, it was decided that GAP would not only be a land and water resources development project but also a large-scale, multi-sectoral regional development activity. The project would focus not only on the economic growth based on infrastructural development, but also on the regional development taking into consideration industry, transportation, urban and rural infrastructure, environmental protection and social sectors like employment generation, health, education, capacity building, gender equity, etc. The main objective of the GAP Project would be to strengthen social, economic, institutional and technical aspects of human development in an economically disadvantaged region by significantly increasing the living standards of its people.

7.0 Environmental Impacts of GAP

In Turkey, the legislation for Environmental Impact Assessment was enacted in 1993. Since then, EIA studies have been prepared for all water projects, including dams. However, it was in 1992, even before the legislation, that the Environmental Impact Assessment Guidelines for Water Development Projects in Turkey were developed by DSİ, with the financial support of the United Nations Food and Agriculture Organisation (FAO) (Akkaya, 2001).

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, seismicity, sedimentation, ecology, human health, socio-economic conditions and cultural heritage (Harmancıoğlu et al., 2001; Chamber of Agricultural Engineers of Turkey, 1993; Development Foundation of Turkey, 1994; GAP-RDA, 1998; METU 1993, 1994; Sociology Association, 1994). The main environmental benefits of GAP Project 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 ground waters, salinity, waterlogging, sedimentation and erosion, increase in the use of fertilisers and pesticides, increase in the incidence of water-borne diseases, etc. (Harmancıoğlu et al., 2001).

In the specific of the irrigation activities, some of the mitigation measures proposed include the increased efficiency of the irrigation systems, including drainage canals, improvement in the irrigation techniques and reuse of the irrigation return flow and urban water in irrigation (Harmancıoğlu et al., 2001).

Due to the construction of the Atatürk dam, and the ensuing advantages in economic activities, some urban areas (e.g. Şanlıurfa) face an incoming population flux, with the attendant need for more housing, water, education, health services, and 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.

Environmental considerations need to be integrally incorporated within the physical planning projects of the GAP Project 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 ecosystem 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 (Tortajada, 2001).

8.0 Impacts of GAP on Sustainable Human Development

8.1 Effect on Small and Marginal Farmers

The ratio of farmers which did not possess land was around 40% in 1990, within the project area. However, some researches assume that this percentage gets smaller. Although not proven definitely yet, due to changes in the possession of irrigation areas and cultivation areas in the recent 10 years, this percentage has dropped to 23.5%, according to some researches (Turkish Chamber of Architects and Engineers, 2001).

The group of farmers having only small lands or no lands at all carry out agriculture by sharing the lands of others, a practice named "ortakçılık" (sharing the crop) or "kiracılık" (cultivation of the leased land), or "%30'culuk" (thirty percenters), when cotton farming is concerned. The ratio of crop sharing families carrying out agriculture on the lands owned by others was 27% in 1994, on the Şanlıurfa-Harran Plain which was opened to irrigation. This ratio is now 57% (Oklahoma State University et al., 1999). New irrigation possibilities naturally offer new advantages to the establishments possessing large lands, but this process also yields benefit to the small farmers cultivating the lands under possession of others as reflected in the trends concerning migration which we shall take up later. This benefit is either in the form of rise of income, or job opportunities in the case of families possessing no land. In parallel to growing irrigation possibilities, the number of landowners possessing large lands who move to cities grows too. A landlord thus becomes a 'businessman', dealing with trade in the city, who manages his land via agents of town or cities, who are crop sharers most of the time.

8.2 Change in Migratory Movements

Upon the introduction of intensive irrigated farming in some areas with 1995, migratory movements have started to display some changes. For example, the percentage of those moving to Hatay and to Adana for seasonal works dropped from 70% to 12%. According to some field surveys, rural settlements in Şanlıurfa started to receive population, contrary to the situation in other rural

areas, after irrigation was phased-in. This poses a significant case in which possibility of irrigation is directly related to demand for agricultural labour force.

According to analysis made by GAP Regional Development Plan, Agriculture and Rural Development Group, under the scenario "full irrigation", which means a land of 1.7 million hectares eventually opening to irrigation, the provinces of the region will have differing needs labour force within a period of 9 years. Table 6 below shows the demand for labour force in respective GAP provinces.

Table 6. Labour Force Need in the GAP Region With Full Irrigation

Provinces	Labour Force (Man/Year)
Adiyaman	52.695
Batman	37.078
Diyarbakir	200.352
Gaziantep	66.527
Kilis	25.752
Mardin	81.351
Siirt	21.181
Sirnak	44.339
Sanliurfa	304.634
GAP	833.909

Source: GAP-RDA, 1990

As can be seen in Table 6 above, "full irrigation" will create employment for around 834,000 people and Şanlıurfa and Diyarbakır will have a share of 60% in this employment.

8.3 Effect on Agricultural Productivity

The total production prior to irrigation amounted to US \$ 31.5 million with a crop pattern of mainly wheat, barley and some vegetables. The value-added was US \$ 60 per decar. With irrigation, cotton became the main crop with still some wheat and barley, and secondary crops were also introduced. The most striking change has been in the land used for cotton, increasing from 21% to 45%. With irrigation, production values rose to US \$ 121 million and the value-added per decar to approximately US \$ 182, both showing significant improvement in only one year. Value-added per decar increased 3-times and the annual per capita income increased from US \$ 1034 in 1994 to US \$ 3963 in 1995. This area is closely monitored to assess the impact of irrigation on different facets of life and economy.

Irrigation in Harran Plain (in 103,000 hectares of land) which started in 1995 yielded an output valued 98,262,000 US \$ as of the end of 1998 (Table 7). Total value of full irrigation in the GAP region is estimated as 3 billion US \$.

Table 7. Gross Agricultural Output Value (GAOV) and Value Added From Irrigation in Harran Plain as a Sample Area

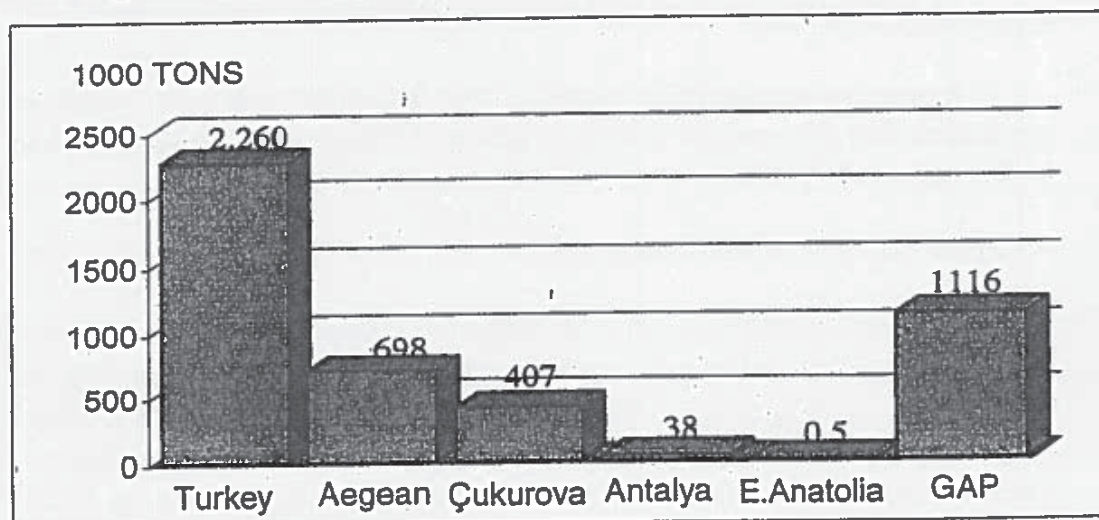
Year	GAOV*				Value Added**		
	Area (ha)	(million \$/year)	(\$/ha)	(\$/per)	(million \$/year)	(\$/ha)	(\$/per)
Prior to Irriga.	30 000	31.50	1 050	1 044	18.0	600	596
1995	30 000	65.4	2 180	2 168	49.8	1 661	1 652
1996	40 000	87.5	2 187	2 229	67.4	1 685	1 717
1997	60 000	125.8	2 097	1 896	100.6	1 667	1 516
1998	90 000	178.8	1 987	2 388	148.8	1 653	1 987
1999	103 000	99.0	1 932	2 185	160.1	1 554	1 748

* GAOV : Production quantity x Yield Price

** Value Added : Value of production – Production cost

Source : GAP-RDA, 2000

The most significant change has been in terms of cotton production in the region. Around half of Turkey's cotton is being produced here with only partial irrigation coming into force (Figure 1). The increasing cotton production has been responsible for increasing income levels of farmers.



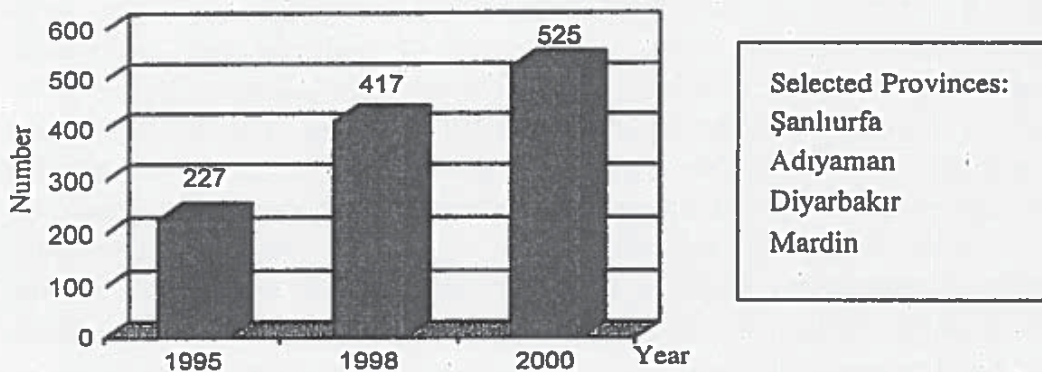
Source: Based on the Statistics Available with State Planning Organisation, 2000.

Figure 1. Region-wise Cotton Production in Turkey, 2000

Between 1990–1998, the growth rate of the Gross Regional Product (GRP) in Şanlıurfa was 9.15 %. When the added value created by Atatürk Dam and Hydro-electric Power Plant is deducted from the Provincial product value, the annual growth rate is about 6.75 %. In the 1990s, not only GRP but also population went up by rapid rates in Şanlıurfa. As the regional population had an annual rise of 2.5 % in 1990 – 2000, Şanlıurfa enjoyed an increase rate of 3.6% per annum. This represents an increase rate which is some 25 % higher than the one envisaged by the original Master Plan for the region (GAP-RDA, 2002). The developments in Şanlıurfa confirms the hypothesis that water resources development by provision of irrigation is the first and may be the absolute condition to make any major progress in the context of the regional development.

8.4 Effect on Industrial Development

The increasing prosperity in agricultural income has also stimulated increase in small and medium industrial enterprises. In selected provinces of the region (Figure 2) the number of industrial units grew considerably after part commissioning of GAP. Many of these are agro based industries like cotton processing, spinning, textile, food processing etc.



Source: Based on the Statistics Available with State Planning Organisation, 2000

Figure 2. Manufacturing Firms (with 10+ Employees) in Selected Provinces

This development has been accelerated by establishment of Entrepreneurship Support and Guidance Centres (GIDEMs¹) by GAP Administration. The original idea behind creation of GIDEMs has been to ensure that funds coming

¹ GIDEM in Turkish means Girişimciyi Destekleme ve Yönlendirme Merkezi.

as compensations for land expropriation and extra returns from irrigated farming find their ways to productive capital investment rather than being used for speculating. Another aim has been to help technology and capital transfer from other developed regions of Turkey and also from abroad to GAP region. The investment consultation and information provided by GIDEMs are summarised in Table 8.

Table 8. GAP-GIDEM Services (15 September 1997 – 31 May 2000)

	Areas of Invest.	Mac. and Equ.	Incentives	Financing	Other	Total
Adıyaman	143	106	102	91	106	548
Diyarbakır	88	163	111	126	146	634
Gaziantep	185	48	70	102	100	505
Mardin	142	98	75	68	132	515
Şanlıurfa	75	58	61	59	144	397
Total	633	473	419	446	628	2599

Source: GAP-RDA, 2000

Various projects in fisheries, clothing, farming equipments, food stuff processing have been realised with the help of GIDEMs, initiating some industrial activities in hitherto industrially backward region.

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 child-care, 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 would be organised in this second zone. The

first zone is mainly occupied by agro-industrial activities that are cotton-related, e.g., cotton ginning, textiles, cotton seed oil, etc. Prior to the construction of the Atatürk dam, these types of activities were extremely limited. These agro-industries are not only generating new employment that is improving the living conditions of many people but also are providing a major value-added service which were 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 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 (Tortajada, 2001).

While increasing industrialisation has ensured many benefits to the people of the region, it also is bringing 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 wastewater, and all of wastewaters are now discharged on the land adjoining the industries. Even though the Şanlıurfa industrial estate is 15 km away from the city, the discharge of wastewater could have major social and health costs in the coming years. First, even though Şanlıurfa is at a reasonable distance away from the industrial estate, ground water of the area may become contaminated with industrial wastewaters over the years. Depending on the gradient of the flow, the ground water of the region may become contaminated by industrial waste products, not only in Şanlıurfa but also in the different cities where similar industrial developments are being encouraged. Although, some new wastewater and sewage treatment plants are being commissioned in the region to meet with this situation.

9.0 GAP- A Paradigm Shift

It was felt by experts in Turkey that world-wide efforts over the last five decades had resulted, on one hand, in new methods, techniques, pioneering technologies, rational use of resources and hence output growth. On the other hand, these efforts had failed to prevent greater problems in social equality, environmental destruction and the general disruption of ecological equilibrium. These conditions make it necessary to seek alternative approaches to

development in general, and to development projects in particular. Hence, sustainable development was determined by the GAP-Administration as the conceptualisation of this new philosophical approach of the development efforts in the region. The ultimate aim of GAP is to ensure sustainable human development in the region. It seeks to expand choices for all people – women, men and children, current and future generation – while protecting the natural systems, which sustain life in all forms. The following sustainability goals have been adapted for the development process:

- Increasing investments to the optimal level which would accelerate the economic conditions.
- Enhancing health care and education services so that they reach national levels.
- Creating new employment opportunities.
- Improving the quality of life of the cities and improving urban and social infrastructure so as to create healthier urban environments.
- Completing the rural infrastructure for optimal irrigation development.
- Increasing inter and intra-regional accessibility.
- Meeting the infrastructural needs of existing and new industry.
- Protecting water, soil and air and the associated ecosystems as a priority consideration.
- Enhancing community participation in decision making and project implementation.

The main components of sustainability for GAP are: social sustainability, physical and spatial sustainability, environmental sustainability, economic viability and sustainability in agriculture and irrigation. In accordance with the sustainable development approach and strategies of GAP, special programmes and projects have been initiated to emphasise the human dimension of development through projects concerned with basic social services (education, health, housing), gender equity, urban management, irrigation facilities, agricultural and environmental sustainability, institutional and community capacity-building, and public participation.

As the GAP has progressed, we have applied the principles of sustainable development to a variety of activities ranging from marketing studies for new agricultural products to establishing women's community centres in poor neighbourhoods. We mention some brief case studies here and plan to use them as a springboard into the issues of integration at the local, national and international levels. In addition to these, there are dozens of other programmes and activities in sectors like agriculture, industries, health etc., which are being implemented for the development of the GAP region.

9.1 Gender Empowerment

Case: ÇATOM. Multi-purpose Community Centres (ÇATOMs-Turkish abbreviation) in the GAP Region are one of the results of the search for integrated and participatory alternatives for social change for gender-balanced development, a need which was identified by the survey "Women's Status in the GAP Region and Their Integration into the Process of Development". This survey was conducted by the Development Foundation of Turkey (TKV) in 1994.

ÇATOMs are community based centres established in poor urban neighbourhoods and in rural communities and provide a gathering place for women who otherwise would remain isolated.

They use a flexible and modular programme that uses social interaction and training to achieve the following short and medium-term objectives:

- Raise the literacy rate of women.
- Promote their awareness and provide information related to health issues.
- Increase knowledge of balanced nutrition.
- Train women in childcare.
- Improve women's income generating skills.
- Enable women to better express themselves.
- Promote skills and understanding of cooperative work.
- Help women become more aware of problems in their communities.
- Enhance self-confidence, and,
- Improve women's access to public services.

ÇATOMs only lay the groundwork and serve as a catalyst for the change process. The basic principle here is to show women what they can do under certain conditions, rather than dictating to them what they should do. It is the women themselves who decide what each local ÇATOM will become. The direct target group of ÇATOMs are girls and women from ages 14 to 50 who live in poor urban neighbourhoods or in rural areas. Activities conducted under ÇATOMs fall under three main categories: social, health and income generation programmes. All these activities contribute to an increased sense of co-operation, interaction and solidarity among participants. Women who participate in income generation programmes are encouraged to organise their work together. One outcome of this has been the project "Improvement of Income Generating Activities and Management Capabilities for Women in Southeastern Anatolia", with the co-operation of International Labour Organisation (ILO) in the provinces of Adıyaman and Kilis. Another project, "Start-Your Own Business" (SYB), aims to instil in women the idea of starting their own businesses, developing their management skills, improving employment and raising income levels. This project was started in 1999 with the participation of

31 women, who attended courses in entrepreneurship, business plans, marketing, legal procedures and insurance, enterprise visits, cost accounting, and the use of resource persons, and capital funds. As a result of this project, 24 of 31 women decided to start their own businesses in fields such as sewing, embroidery, sheep lots, day care centres, and snack bars. They developed concrete business plans and took steps for starting their business. The first enterprises that followed were "SYB Dowry" started by two women in Adiyaman province and an embroidery and textile workshop started on credit by two women in Kilis province. Now the present target is to replicate the SYB project in all other ÇATOMs.

Under the social programme, there are activities and meetings to promote the sense of community and an excursion through the region as per the request of participants. Since the objective is participatory community development, there are also meetings in neighbourhoods and villages where ÇATOM participants get together and discuss matters with the rest of their communities.

In addition to programmes conducted at ÇATOM centres and workshops, field staff are involved in home visits and consulting services to provide information, mainly in health and gender issues. During these home visits, field staff also have the opportunity to identify common problems, interests and needs of women for the purpose of developing further projects.

Although ÇATOM is basically a project focusing on women's development, it was decided in 1999 to diversify programmes and include men. The first experiments along this line include Saj (musical instrument) courses for men in the Şırnak province ÇATOM, and a "Training of Fathers" course in the Adiyaman province ÇATOM. There are also psychological counselling and guidance services being provided to fathers.

ÇATOM activities are guided by field personnel who have been recruited from among local high school graduate women and who receive periodic training. This model contributes to local capacity building. Since 1997 there have been efforts to form ÇATOM committees elected from among the members. These committees are envisaged as a means for ÇATOM women to take part in the management of relevant activities and so contribute to local capacity building and to help ÇATOMs to be fully self-sustaining organisations. In some ÇATOMs, the members of these committees have already started to function as development volunteers. As of May 2001, ÇATOMs services have reached around 45,000 persons. In 2001 alone, altogether 4512 people (3843 women, 371 men and 298 children) directly benefited from ÇATOM programmes (GAP-RDA, 2001b). Around 377 women benefited from income generating programmes such as kilim weaving, stone working, machine knitting, hair dressing etc. and health training was given to 1576 persons (including 120 men) in 2001.

A social impact assessment was conducted in 1998 (Development Foundation of Turkey, 1998) to evaluate the relevance, approach and methods of programmes and to assess the impact of ÇATOM activities on various sections of local communities. It was found that ÇATOMs have reached the poor at the bottom of social pyramid. One of the most meaningful outcomes of ÇATOM activities has been that the participants have started functioning as community health volunteers. For example, participants in Batman and Şırnak provinces ÇATOMs were assigned by the Directorates of Health to take part in their immunisation campaigns. It is a point of specific concern to ensure that all ÇATOM participants are capable of working as health volunteers and encouraging others in their communities to develop awareness of health, sanitation and environmental protection issues. Present trends are promising in the sense that ÇATOM participants have the potential to act as local community leaders and utilise available health services by others.

9.2 Producing More Food and Using Water More Productively

Case: Management, Operation and Maintenance (MOM) of irrigation systems. Traditional farming methods for rainfed lands don't make the best use of irrigation. Therefore, GAP has co-ordinated a project for the training of local farmers and their organisation into water user groups with the responsibility for planning among themselves their use of the available water. Major objective of the MOM model is to provide an institutional and organisational framework within which proposed management model can be replicated with following objectives:

- To maximise net benefits derived from irrigated agriculture.
- To ensure the financial and physical sustainability of irrigated agriculture.

A detailed delineation of this project has been done by another author in this volume.

10.0 Resettlement and Rehabilitation

In Turkey, the designated executing agencies for water and land development projects is 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 (Altınbilek et al., 1999a, b). 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. 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 exceeds the compensations offered, the differences are paid back to the owners. However, when it is the reverse, the owners are given a 5 year moratorium on the debt, followed by a 20 year interest free repayment period (Altınbilek, 1999a).

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 development, 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 from the Government training on new agricultural production methods. 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.

According to the State Planning Organisation of Turkey, many of the people who request financial assistance from the Government to be resettled, are generally landless or poor. Major land-owners, with large properties, generally prefer to receive cash compensations, and then use the compensations received to establish small industries or undertake commercial activities in the cities. It is fairly common to find in many instances that one part of a family whose land was expropriated moves to a city, but the rest prefer to stay on the land. The experiences indicate that many of the second generation of the families that decide to resettle in the cities and invest their money successfully, become entrepreneurs (Biswas and Tortajada, 1999).

Overall, the main problem for the relocation of populations is the scarcity of land so that a group of people from the same village could be resettled together, and not the availability of funds for compensations. Experiences from different water development projects from several parts of Turkey indicate that some people prefer to receive the appropriate financial compensations and then plan and organise their own resettlement in areas of their choice. People from the rural areas, mostly non-skilled and not familiar with the various investment opportunities that may be available, generally do not know how to manage properly their expropriation funds. Accordingly, they have often unwisely used the compensation funds received, and have later ended up with no house, no land, no job, and money. Thus, within a limited period of time, many of them have become destitutes, with economic and living conditions significantly worse than before they were resettled because of their own poor investment decisions and bad financial management. This is an important issue that needs further consideration in terms of the long-term economic efficiency of the process and the social acceptability of the resettlement practice. This, however, is not only a

problem limited to Turkey, but also for nearly all developing countries, for which proper solutions have to be found. In the final analysis, people who are to be resettled must have better conditions than before, since they are negative beneficiaries of the development projects (Altınbilek et al., 1999 a,b).

After a long series of discussions, a new approach to resettlement has been decided upon for the Seventh Five Year Plan in Turkey by the State Planning Organisation. The Plan mentions specifically that: "Laws shall be drawn up to plan and put into effect additional projects, such as environmental impact assessment and resettlement projects, which should run alongside and simultaneously with major construction projects". This Plan also makes clear that the organisation who executes the main construction project, like DSI, will be responsible for implementing the resettlement projects. This new approach also includes some remedial solutions for site selection problems associated with resettlement. Site selection is a very difficult problem at present. Experiences indicate that most of the existing state-own land is occupied by landless people, who have been living there for years. Removing them would mean their resettlement. On the other hand, expropriation of a current settlement is not a realistic solution since it would also result in further resettlement. Thus, one alternative would be to look for new approaches, other than the consideration of land-for-land strategy only. Thus, innovative solutions would have to be developed for case-specific conditions (Altınbilek et al., 2000).

10.1 Resettlement and Rehabilitation in GAP Region

In 1997, the GAP Administration, with the support of the United Nations Development Programme (UNDP) and the Food and Agriculture Organisation of the United Nations (FAO), initiated a project entitled "Planning and Implementation Project for Resettlement, Employment and Economic Investments for the Population Affected by the Birecik dam" (GAP-RDA, 1997). The main objectives of this project were to:

- Organise the affected populations so that they could express their own views and preferences in terms of selecting the areas where they could be resettled;
- Inform them of their entitlements in terms of the various resettlement laws;
- Advise them on how best the compensation money received can be used to generate stable and regular income on a long-term basis; and
- Support them to generate employment and/or income-generating activities in their new settlements.

During the survey undertaken for this project, the heads of more than 1,300 households were interviewed from a total of 200,000 people in 36 settlements. This population had already been affected by the construction of

three dams (Karakaya, Hancağız and Hacıhıdır), and would be further affected by four more dams that were under construction at the time of the study (Atatürk, Dicle, Kralkızı and Batman), as well as by another dam, Ilisu, that is likely to be constructed in the near future. Heads of villages and people working in the local government institutions were also interviewed with the objective of finding out their views on and concerns with the entire resettlement process. The results of these interviews indicated that compensation (both level and timing of payment) was their main concern, since even though 1052 families would be affected by the dam, only 131 families had received their compensation money.

The results of this survey reflected not only the problems faced by the Project Affected People (PAP) in terms of lack of funds because of delays in receiving compensations, but also the socio-cultural difficulties they had to face to adapt themselves and their families into their new living conditions. The lack of timely and proper implementation of the expropriation and the resettlement laws made the processes difficult, frustrating and time consuming. A fundamental problem that repeatedly was mentioned by the PAP was the lack of economic activities and unemployment for the displaced populations, which could result in socio-economic hardships for thousands of families. The PAP expected in general a more timely resettlement planning, better levels and timely payment of compensations, their effective participation throughout the decision making processes, including selection of sites where they could be resettled, support for employment generation, including self-employment, training and support for farming and animal husbandry-related activities, availability of low interest credit facilities, equitable land distribution, and so on.

Based on the results of this survey, it was clear that the adverse impacts of the construction of the Birecik dam in terms of resettlement could be minimised if the PAP were included in the planning and the decision making processes from the very beginning. In addition, compensations should be paid at appropriate levels on a timely basis and training and guidance services should be organised properly to ensure the channelling of the compensation funds to productive income-generating activities. If all these constraints could be simultaneously taken care of, the adverse socio-economic impacts of resettlement could be minimised on both short and long-term basis.

The GAP Administration thus decided to initiate a pilot resettlement planning project in the area that would be inundated by the Birecik dam. The primary objective was to initiate a new approach to resettlement, which would be more acceptable to the people whose lives will be disrupted by the projects constructed, and to ensure that the standard of living of the PAP is better than what they enjoyed before. The approach would be participative and consultative, wherein the target population would be considered to be an integral part of the resettlement planning and implementation processes, with good communication

and co-ordination between the governmental institutions involved and the people to be resettled. Due to the historical and the archaeological richness of the area that would be inundated by the project, the protection of the cultural assets was also considered to be a priority consideration.

10.2 Birecik Dam Resettlement Process

The Birecik dam is a multi-purpose dam, with emphasis on hydro power generation, ensuring a reliable supply of water for domestic, industrial and agricultural purposes. Flood control would also be an important benefit of the project. The annual electricity output of the dam is expected to be 2.5 billion kWh, and an area 700,000 decars (1 ha=10 decar), reaching up to the Syrian border, will benefit from irrigated agriculture.

The first step of the participatory resettlement process initiated by GAP Administration consisted of establishing communication with the populations affected and to find out their concerns so that the social, economic and spatial preferences of the people affected, could be defined. The details of population settlement affected by Birecik dam are shown in Table 9. Surveys in 13 settlements were carried out over two years, which resulted in responses from 1307 families. Concurrently, open meetings were organised in the different settlements in order to establish a direct dialogue with the populations. This was also a confidence-building measure. During all these meetings, villagers were given appropriate information on both compensation and resettlement practices, their legal rights and obligations, and overview of resettlement experiences from both within and outside the region.

Table 9. Settlements and Population Affected by the Birecik dam

District	Settlement	Population (1997)	Area (decars)	Plots affected	Level affected
Birecik (Ş. Urfa)	Meteler	171	3457	190	Fully
	Altınova	1595	311	14	
	Surtepe	312	22	37	
	Geçittepe	173	3034	219	Fully
	Keskince	946	6718	555	Fully
	Dorucak	549	625	75	Fully
	Ayran	2592	821	95	
	Sub-Total	6228	14988	1185	
Halfeti (Ş. Urfa)	Kavaklıca	464	2510	289	Fully
	Sırataşlar	817	568	65	
	Bulaklı	307	2	1	
	Kayalar	522	423	3	

Table *conid.*

District	Settlement	Population (1997)	Area (decars)	Plots affected	Level affected	
Halfeti (Ş. Urfa)	Bozyazı	906	355	9	Fully	
	Gözeli	890	762	7		
	Saylakkaya	843	223	2		
		Savaşan	299	597	41	Partly
		Çakallı	573	690	28	
		Merkez	2560	2322	232	Partly
		Sub-Total	8181	8452	677	
Bozova (Ş. Urfa)	Kırağılı	326	158	11	Partly	
	Killik	604	639	11		
	Ürnlü	855	83	4		
	Irmakboyu	532	707	28		
	Özgören	307	1161	18		
	Karapınar	154	131	12		
	Sub-Total	2778	2879	84		
Nizip (G. Antep)	Kavunlu	422	4312	572	Fully	
	Samandöken	291	1120	40		
	Keklik	180	1561	308		
	Toydemir	193	131	12	Fully Partly	
	A.Çardak	813	3927	772		
	Y.Çardak	285	1002	221		
	Erenköy	563	1916	412		
	Gümüşgün	220	1384	354		
	Kamışlı	412	929	46		
	K.Meydanı	114	1510	159		
	Sub-Total	3493	17792	2896		
Yavuzeli (G. Antep)	Kasaba	284	605	94		
	Sarılar	1473	432	9		
	Sub-Total	1757	1037	103		
Araban (G. Antep)	Elifköy	2595	317	5		
	Fıstıklıdağ	715	949	16		
	Hisarköy	880	490	14		
	Tarlabaşı	109	396	7		
	Çiftekoz	310	100	0		
	Sub-Total	4609	2252	42		
Besni Merkez Merkez (Adiyaman)	Kızılın	2140	642	28		
	Gümüşkaya	1610	837	35		
	Akdere	1175	667	34		
	Sub-Total	4295	2146	97		

Source: Yaşınok, 2000

The populations were specifically informed on the criteria for evaluation of their properties, and on how the valuation committee would price their resources and assets so that the total compensation could be determined. They were advised to point out certain specific characteristics of their assets and

resources to the valuation commission, which would ensure that they receive higher, but just levels of compensations. This was a totally new process, since these types of information and support were not available to PAP in any earlier project in Turkey. This campaign to inform the people of their rights and how valuations would be made, generally resulted in the families receiving higher levels of compensation than otherwise may have been the case.

The people who decided to be resettled in the project area, worked jointly with the concerned governmental institutions to identify the locations of their new villages. In addition, a Multipurpose Community Centre (ÇATOM) was opened by GAP Administration in Halfeti District Centre, with the objective of providing information on a regular basis and establishing regular communication with the settlers. The information provided included an overview of the impacts of the Birecik dam at the national, regional and local levels; how it would affect the local populations directly and indirectly, expropriation, compensation and resettlement-related issues; preferred locations for their new settlements; types of housing they need or could expect, etc.

In terms of compensations, the resettlers had several alternatives to choose from. They could either opt for cash payments and then be responsible for their own resettlement, or request the authorities concerned to use the cash amount to facilitate their resettlement. Generally, however, it appears that the people preferred to resettle as a group in areas near to the original settlements with which they were familiar with. Settlers who requested cash compensations were paid the amounts stipulated by the law, although there were considerable delays in receiving such payments in many cases. They also received support from the government for the construction of their new villages. Some people preferred not to accept compensation in cash, but requested instead that the authorities construct their houses and infrastructural facilities. Other resettlers decided to accept their compensation amounts in cash and then resettle in urban areas of choice by themselves, while some others requested the support of the government to move into urban areas, and thus forego the cash compensation alternative.

Through the participation, information and communication strategies, the villagers were made fully aware of their rights and financial entitlements under the Turkish compensation and resettlement laws. The population was given all the relevant information on the criteria by which their land and properties would be assessed for expropriation by the government, and thus the levels of compensation they could expect. The GAP Administration staff advised them as to which aspects of their land and properties should be specifically shown to the assessors so that they received proper compensations. The villagers followed these advices, as a result of which their compensation payments were assessed at

correct levels, which were higher than the initial estimates prepared by the government. The final appropriation cost was, thus, higher than the initial estimates, which were based on earlier resettlement experiences, when people did not have much information on how their properties would be assessed by the government. Unfortunately, it appears that this was not appreciated by some of the relevant institutional authorities who were partners of the GAP Administration in the resettlement process. Payments of higher compensations, thus, became an important element which directly contributed to confidence building with the local populations. Such results of the awareness-raising aspects of the participatory process can generally be considered to be positive.

In order to learn from their own approaches, the GAP Administration carried out an internal evaluation on "the planning and implementation project for resettlement, employment and economic investments of the population affected by Birecik dam" (GAP-RDA, 2000b). Following it, an independent study was also conducted to evaluate the resettlement process due to the Birecik dam and of the salvage operations in the city of Zeugma.

The main lesson of this resettlement process is the fact that the populations were consulted, informed and supported before and throughout the resettlement period by the government, which contributed to the confidence building between the populations and the related agencies. There were also handicaps, which were mainly due to shortages of funds, delays in execution, and the lack of co-ordination between the several governmental agencies in charge of the different tasks.

11.0 Conclusion

The importance of water development projects for the socio-economic development of developing countries cannot be denied. However, there are several important issues which need equal attention. Many governments have failed to identify and minimise the social and environmental negative impacts resulting from the construction and operation of large projects. In addition to this, irrespective of the importance and the necessity of actively engaging the affected populations in the decision making processes, these have been many times ignored in the past. It is only recently that involuntary resettlement is being recognised as a development process and not simply as a salvage operation as has often been the case in the past. Participatory resettlement, as initiated in the Birecik dam, is a step in the right direction and needs to be replicated else where as well.

As we have seen that GAP has been conceived and implemented as a means of integrating water resources development with overall human development in the poorest and most backward regions of Turkey. The strategy

aims at bridging the hiatus between physical, spatial development and the human centred development. Despite constraints and challenges initial results have justified it not only as a tool for meeting physical progress and achievements but also as an instrument for *Social Engineering*. It has sought to resolve the dichotomy between the dominant interventionist paradigm of development and participative and decentralised model, by using a balanced sustainable strategy of integrating the water resources development with overall socio-economic development of the region, in a just and equitable way.

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