Eidgenössische
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Ecole polytechnique fédérale de Zurich
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Seminar for Doctoral Students at the ETH Zurich

Sustainable Management of International Rivers

Case-Study: Southeastern Anatolia Project in Turkey – GAP

Atatürk dam: Electricity 8900 GWh/a, 50'000 displaced, Republic of Turkey, Ministry of Foreign Affairs http://www.mfa.gov.tr/grupd/dc/dcd/gap.htm

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Online: http://www.eawag.ch/research_e/apec/damsworldwide_e.html
, 2. Version: 07.02.2001
All comments are welcome

Abstract

The Southeastern Anatolia Project, GAP, is one of the largest dam projects in the world. The project was launched by the Turkish government in 1977. It comprises about 20 dam projects combined with hydro power plants in the southeastern mountains - the Kurdish part of Turkey. In this paper we focus on four key questions linked to the project:

1. What are the economic, environmental and social impacts of the project on Turkey? During the past 25 years in which GAP was being implemented, many ecological and social problems came up that remain unresolved. The lack of a transparent information policy prevents good assessment of these problems. Economic welfare hoped for in the southeastern region has not been realised so far.

2. How big is the contribution of the GAP hydro power plants to the whole Turkish electricity production – are there alternatives? 60% of the planned GAP hydroelectric power plants are running. Their contribution amounts to 15% of the total electricity production of Turkey. Alternatives would be the improvement of distribution systems, wind and photovoltaic power plants, but none of them have been considered so far.

3. What is the state of international relations between Turkey, Syria and Iraq due to shared water resources? There are no binding agreements and relations are tense. Open violent conflict is unlikely however, as Turkey the upstream riparian state is the most powerful state in the basin.

4. How is the international community involved in the financing of the GAP project? As the GAP project develops, the financing by foreign private companies is becoming increasingly important. This goes hand in hand with a loss of control by the Turkish government. Countries involved in financing these projects (e.g. Switzerland) become co-responsible for the success, failure and international implications of such projects.

We have included a wide range of issues in this paper to demonstrate the different interests and positions connected with such a “mega-development” project.

Content

1 Introduction

This report is the result of a group work in the Seminar *Sustainable Management of International Rivers* of the ETH Zurich. The subject of the report is the Southeastern Anatolia Project in Turkey (GAP). We have examined the political, social, environmental and economic aspects of this project from three different points of views: local, regional and international.

1.1 Overview of the GAP project

The Southeastern Anatolia Project, or GAP using its Turkish initials, is the largest development project ever undertaken by Turkey, and one of the largest of its kind in the world.[1] The scheme includes 13 major projects, primarily for irrigation and hydropower generation. GAP is planned by the State Hydraulic Works (DSI). The project envisages the construction of 22 dams and 19 hydroelectric power plants on the Euphrates and Tigris rivers in the Kurdish part of Turkey. The ultimate plan is that 17.600 km^2 of land will be irrigated and 27.300 GWh of electricity will be generated annually. By June 1999 about $ 32 billion[2] had been spent on the GAP project.

The decision to use water resources for economic development had been taken by Atatürk, the founder of the Republic of Turkey. At that time, as the country embarked upon an ambitious transformation and development program in economy and culture, the need for electric energy emerged as the most urgent priority. Thus the Electric Works Studies Agency was established in 1936 upon Atatürk's instructions in order to produce electrical energy from unexploited water resources. Between 1950-1960 drilling works were carried out by the Electric Works Studies Agency on both the Euphrates and Tigris. The State Hydraulic Works (DSI) was set up in 1954 as new requirements emerged. Principles were proposed for the utilization of the Lower Euphrates and Tigris basin. In 1977 the government decided to unite both projects under the title "Southeast Anatolia Project".

Figure 1 Map of Turkey indicating the region of the GAP project. It can be seen that the transboundary rivers Euphrates and Tigris flowing to Syria and Iraq are involved. CIA, The World Factbook http://www.odci.gov/cia/publications/factbook/geos/tu.html.

[1] Embassy of the Republic of Turkey, Washington D.C., http://www.turkey.org/

[2] RiverNet, European Rivers Network, The Ilisu dam project http://www.rivernet.org/turquie/ilisu.htm, Southeastern Anatolia Regional Development Administration http://www.gap.gov.tr/English/Frames/fr1.html

1.2 Structuring the Case Study – key questions

1. What are the economic, environmental and social impacts of the project on Turkey?

2. How big is the contribution of the GAP hydro power plants to the whole Turkish electricity production – are there alternatives?

3. What is the state of international relations between Turkey, Syria and Iraq due to shared water resources?

4. How is the international community involved in the financing of the GAP project?

These questions will be answered regarding the entire GAP project. Question two and four will also focus on the Ilisu dam, which is one of the largest parts of the GAP project to be realized in the near future.

1.3 How did we get the information?

Many of our sources were published on the internet. Swiss and Turkish newspapers and different books were considered as well. Additionally letters to ABB Alstom, UBS, VA TECH Escher Wyss (Sulzer Hydro) and the State Secretariat of Economic Affairs (SECO) provided us with statements from Swiss companies and authorities recently involved in the GAP project. In addition we asked the opinion of international experts in relation to some specific questions. After the first version of our Seminar work had been written (16.06.2000), we had the chance to discuss various aspects with Peter W. Silberschmidt, the Managing Director of the Swiss Export Risk Guarantee Agency. We would like to thank him here for the very interesting and animated discussion. Based on this talk we have adapted various points that are included in this second version.

2 Answers to the key questions linked with the GAP project

2.1 GAP Project and local impacts in Turkey

"What are the economic, environmental and social impacts of the project on Turkey?"

2.1.1 Economic impacts

The main objective of the GAP is to reduce regional economic inequality between the West and the underdeveloped south-east area of Turkey by mobilizing regional resources, increasing productivity and creating employment opportunities for the local people. The ultimate aim of increasing per capita income is to encourage political and social stability in the region.
The GAP region comprises nine provinces - Gaziantep, Diyarbakir, Sanliurfa, Mardin, Adiyaman, Batman, Kilis, Sirnak and Siirt, the project covers an area of 74,000 km^2. The GAP project includes irrigation and domestic water supply projects and hydroelectric energy plants. Seven projects are located in the Euphrates river basin and six are in the Tigris river basin. It is expected that on completion, the GAP will:

- regulate 28% of Turkey's total water potential and
- enable 1.7 million hectares to be irrigated, approximately 50% of the total irrigated area in Turkey.

Economic development in the region is expected as a result of improved irrigation so that the region can contribute to, rather than be a burden on, the national economy. The objective is to encourage commercial farming in order to develop the production of cash crops and agro-industries, such as food processing for export [3].

Karakaya and Ataturk dam together generate a considerable share of energy entering into the interconnected system. Since the phasing in of these two dams on the 15 September 1999, the cumulative energy production has been about 155,000 GWh (Karakaya Dam : 94,800 GWh and Ataturk Dam: 60,400 GWh). The monetary value of energy generated by Ataturk and Karakaya dams is equivalent to 9.3 billion US Dollars. Expressed in terms of alternative sources of energy, this amount corresponds to the fuel importation of 38.8 million tons of oil or 30 billion cubic meters of natural gas. For further details about electricity production in Turkey, focusing on the GAP Project see section 2.2.

The total population of the region is 5.2 million – 9.2% of the total Turkish population (1990 census). Urbanization has been rapid in recent years and 56% of the population live in urban areas. The fertility rate in the region is high at 5.7%, compared with the national average for Turkey of 3.4%. Southeast Anatolia is the third largest agricultural region in Turkey, with a total land area of 7.4 million hectares, of which 40% is under cultivation. Currently 129,740 hectares are under irrigation and 2,628,700 hectares are dry farming. However, agriculture is not highly mechanized in this area. Only 4.9% of tractors in Turkey are found in the Southeast, which compares unfavorably with other regions such as the Aegean, which has 9.8% of the national area under cultivation but 19.9% of all tractors. Due to particularly long summer droughts, the traditional dry farming crops of the region are wheat, barley, lentils, sesame and chickpeas. Where there is irrigation, cultivation of cotton, tobacco and other commercial crops is common. Currently only 7% of the potential cultivable land is being irrigated, but following completion of the GAP, this will rise to 53%. Irrigation is essential if production is to increase and product variety is to be encouraged.

[3] Southeastern Anatolia Regional Development Administration http://www.gap.gov.tr

The GAP project was scheduled for completion in 2010, but the deadline has now been postponed until 2047 due to financial problems[4]. Former State Minister Salih Yildirim has stated that the economic steps do not fit the regional realities and several mistakes have been made in determining the priorities of the region. He has pointed out that "politicians put their political calculations before the realities in the region"[5].
Up until the 56th Turkish government, 8 economic plans have been put in place for the GAP project. In these plans the following goals were set forth

- To ameliorate the adverse conditions in this region
- To support the unfinished construction of projects
- To speed up the financing and development of resources
- To improve the private sector
- To give low interest credit to investors
- To support the return of the people to their own villages
- To give free land to the companies that employ more than 10 people
- Not to tax companies that have employees for three years or more

However, these goals have not been reached yet. After Ocalan, the leader of the PKK, had been arrested, the government tried again to give more importance to the GAP project by implementing economic measures for the development of the region. These measures, however, have not yet been put into practice. The percentage of functional illiteracy (ca. 40%) in the region is twice as high as in the rest of the country. The unemployment rate remains very high. Land reform, which was aimed at abolishing the feudal structures in Southeast Anatolia and distributing income more equally, has not been realized. This issue had already been a matter of grave concern in Ataturk's time. Still land lordship prevails, only 3.3% of the regional population owns land-units greater than 500 hectares. Furthermore 40% of the population have no land at all[6].

Currently only 40% of the project is completed. To complete the GAP by 2010, 900 million US$/year would have to be invested. In 1999, however, only 450 million US$ were invested. So this is likely to cause a 15 year delay in implementation for energy, 37 years for agriculture and 25 years for the region's infrastructure.
A law to encourage investments in 11 cities was extended to 22 cities. Investments, however, focused more on the larger cities and often did not reach the cities where real necessities are present. The main objective of the law was to enhance the situation in cities where economic and social indicators are very low, such as Tunceli, Mus, Bingol, Agri, Sirnak. Gaziantep, for example, alone received 35% of the total encouraged investment. If the government had provided the same possibilities for every region, the economic gain in these regions would have been much greater [4].
Government plans are launched each year to assist these developing cities. In 1999, for example, Ecevit presented a plan of dividing a budget among the cities to enhance development and complete buildings which were half constructed. Due to the number of the cities, however, the investment plan was not sufficient (40 trillion Lira). In Diyarbakir alone, 10 trillion Lira are needed to complete the construction of buildings. With this construction, job opportunities for 14,000 people could be created.
Investment in hydropower energy was completed successfully but the plan for agricultural investment is still unfinished. The percentage of the total investment in irrigated agriculture was

[4] Turkish Newspaper, Cumhuriyet, 18.02.1999, p.4 http://www.cumhuriyet.com.tr
[5] Cumhuriyet, 18.02.99
[6] Cumhuriyet, 18.02.99

11.9%, of which 6% have been invested in the Euphrates area and 5% in the Tigris area. If completed, a total of 1.7 million hectares land will be irrigated.
On the 13th April 1999, there was an agreement for establishing a "GAP Free Trade Region". This was to attract (foreign) capital but it is probably not helpful for workers or for Turkish private investment.

GAP re-evaluation: After observing that GAP had not led to the expected enhancement of physical and economic structures and further that social goals had not been met, a first meeting was held in Diyarbakir under the name of New Revision of GAP. Olcay Unver, the head of the GAP project, said that when the GAP master plan is considered in the light of the necessities and priorities of our time, adaptations are needed. For this reason the participation of the public and private sectors was solicited. GAP had been planned according to the possibilities and priorities of 1989 with the aim of improving water and energy resources. Since then, however, the perspectives of regional development have changed. The idea of sustainable development has also gained importance and has become a global priority. The original GAP master plan was directed at the macro level in the region. However, now it has been realized that GAP must have a stronger pragmatic approach and it must take the regional requirements into consideration[7].

2.1.2 Environmental impacts

Erosion, sedimentation, salinization

The total GAP region is 7.4 million hectares, 5.5 million hectares of these are affected by moderate to very intensive water erosion. This area is volcanic and steep and erosion has been significant enough to expose underlying sub-soils and rock structures. An area of 4 million hectares now has a problem with this increased bedrock exposure. Farmers, however, still attempt to cultivate their land by removing the stones.
Because of improper and excessive irrigation there has also been an increase in salinization. In the GAP region 150 000 hectares in the Harran valley face the problem of aridity due to salinization and irrigated agriculture only started in this region in 1995[8].
Erosion has also resulted in sedimentation, 10% of the volume of the Ataturk Reservoir has been filled with sediment. However, complete sedimentation will take 500 years in this reservoir because of the Keban and Karakaya dams which are located above the Ataturk dam. This differs from the sedimentation rate of other dams in Turkey, many of which only have a 50 year life-span[6].
Soil erosion, due to insufficient forests and vegetation cover, is also a problem in the GAP region. Together these reasons explain why 72.3% of the region is facing intensive soil erosion[9].

Wastewater treatment

Wastewater from the surrounding areas flows directly into the Ataturk dam reservoir which is used as a drinking water source. However, there is not enough data to evaluate the situation. Experience with reservoir projects indicates that present health education programs and the setting up of laboratories will not be sufficient to protect the affected people from waterborne diseases[10].

[7] Cumhuriyet, 16.04.00
[8] Cumhuriyet, 30.12.98
[6] Cumhuriyet, 30.12.98
[9] Cumhuriyet, 01.04.99
[10] Cumhuriyet, 03.10.99

2.1.3 Archaeological impacts

There are some settlements of historical importance in the region that will be submerged by the construction of dams. For example, the Birecik Dam would flood Zeugma, Apamea, Urima and Halfeti.

The planners indicate that only 2/5 of Halfeti will be under water. It was also decided that water from this dam will be used as drinking water, not only for irrigation and energy. Because of this, the rest of the settlement cannot survive because of the laws about the protection of drinking water sources. So people from this area would have to relocate[11].

Zeugma contains the historical relics from the Hattiti, Asur, Kommagene, Roman and Byzantine periods. Rescue excavations are discovering many significant archaeological findings but due to time limitations they cannot rescue all of them. Archaeologists demanding additional time were told that this would result in a 30 million dollar loss[12].

Except for the town citadel and its castle and palace, Ilisu Dam will submerge Hasankeyf, a first degree archaeological site. Other structures, which are unique to the region such as monumental bridges and many man-made caves carved into the rocks, will be lost under the Ilisu Dam Reservoir. Excavations were started in 1991, but after 2 archaeologists were killed, they stopped for 7 years. The excavations resumed, but the head of the excavation, Professor Olus Arik estimated that for the completion of all the excavations 50-60 years would be needed because the amount of movable ruins were few and even the transfer of the movable ones would take 8 years[13].

2.1.4 Social Impacts

In this region, the majority of inhabitants are of Kurdish origin, but are bilingual (Kurdish and Turkish). The elder generation in this region mainly speaks Kurdish.

Unequal distribution of land

The most distinguishing feature of the GAP region is the large-holding landowners in a country characterized by small family farms. This is because land was given to tribal leaders for political support during the Ottoman Empire. These land holdings have since been passed on down the family line. There are many villages in which one or relatively few families own all the cultivated land, with the land of some families extending beyond a single village boundary. Approximately 32% of all large holdings in Turkey are located in the southeast where 231 families and 96 extended families own entire villages and where 30% of the households own no land. Small and medium sized landowners have struggled to compete with the neighboring large holdings which have access to mechanization, more capital and the market.

The position of the women

Women in this region have a marginal position and are not permitted to inherit land or property and therefore they do not receive individual compensation during resettlement. There is a general cultural belief that land should be passed down to sons and not daughters even though the Turkish Civil Code states that land should be shared and inherited equally by both men and women.

Not enough information and education

In the GAP irrigation canals, 100 people have been drowned in about 5 years. On the Euphrates, irrigation began on Harran and Urfa in 1995. Since then, people, especially children, entered the canals to refresh themselves or they fell into the canals accidentally. Families who lost their

[11] Cumhuriyet, 28.10.99
[12] Cumhuriyet, 24.05.00
[13] Cumhuriyet, 16.07.99

children and farmers using the canals began to argue over this issue. The families wanted to stop the water in the canals temporarily in order to search for their children, while the farmers were against this (temperature: 47^0C)[14].
With the completed construction of Birecik, 46 settlements will be submerged under water. The UNDP (United Nations Developmental Program) continues to work on the settlements where people are affected. Approximately 32,000 people live in this area and 50,200 hectares will eventually be under water. The UNDP program will try to reduce negative economic, cultural and physiological effects to minimize the impact of the relocation of the population.

Displacement of people

"Article 46 of the Turkish Constitution states that involuntary displacement comprises expropriation and resettlement. Resettlement is regulated by two main laws – the Expropriation Law (No 2942) and the Resettlement Law (No 2510), which make provisions for state-assisted resettlement in both rural and urban areas"[15].

The involuntary resettlement of rural and urban populations was necessary for 9 large dams. As is shown in the table, 143,530 hectares of land have been expropriated. A total of 88 sub-villages, 4 districts and a town are affected by the dam projects. 87% of the families have opted for self-resettlement and only 13% have requested government-assisted resettlement.

[14] Cumhuriyet, 14.07.99

[15] The UK's Official Export Credit Agency: Ilisu Hydroelectric Power Dam in Turkey. Government-commissioned reports examining the issues surrounding the Ilisu Hydroelectric Dam, 2000. p.5
http://www.ecgd.gov.uk/downloads/ILISUfinal.pdf

Table 1 Population displacement, Area of Land Expropriation by Type of Resettlement in GAP Area (General Directorate of State Hydraulic works (DSI)[16])

DAM	Expro-priated Area (ha)	No of Districts, Villages, Sub-villages	Total Pop. Displaced	RESETTLEMENT			
				Population opting for Govt. Assisted Resettlement	% of Total	Population opting for Self Resettlement	% of Total
Ataturk Completed	43 400	1 district 34 villages 85 sub-villages	55 300	2 508	5	52 792	95
Batman Completed	2 410	17 villages	10 854	1 582	15	9 272	85
Birecik In progress	5030	1 district 44 villages	31971	6500	20	25 471	80
Cat Completed	1 430	7 village 3 sub–villages	4 000	1 965	49	2 035	51
Dicle In progress	1 240	1 district 19 villages	2 875	343	12	2 532	88
Karakaya Completed	29 800	105 villages	45 000	3 999	9	41 001	91
Karkamis in progress	1 165	1 district 12 villages	15 000	Under Construction	-	-	-
Keban Completed	62 000	174 villages	30 000	6 487	22	23 512	78
Kralkizi In progress	2 085	14 villages	2 732	21	23	2 711	77
Total	193 076	4 districts 382 villages 88 sub-villages	197 732	23 405	13	159 326	87

Source: DSI, GAP, 1999

People who are to be displaced are faced with two resettlement options. They can either ask for monetary compensation for the assets they will lose (self-resettlement), or they can ask for government-assisted resettlement, this is a package which includes new housing in a designated receiving area and assistance in restoring the pre-resettlement income.

"The State provides loans for the resettled population to cover the cost of the housing and land that is allocated to them. The sum loaned has to be paid back within 25 years in 20 equal installments, with no payment for the first 5 years. In rural areas the resettled receive a house, land and rehabilitation whereas in urban areas they will receive only housing under government-assisted resettlement. The government's policy is to aim for an arrival site not further than 50 km from the population's present location to mitigate adverse effects of resettlement. Various measures are undertaken to ensure that pre-displacement income can be restored if not improved as part of the redevelopment policy. In rural resettlements this includes assessment of land quality in the receiving area through soil analysis to ensure potential productivity. Different forms of government assistance include technical assistance with farm land (such as land leveling), livestock, farm equipment, inputs and access to credits"[17].

Three main government institutions are involved in the resettlement: the General Directorate of State Hydraulic works (DSI), the General Directorate of Rural Services (KHGM) and the GAP Regional Development Administration. The DSI's Real Estate and Expropriation Department is

[16] The UK's Official Export Credit Agency: Ilisu Hydroelectric Power Dam in Turkey, 2000. http://www.ecgd.gov.uk/whatsnew/data/ilisufinal.pdf

[17] The UK's Official Export Credit Agency: Ilisu Hydroelectric Power Dam in Turkey, 2000. http://www.ecgd.gov.uk/downloads/ILISUfinal.pdf

responsible for the implementation of expropriation and compensation for immovable assets in reservoir areas. The General Directorate of Rural Services is responsible for the resettlement, which includes preparing sites and infrastructure (construction of housing, roads and so forth) for the arrival of the displaced people. The DSI and the KHGM work together. The GAP directorate acts as the project coordinator, but its links with the DSI seem to be weak.
The majority of people who have chosen compensation under the various resettlement programs have faced many problems in the urban areas where they are newly settled. Moving from a village environment where there is strong social support is both psychologically as well as culturally disruptive. To deal with cash was exciting for poor farmers. But many of them had never had cash in their hands before and they also had no experience about financial management, unlike many of the landowners who own property in cities and have experience in dealing with financial issues.

As a planner from the GAP regional office explained:
"We had a very bad experience with the Ataturk dam. People did not get their money on time. Some spent their money on gambling, others went and blew it all. They did not know how to spend well. Some left their money in the bank, but because of high inflation rates (more than 100%) their money quickly devalued. Others started businesses but lacked experience and lost everything. There were others who started joint ventures. Because in the villages everything is based on trust, they thought that they could have joint ventures based on trust in the cities too. But it's not the case and as a result they lost out"[18].

The Sociological Association for GAP Resettlement (1994) made an analysis of the experience of other resettlements under GAP. 67% of those who have already been resettled and 88.6% of those who opted for expropriation compensation would like to return to their original villages.
The majority of families who have been affected by other GAP dams are not satisfied with their new settlements. 63% of those who have been resettled by the state and 74% of those who accepted compensation are unhappy. Most of them showed the inadequate level of income as the main problem for their dissatisfaction.

"Compensation is not only considered to be insufficient by most households who resettle in urban areas, but the majority also believe compensation was not equal to the real value of the expropriated property. Many families have opened cases for reassessment, a process that takes 2-3 years, and most win their appeal. In many cases delays in actual payment have resulted in limiting investment capacity and loss in real terms as a result of high inflation"[19].
Unemployment in urban areas is also a serious problem. Most settlers in the cities suffer from economic problems and rural settlers have problems of adapting to their new situation (unsuitable locations, housing that is not suited to rural life, lack of good quality fertile land and few employment opportunities). Higher living costs cause problems for those who have to change their consumption patterns. Fruit and vegetables originally grown in subsistence farming, for example, now have become commercial goods that households have to buy. A higher level of income is therefore required to restore old standards of living.

"People who have been resettled by the State and provided with housing tend to react negatively to their new physical environments and limitations to their mobility according to the Sociological Association. Complaints about the housing provided are that it is suitable for urban and not rural ways of life. Problems of communication and integration between the host communities and

[18] The UK's Official Export Credit Agency: Ilisu Hydroelectric Power Dam in Turkey. Stakeholder's Report, p. 16 http://www.ecgd.gov.uk/downloads/ILISUfinal.pdf
[19] The UK's Official Export Credit Agency: Ilisu Hydroelectric Power Dam in Turkey. Stakeholder's Report, p.17 http://www.ecgd.gov.uk/downloads/ILISUfinal.pdf

resettled populations are apparent. When asked their preference, people would like resettlement with their own community"[20].

It should also be noted that a great deal of migration form the Southeastern region is occurring independently of the GAP Project. This is probably due to the socio-economic situation of the region.

2.1.5 Summary

The GAP project should aim to radically change the social-structure, traditional productivity and urbanisation patterns in the region. It was conceived however, as a project to use the natural resources for the benefit of the country. Unless the development of the region and enhancing the living conditions become the main purpose of the project, GAP will only be considered as an "engineering project". A precise assessment is needed of the economic, ecological and social problems. Open questions should be clarified and then an attempt made to improve them. For the resettlement of the people, past experience showed that the resettlement plans were very poor. Now for the Ilisu dam, there are no detailed resettlement plans. This causes the local people to distrust the government. Some points that are important for future resettlement plans:

- Consultation/participation with local stakeholders
- Consideration of the problem of land title, deeds, forced land confiscation and absentee rural families
- Consideration of the needs of the poor, the landless, small holding farm households and vulnerable groups, including women and children.

"Monitoring of resettlement should be implemented with a participatory approach, inclusive of all local stakeholders, vulnerable groups and the poor. However, this requires considerable political will in an institutional culture and political system not used to open consultative processes"[21].

[20] The UK's Official Export Credit Agency: Ilisu Hydroelectric Power Dam in Turkey, 2000. http://www.ecgd.gov.uk/downloads/ILISUfinal.pdf
[21] The UK's Official Export Credit Agency: Ilisu Hydroelectric Power Dam in Turkey, 2000. http://www.ecgd.gov.uk/downloads/ILISUfinal.pdf

2.2 Electricity aspects

"How big is the contribution of the GAP hydro power plants to the whole Turkish energy production – are there alternatives?"

The Turkish electricity production – today and tomorrow

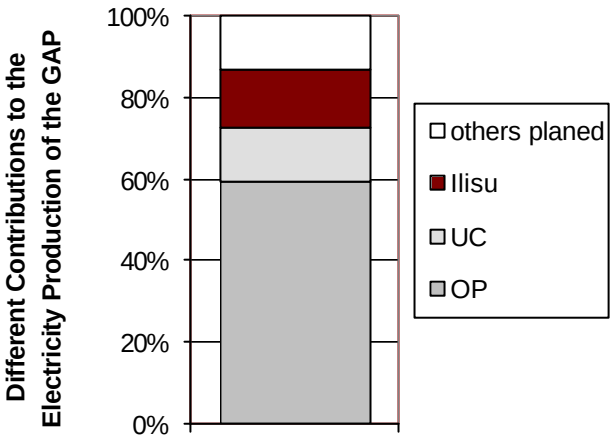
The following discussion is very general and includes the GAP project as a whole, but focuses specifically on the Ilisu dam which is subject to several other discussions, especially the export risk guarantee of the Swiss government (see 2.4.2).

2.2.1 Overview over the electricity production of the GAP project

The following table shows the expected electricity production of the different hydroelectric power plants of the GAP project. At the moment about 60% of the expected production has been reached. The Ilisu dam will contribute with 14% to the total power production of the GAP project.

Table 2 Overview over the GAP Project.[22] *OP = Operating, UC = under construction, DD = detailed design, FS = feasibility study, MP = master plan, Rec = Reconnaissance*

Dam Name	Energy-Production 10^3 GWh	present state of the Project
Karakaya	7.354	OP
Atatürk	8.900	OP
Cagcag	0.042	OP
Sanliurfa	0.124	UC
Birecik	2.516	UC
Dicle-Kralkizi	0.444	UC
Batman	0.483	UC
Ilisu	**3.830**	**DD**
Cizre	1.208	DD
Karkamis	0.652	DD
Adiyaman-Gösku	0.043	FS
Adiyaman-Kahta	0.509	MP
Silvan	0.623	Rec
Kayser	0.341	Rec
Garzan	0.315	Rec
Total	***27.384***	



[22] I. H. Olcay Ünver, 1997, updated by www.gap.gov.tr/English/enerji.html

2.2.2 Electricity production and consumption in Turkey – How big is GAP?

The actual electricity production and consumption of Turkey is shown in *Figure 2*. It is clear that the consumption of electricity is rising by about 10% each year. So far the power production seems to go hand in hand with the increasing amount of consumed electricity. But the following two facts clearly show that Turkey already has, or will have, a problem in providing the needed power: a) some of the produced electricity is lost again due to the bad distribution of the electricity (see *Table 3*) and b) electricity imports increased after 1997.

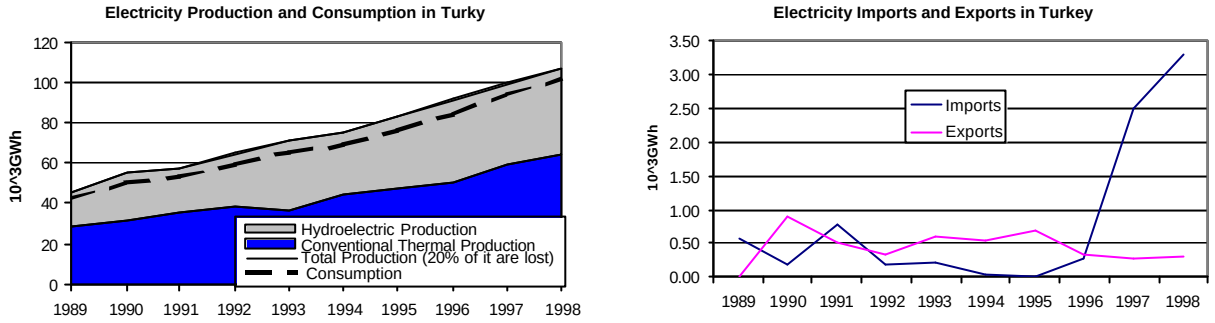
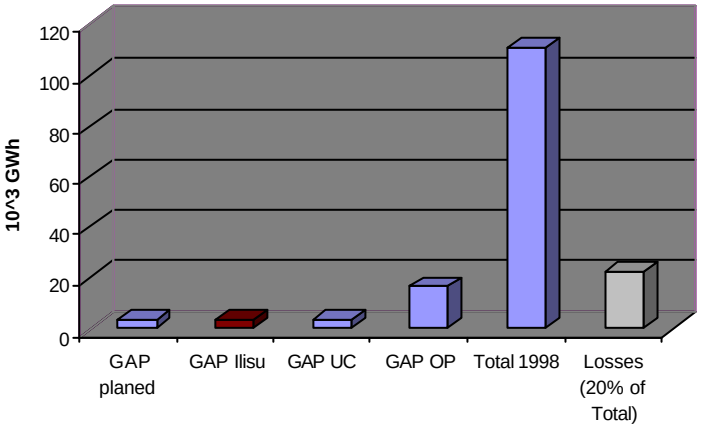


Figure 2 Electricity production and consumption as well as electricity imports and exports of Turkey over the past ten years.[23] Note that the scale of the left graph is expanded compared to the right one!

Looking at the electricity production of Turkey only, *Table 3* gives an idea of its composition. Important to note are the losses due to the poor distribution system. These losses are mentioned in different independent references and are estimated to have a value of about 20% of the total electricity production in Turkey. These estimated losses are much larger than the contribution of the Ilisu dam to the total electricity production. At the moment the GAP power production accounts for about 15% of the total Turkish electricity production (since 1998 no new GAP dams are operating for purposes of power production).

Table 3 Overview over the electricity production of Turkey

Description	10^3 GWh
GAP Planed	3.691
GAP Ilisu	3.83
GAP UC	3.567
GAP OP	16.296
Total 1998[23]	110.9
Losses[24]	22.1



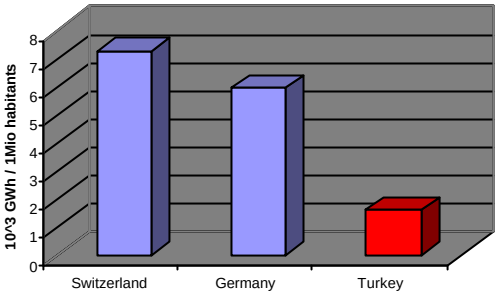
[23] US Energy Information Administration, Electricity Data, http://www.eia.doe.gov/emeu/international/electric.html
[24] Wasser als Waffe – Türkische Dämme und Schweizer Helfer, 1998, Joerg Dietziker, EvB NZZ, Nr. 54, 4.3.2000, http://www.eia.doe.gov/emeu/cabs/turkey.html

2.2.3 A Comparison between Switzerland – Germany – Turkey. An Outlook on the electricity consumption of Turkey

Assuming that the electricity consumption of Switzerland, Germany and Turkey are correlated with the stage of economic development, one can guess what the electricity consumption of an equally developed Turkey would be. This was done in the following two tables.

Table 4 Comparison of the electricity consumption Switzerland – Germany – Turkey on the basis of 1998[23,25]

Country	Electricity consumption 10^3 GWh	Population Million	Quotient
Switzerland	50.8	7	7.3
Germany	488	82	6.0
Turkey	102.2	63.5	1.6

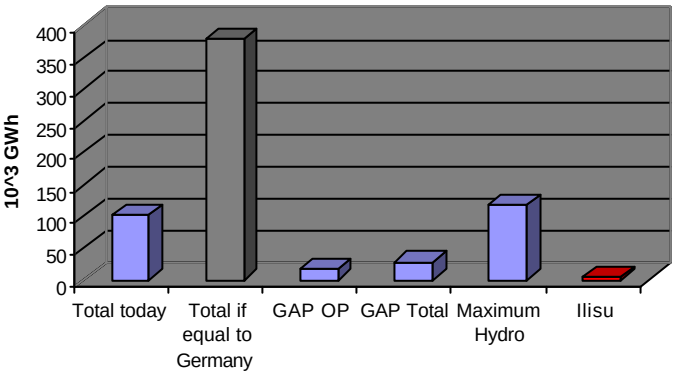


The estimated value of the total annual electricity consumption is $380 \cdot 10^3$ GWh if Turkey would today consume the same amount of electricity per capita as Germany (*Table 5*). Extrapolating the electricity consumption of Turkey shown in *Figure 2* the value of $380 \cdot 10^3$ GWh would be exponentially reached in about 25 years.

Though it is a very simple calculation, it shows that demand due to economic development will still rise in the future. The fact that the population of Turkey is increasing will also intensify the problem of providing electricity in the future.

Table 5 Outlook on the possible development of the Turkish electricity consumption, assuming that Turkey will reach the standard of Germany, and that the population of Turkey will not grow.

Description	10^3 GWh
Total consumption today	102.2
Total if equal to Germany	377.9
GAP OP	16.296
GAP Total	27.384
Further hydropower potential in Turkey[26]	118.000
Ilisu	3.830



[25] Central Intelligence Agency, The World Factbook, http://www.odci.gov/cia/publications/factbook/
[26] Virtual Countries, Inc. Seattle, Washington www.turkey.com/groupc/gap.htm

2.2.4 Alternatives for electricity Production – Ecological comparison

A comparison of the most popular ways to produce electricity is given below. The comparison takes into account the whole life cycle of a power plant, that is construction, operating and disposal. Generally hydroelectric power, nuclear power, photo voltaic and wind plants have very low environmental impacts during their use. Most of the impacts arise during the construction and disposal. On the other hand the impacts of oil-, coal- and gas-burning plants are dominated by the operating phase (including transportation of the fuel).

Table 6 Ecological comparison of the most popular ways to produce electricity [27] ***Area II = modified, III = cultivated (influence of human activities is big), IV = dominated by buildings. CO_2, SO_2, NO_x, CH_4 = main Air pollutants. The numbers of each column refer to 1 TJ electricity produced.***

		Oil	Gas	Gas-turbine	Photo Voltaic	Water	Nuclear	Stone-coal	Brown-coal	Wind
Area II-IV	m^2a	664	257	313	180	28	53	577	100	103
Area III-IV	m^2a	111	172	66	838	4.2	8.6	269	181	57
Area IV-IV	m^2a	1.4	0.2	0.04	2638	0.03	0.2	0.6	0.1	1.7
CO_2	kg	229380	245831	205413	47203	1045	4586	280417	370979	11620
SO_2	kg	2360	58	78	381	2.9	28	1916	3620	50
NO_x	kg	505	408	498	112	3.2	11	648	558	26
CH_4	kg	308	374	477	105	2.4	14	806	32	37
Deposit	kg	2000	5022	1312	10184	5672	1775	66405	48287	2342
burnable waste	kg	4.7	0	0	326	0	1.2	3.5	0	84
hazardous waste	kg	509	119	210	264	1.2	5.1	48	19	14
radioactive Waste	m^3	0.01	0	0	0	0	0.03	0	0	0

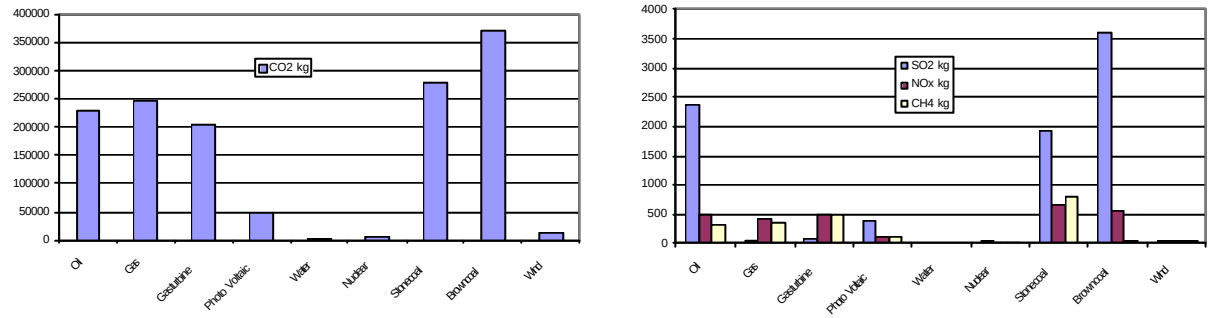


Figure 3: Relevant ecological impacts stem from green house gases like CO2 (graph on the left) as well as from SO2, NO2 and CH4.

[27] Ecoinvents for Energy Systems, 3. Edition 1996

2.2.5 Special Focus on the Ilisu Dam

"At a cost of $ 1,300/kW (plus financing costs), Ilisu is a relatively expensive power project. Project opponents in Turkey believe that power could be saved at a lower cost by modernizing the country's transmission system, which has a reputation of being inefficient. According to the authors of the EIA, no supply-side or demand-side alternatives to Ilisu have been considered as part of the feasibility studies. It seems likely that the Turkish government is prepared to pay a high price for Ilisu because of its interests to control the Kurdish population of South-East Anatolia, and to increase its political clout vis-à-vis Syria and Iraq"[28].

2.2.6 Summary

From the data shown above, the following three observations can be made:

1. As Turkey wants to develop and to become a more industrialized country, this will lead to an increase in the electricity consumption of the country (*Table 4*). This amount of energy cannot be supplied by using hydroelectric power plants. Therefore Turkey has to look for new solutions to provide for the electricity it will consume in the future. There are already plans for building nuclear power plants, as was reported in the NZZ[29]. This is a hint that Turkey realises that additional sources have to be investigated. These plans, however, have recently been shelved due to financial constraints[30].
2. Comparing the potential of the Ilisu dam to the expected future electricity consumption (*Table 5*), the project is a very small step towards achieving the needed amount. Nevertheless, it still has the power production potential of about two nuclear or thermal power plants.
3. As can be seen clearly in *Table 6*, producing electricity by means of hydroelectric power plants is one of the most ecologically sound techniques that are available today. Therefore if the discussion turns to alternatives for the currently un-built GAP dams, the answer cannot be oil- or gas-plants if you only look at the ecological impacts. Efficiency increase and demand side management must also be investigated.

[28] RiverNet, European Rivers Network, The Ilisu dam project http://www.rivernet.org/turquie/ilisu.htm
[29] The Swiss Newspaper, Neue Zürcher Zeitung (NZZ), 04.03.2000, Nr. 54
[30] Engineering News-Record, Turkey drops nuclear plant project
http://www.enr.com/power/2000/07/25/ANA/0421-0410-Turkey-nuclear.sched-3rdlead...asp July 25, 2000

2.3 International relations related to shared water resources between Turkey, Syria and Iraq

"What is the state of international relations between Turkey, Syria and Iraq due to shared water resources?"

2.3.1 Basin wide consequences of GAP

Turkey argues that GAP is also beneficial to Syria and Iraq, as the flow of the rivers is more constant now. Prior to the regulation of these rivers the flow could descend to 100 cubic meters/sec or rise to 7000 m^3/s. During the filling of dams, however, the 500 m^3/s [15.8 billion cubic meters/year (BCM/a)] which had been more or less guaranteed by Turkey on an annual average, has not been maintained. This caused problems for the downstream countries. After GAP has been terminated, the waters of Euphrates will decrease from the earlier 30 BCM/a at the Syrian boarder to 16 BCM/a, and at the Iraqi boarder from the earlier 16 BCM/a to 5 BCM/a[31] or 9 BCM/a[32] depending on the estimate. A lot depends on how much, and with what technology, of the planned irrigated area of 1 693 027 ha[33] will actually be implemented. Some of the water used in Turkey will find its way back into the river, and this water can of course be reused by the downstream countries. The problem is the water quality which will have decreased, as the used water will carry greater quantities of salt and chemicals (fertilisers and pesticides)[34]. This is especially a problem for Iraq, as it is the lowest downstream country on the Euphrates and the Tigris already naturally contains a high salt content. 74% of the irrigated areas in Iraq suffer from some form of salinity (50% medium saline, 20% slight, 4% severe)[35]. Thus the water problem will manifest itself as a water pollution problem. Turkey estimates that the GAP projects will utilize 11 BCM/a, according to John Waterbury this could be underestimating water loss through evaporation[36]. One source estimates that up to 60% less water will reach Syrian and Iraq after GAP is implemented[37].

Turkey is the water monopolist in the Euphrates/Tigris basin, nevertheless, possible factors available to the downstream countries to influence relations with Turkey are the Sandjak d'Aleandrette (because the water flowing from the Orontes into this area is controlled by Syria, even if this Syrian Region is occupied by Turkey), Kurdistan, oil and Islam[38]. Further factors favouring co-operation is the Turkish interest in the markets of the Arab world[39].

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[31] Ayeb, Habib. L'eau au Proche-Orient, La guerre n'aura pas lieu. Condé sur Noieau (France) 1998, p. 123-125

[32] FAO, Food and Agriculture Organization of the United Nations, Irrigation in the near east region in figures, Iraq, http://www.fao.org/docrep/W4356E/w4356e0e.htm#Iraq 1997, The 9 BCM/a is based on the Iraq-Syria agreement of 1990

[33] Southeast Anatolia Project, FAQ, http://www.gap.gov.tr/English/Frames/fr5.html

[34] Ayeb 1998

[35] FAO, Irrigation.1997

[36] Waterbury John, Transboundary Water and the Challenge of International Cooperation in the Middle East. In Water in the Arab World, Peter Rogers and Peter Lydon, Cairo 1996. p.58

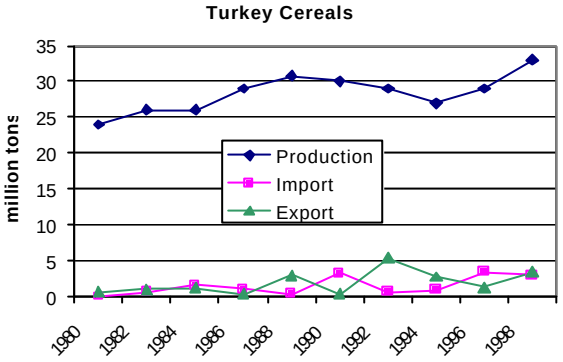
[37] Jörg Barandat. Kooperative Konfliktbearbeitung an grenzüberschreitenden Gewässern. In: Umwelt-Konfliktbearbeitung und Kooperation. Günther Baechler (ed.) forthcoming.

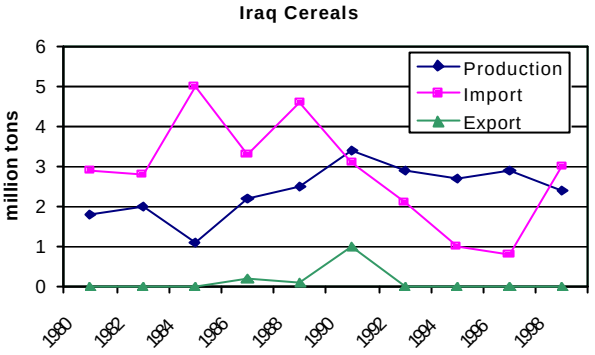
[38] Ayeb 1998, p. 119

[39] Waterbury 1996

Agricultural consequences

Water is one of the most important resources for agriculture in arid and semi-arid regions. GAP hopes to enable the irrigation of 1.7 million hectares of land, the idea being for Turkey to become the bread-basket and vegetable producer of the Basin[40]. Currently the irrigated area in the South East Anatolia area amounts to about 12% of the planned projects[41]. *Figure 3* shows the development of cereal production, imports and exports. Why cereals? Cereals are basic foodstuffs and 1 kg of wheat needs about 1000 liters of water for its production. In other words it easier to import food than to import water. Water-short countries thus often import food (mainly cereals), this has been called "virtual water". The fluctuations in the graphs, especially for Iraq, cannot be explained by water development in Turkey alone. Of much greater impact was the second Gulf war and international embargo on Iraq.





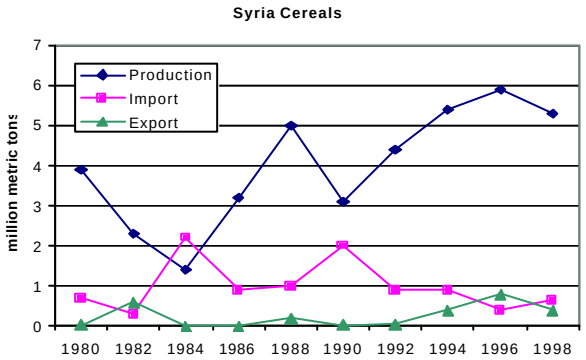


Figure 3 Cereal Production, Imports and Exports of Turkey, Iraq and Syria. Source: www.fao.org FAOSTAT

What is Turkey's interest in GAP ?

Besides Turkey's domestic reasons for GAP, international reasons also seem to play an important role:

1. Control over the waters of the Euphrates and Tigris[42].
2. Ending the Kurdish struggle for autonomy by creating geopolitical facts on the ground. A new geography that is incompatible with separatist movements. An independent Kurdistan will not be possible after the GAP infrastructure has brought this area closer to Ankara[43].
3. With the displacement – out of free will (economic development) or forced (flooding) – of the Kurdish population a territorial rupture will be created between the Kurdish population and the bases of the Kurdish PKK that are situated on the other side of the frontier between

[40] Barandat, Jörg, Die Türkei in der Wasserfalle, 1997. In Barandat, Jörg, (Hrsg.), Wasser - Konfrontation oder Kooperation, Ökologische Aspekte von Sicherheit am Beispiel eines weltweit begehrten Rohstoffs, Baden-Baden 1997, S. 368-378.

[41] Southeast Anatolia Project, FAQ, http://www.gap.gov.tr/English/Frames/fr5.html see also United Kingdom Government-commissioned reports examining the issues surrounding the Ilisu Hydroelectric Dam, 2000

[42] Ayeb 1998, p. 121

[43] Ayeb 1998, p. 122

Turkey and Syria and Iraq. The per head income in South East Turkey is lower than in the rest of the country, thus economic development is hoped to soften extremist tendencies[44].

4. Through GAP, Turkey has control over one of the main water sources in the Middle East. The "peace pipeline" plan, so far not implemented, allows for the possibility of selling this water to countries such as Israel[45].

2.3.2 Positions and power of Turkey, Syria and Iraq in relation to internationally shared waters.

Animosity was very great towards Turkey during the conference on international law over shared water resources in the Arab region, held at Sharm el Sheik in May 2000 (In discussion with Branko Bosnjakovic, United Nations Economic Commission for Europe, 15. June 2000, Berlin). Since only a minimal part of the GAP irrigation project has been realised, tensions are likely to increase as more water is used by these projects. According to Robert Mandel who examined 14 international river basins, three factors are important in assessing the conflict potential of international rivers: 1) The degree to which cooperative frameworks and agreements have been realised 2) The perception of water scarcity and unequitable distribution and 3) the power balance and degree of interdependence between the riparian states. Mandel estimates that the conflict potential in the Jordan and Euphrates basin is high, the Tigris Basin was not included in the analysis[46].

The distribution of power is important in understanding why Syria and Iraq cannot enforce their interests and why no binding agreements have been reached on water allocation in the Euphrate/Tigris basin. Three indicators have been chosen to demonstrate the power between the riparian states: economic power, military power and internal renewable water resources (water that does not flow in from another country); see *Figure 4, 5 and 6*. For a visualisation of international relations in relation to shared water resources, see the graph below[47].

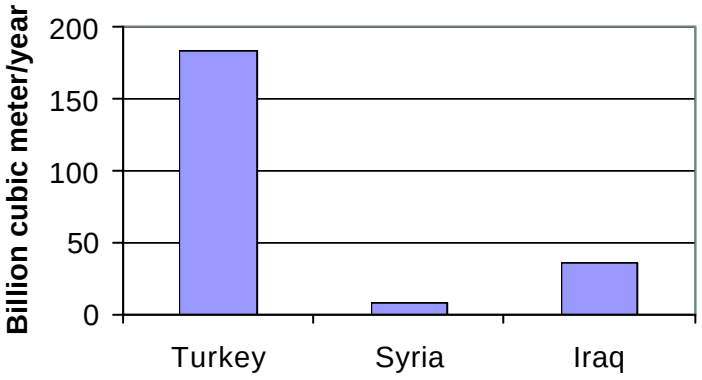


Figure 4 Internal renewable water resources of Turkey, Syria and Iraq. Source: Irrigation in the Near East in Figures, Fao 1997 www.fao.org/docrep/w4356e/w4356eOw.htm

[44] Ayeb 1998, p. 122 and 191
[45] Barandat, 1997
[46] Mandel, Robert. Sources of International River Basin Disputes. In: Conflict Quarterly, Nr. 4/1992, 1992: P. 25-56. In: Barandat forthcoming.
[47] Mapping method adapted from: Responding to conflict, Norbert Rupers, January 2000, Birmingham

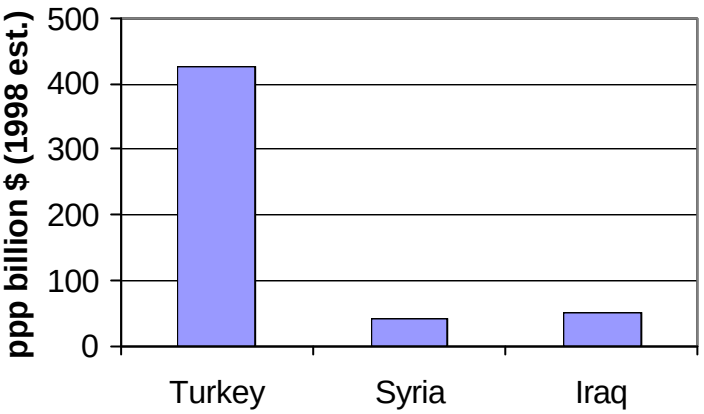


Figure 5 GDP of Turkey, Syria and Iraq. Source: CIA factbook: http://www.odci.gov/cia/publications/factbook/country.html (ppp = purchasing power parity)

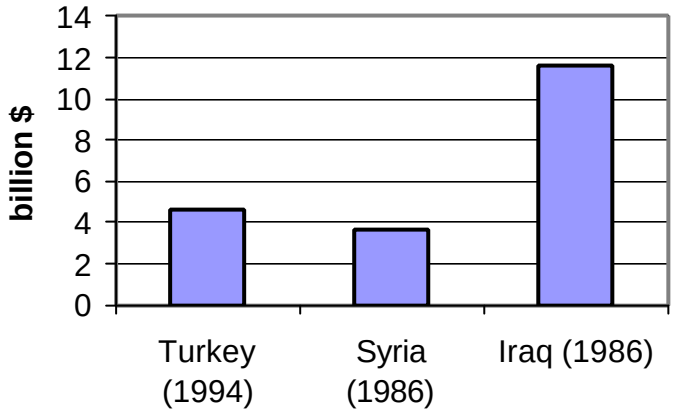
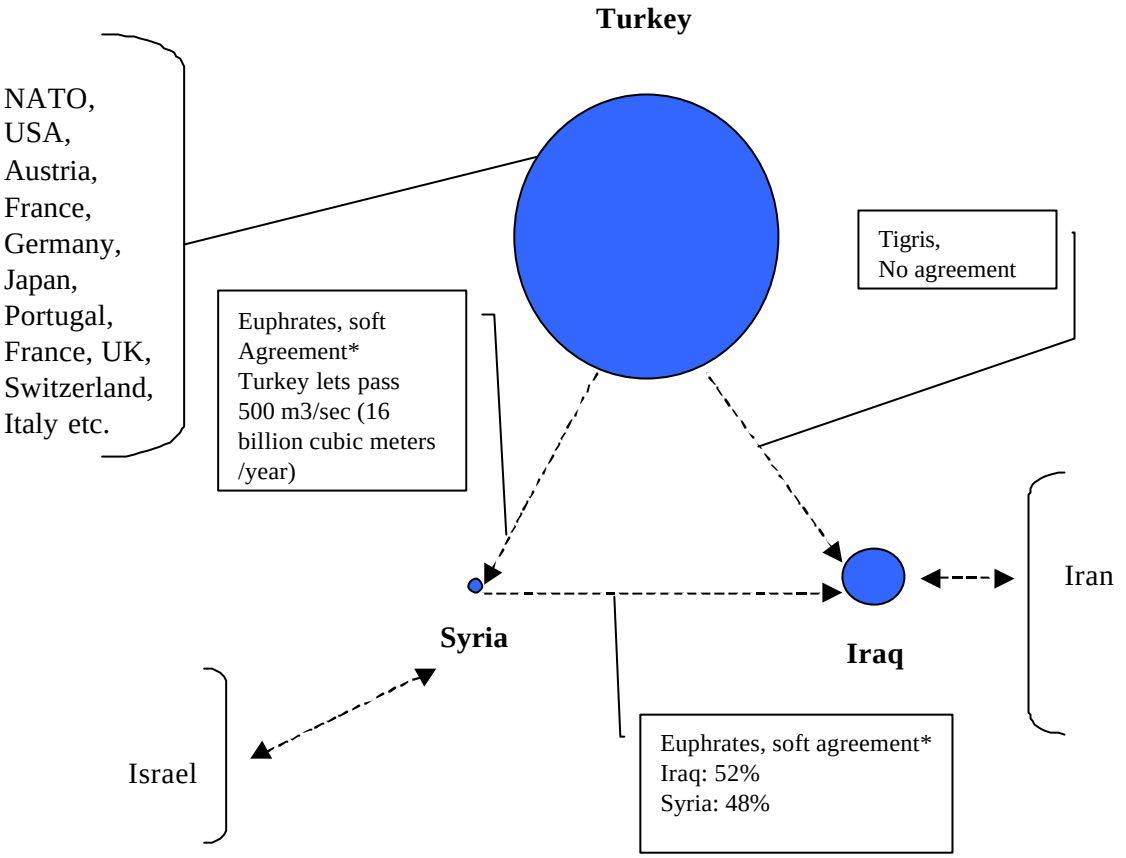


Figure 6 Military budget, in billion US$ Source: The Library of Congress, Country Studies http://lcweb2.loc.gov/frd/cs/

Date of estimate given in brackets, newer estimates, e.g. for Iraq, are difficult to find.

In 1982 Iraq's defence expenditure exceeded 50% of GNP, compare this to Turkey in 1991 with a military expenditure of 5.4 % of GNP and Syria in 1985 with a military budget equivalent to 21.1% of GNP.

International Relations Related to Shared Water Resources



Legend:

Arrow shows direction of pressure

Line arrow: alliance, support

Dotted arrow: a mix of cooperation and conflict

Symbol size correlates with internal renewable water resources.

Countries in half brackets are side players)

*Soft agreement refers to agreements that are not legally binding

Turkey's position:

1. Turkey (as well as Syria) would like the Euphrates and the Tigris to be considered as one basin, two branches of the same river. This would mean that one could agree separately with Syria on the Euphrates and with Iraq on the Tigris, because this would be an easy way of sharing the "one" river basin[48].
2. Turkey considers the rivers as transboundary and not international. This means that Turkey has more freedom on how to use the waters. As the rivers have their source in Turkey, it maintains that it has rights over them. If the rivers were considered as international, a trilateral agreement would have had to be signed before GAP could have been implemented[49]. Conceding 500 m^3/s (15.8 BCM/yr.) to the downstream states is seen as an act of good neighbourliness, not a legal obligation[50].
3. According to Ayeb, Turkey nevertheless respects certain aspects of international law: not causing appreciable harm to "prior rights" of utilization, in other words Turkey will not cause too much harm to users who have already been using the water. This avoids, or at least postpones, open conflicts[51]. What does "appreciable harm" or "too much" mean, however?
4. Turkey proposes the principle of "comparative advantage". Thus, in agreement with others and based on technical considerations, water should be developed for the maximum benefit of all. In other words this means a sectoral specialization. Turkey uses the water to develop irrigation, thus covering the nutritional needs of the countries of the basin as well as supplying them with hydro-electric power. On the other hand Iraq could supply Turkey with oil, a vital resource for Turkey's economy[52]. In 1992 Prime Minister Süleyman Demirel responded to a press conference over watercourses by saying: *"This is a matter of sovereignty. We have every right to anything we want... Water resources are Turkey's, and oil is theirs. Since we don't tell them 'look, we have a right to half of your oil,' they cannot lay claim to what's ours... These crossborder rivers are ours to the very point they cross the border"*[53]. This quote seems to contradict point three about not causing appreciable harm.

Syria's position:

1. The river should be considered as an international river, historic rights of usage are to be protected. No water development projects should be undertaken without the prior consent of the other riparian countries. Supply increase due to water development projects should be shared on an equitable basis. Although Syria takes a strong stand regarding these principles when it comes to negotiations with Turkey, she is more flexible in applying them in relation to the downstream Iraq. This is largely due to the conflict-rich relationship between the two opposing Baath-parties in power in these two countries[54].
2. The rivers should be considered as one basin. Syria has the total downstream rights on the Euphrates, Iraq on the Tigris[55].

Iraq's position:

1. The rivers should be considered as independent, each river should be shared equitably and independently of each other. This would ensure that Iraq has rights over the Euphrates equal to the other riparian countries. Utilization of the Tigris is linked to numerous problems: a) The river traverses the North of Iraq which is Kurdish territory. Should this area become

[48] Ayeb 1998, p.115
[49] Ayeb 1998, p.115
[50] Waterbury 1996 p. 58
[51] Ayeb 1998, p. 115
[52] Ayeb 1998, p. 114
[53] The Turkish Times, Aug. 15, 1992, p. 5 quoted in Waterbury 1996 p.57
[54] Ayeb 1998
[55] Ayeb 1998, p. 115

more independent, it would mean that Baghdad would lose control over its water resources. b) The River Tigris has a higher salt content than the Euphrates, this means that it is difficult to use this water without mixing it with less salty water from the Euphrates – especially for soils that are already naturally salty. c) The majority of Iraqi irrigation schemes, as well as many villages, are situated along the Euphrates[56]. According to John Waterbury, the probable outcome in the long run will be for Iraq to transfer water from the Tigris to the Euphrates basin within her boarders[57].

2. Concerning the legal status, Iraq has a similar position to Syria[58].

2.3.3 A chronological summary of the history of conflict and cooperation in the Euphrates / Tigris Basin

Date	Countries involved	Cooperation/conflict
1946	Turkey Iraq	*Cooperation:* Bilateral treaty: art. 5: Prior notification about water development projects (Ayeb 1998, p. 105).
1964	Turkey & Syria	*Unsuccessful cooperation:* Unsuccessful Turkish proposal to link sharing of Orontes and Euphrates, Syria refuses as she sees this as accepting the Turkish occupation of Sandjak d'Alexandrette (Ayeb 1998, p. 106).
1965, Baghdad	Turkey, Syria & Iraq	*Unsuccessful cooperation:* Iraq demands 18 BCM/a (Billion Cubic meters per year) of Euphrates Turkey: 14 BCM/a Syria: 13 BCM/a (actual total is 32 BCM at Hit, demand = 1.4 x supply) (Ayeb 1998, p.106).
1966 until today	Syria & Iraq	*Conflict:* Split in the Baath party, opposition between the antagonistic parties (one ruling Syria, the other Iraq). This explains why Syria and Iraq cannot find a common position over the Palestinian question or common water resources (Ayeb 1998, p.106-107).
1967	Syria & Iraq	*Unsuccessful cooperation:* Iraq demands 16 BCM/a (billion cubic meters per year) from Euphrates Syria wants to concede a maximum of 9 BCM/a (Ayeb 1998, p. 107).
1975	Syria & Iraq	*Conflict & cooperation:* Syria fills the barrage of Tabqa (14.2 BCM), this barrage together with the barrage in Turkey (Kiban, 1973) is said by Iraq to reduce the flow by 9 BCM, from the original of 28 BCM. Arab League and Saudi Arabia offer to mediate. Syria moves armed forces from the Israel front to the Iraqi front. Saudi mediation efforts are finally successful. Pressure from the USSR on both Syria and Iraq helps the process. Declaration of principles is not followed by an official signature, but there seems to be a secret agreement that was signed by the two governments. (Ayeb 1998 p. 109.)

[56] Ayeb 1998, p. 112
[57] Waterbury 1996 p.59
[58] Ayeb 1998, p. 112

		Besides water, other factors were very important in this crisis: 1) March 1975, Damascus arrested 120 – 200 militant Syrians suspected of being close to the Baath party exiled in Iraq. 2) Baghdad rejected Syria's moves of disengagement with Israel (H. Kissinger). After the war of 1973, Baghdad probably feared that Damascus would follow the steps of Egyptian moves towards peace with Israel (Ayeb 1998 p.109-110).
1980s	Turkey, Syria & Iraq	*Ineffective cooperation:* Added tensions between the riparian states due to the civil war of the Kurdish Workers Party (PKK) opposing the Turkish government. Closely linked to this is the GAP in the South East of Turkey where the majority of the population is Kurdish (Ayeb 1998). All three riparian states agreed to a joint technical commission for the exchange of information. Although the commission only met sporadically, it is the closest to a tri-partite cooperative accord (Waterbury 1996 p. 57).
1987	Turkey Syria & Iraq	*Cooperation:* Protocol stating that Ankara will leave 500 m^3/s (ca. 16 BCM/a) of the Euphrates to the downstream countries. This was linked to security questions, indirectly including the Kurdish PKK issue. The modest protocol was not always kept, e.g. during the inauguration of the Ataturk Dam. (Ayeb 1998 p.112). 16 BCM is about half the average annual pre-construction discharge at the Turkish-Syrian boarder. There is no agreement on the Tigris (Waterbury 1996 p. 55).
1990	Turkey & Iraq	*Negative impacts:* During the first phase of the filling of the Ataturk reservoir, the level of the river sank by one meter at the Syrian boarder. It is estimated that Iraq suffered a loss of 15% of its crops due to this (Ayeb 1998, p.123).
1990	Syria & Iraq	*Cooperation:* Agreement between Syria and Iraq: 58% of the water measured at the Syrian –Turkish frontier to go to Iraq, 42% to Syria. Syria perceived this agreement as conceding a part of its own water quota to Iraq and threatened to take it back at some point in time. (Waterbury 1996 p. 57 and FAO, Irrigation in the Near East in Figures, 1997)
1990	Turkey & Syria	Syria began the construction of a dam on the Orontes, the only river flowing into the Turkish area of the Alexandrette. Turkey demanded from Syria 1) control of Kurdish activities 2) giving up the area of the Alexandrette 3) a definitive sharing of the Orontes (Ayeb 1998, p.118).
1991	2. Gulf war	*Conflict:* Both Turkey and Syria joined in the allies opposition against Iraq (Ayeb 1998). It is claimed that Lord Owen urged Turkey to restrict the flow of the Euphrates to Iraq, if this advice was given, it was not heeded by Turkey (Waterbury 1996). According to another source, during the Month of January 1991 Turkey was filling the Ataturk dam (second phase). Syria continued using the water normally, thus the water shortage was carried by Iraq alone – while at the same time being bombed by the allies. This is contrary to the Syro-Iraqi agreement of 1975: 58% of the Euphrates to Iraq, 42% to Syria (Ayeb 1998, p.116).

1992	Turkey & Syria	*Cooperation:* Turkey asked that the protocol of 1987 be modified to include a reference to the link between Damascus and the Kurdish PKK. The Turkish minister of interior Ismet Sezgin asked the Syrian President Assad: "When I return to my country, will I be able to say that the Kurdish problem is resolved?" "You will be able to say that there is a true cooperation in order to resolve this problem" (Bulloch, Darwisch 1993, p 67 in Ayeb 1998 p. 118).
1993	Turkey, Syria & Iraq	*Negative impacts:* Filling of the Birecik dam, water sinks to 300 m^3/s. Turkey argues that the agreed on 500 m^3/s is the *annual* average, but Syria and Iraq have limited storage capacity, thus the timing is vital (growing season) (Ayeb 1998).

2.3.4 Summary

Turkey dominates the international relationship over water resources in this area due to the following factors:

- Turkey is the upstream country and claims the right to decide about water resources arising in, and flowing from, its territory.
- Turkey has by far the highest GDP, its internal renewable water resources are far greater than those of the downstream countries.
- Syria and Iraq depend on cereal imports, an indicator of water shortage.
- In contrast to Syria and Iraq, Turkey has strong international support in political as well as in economic issues.

This strong Turkish position inhibits the signing of "equitable" contracts about the transboundary rivers, however, it also means that an open conflict is unlikely.

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2.4 Financing large international projects - a case study of the Ilisu project

"How is the international community involved in the financing of the GAP project?

As can be seen in *Table 2* the Ilisu dam is one part of the GAP project. Its implementation should contribute 3.5% to the total electricity production of Turkey. It is mainly envisioned for electricity production and is located on the Tigris River. Though the construction work should have begun by the beginning of 2000 nothing has been done yet. Whatever the reasons for this delay might be, the Ilisu dam project is quite controversial both inside and outside of Turkey.

2.4.1 Financing model: Build-Operate-Transfer (BOT)

The BOT is a relatively new approach to the financing of large-scale infrastructure projects such as dams, power plants or roads. It involves direct investments from the private sector. In this model, a private company or consortium agrees with a government to invest in a public infrastructure project, which is then financed and built using the companies or consortiums own resources. The private developer runs the facility for an agreed concessionary period (e.g. 15 years) in order to recoup their initial investment. Afterwards the ownership and the operation of the facility are transferred to the government or to a relevant state authority[59]. This financing model firstly offers additional (private) funds and therefore a reduction on public spending and secondly a gain in efficiency due to competition between companies. The disadvantage of this financial approach is the loss of control over the project by the government. Problems can also arise in the realization of large projects since many companies are not used to operating on such a large scale. Further problems may occur in the technology transfer at the end of the operating period.

The total cost for the Ilisu dam is 1.52 billion US$[60]. The Ilisu dam was originally planned according to the **B**uild-**O**perate-**T**ransfer (**BOT**) model[61]. Later this was given up, however. Possible reasons for this were because the BOT system is very complicated and because investors probably had reservations in having to abide by the Turkish law[62].

Nevertheless, an international consortium is involved in the development of the Illisu Dam. The Turkish government charged the former Sulzer Hydro with compilation of this consortium. The Swiss Union Bank (UBS) became responsible for the financial affairs and the former ABB Power Generation was also included. Pending the final decision, these exports are

[59] Build-Operate-Transfer (BOT) Private investment in public projects...or just more public subsidies for the private sector? Watershed, Vol. 2 No. I July - October 1996, Towards Ecological Recovery and Regional Alliance (TERRA), Bangkok. http://jsa-44.hum.uts.edu.au/signposts/articles/Generic/Development/364.html

[60] Peter Bosshard, Erklärung von Bern, Das Ilisu-Projekt: Ein Testfall für die Kohärenz der schweizerischen Aussenpolitik http://www.evb.ch/ilisu.htm#3

[61] Joerg Dietzike, Türkische Dämme und Schweizer Helfer : Wasser als Waffe : die Bedeutung des Südostantolienprojekts GAP und die geplante Zerstörung von Hasankeyf durch Sulzer Hydro und ABB Schweiz, Erklärung von Bern, 1998

[62] Birecik Dam (1.5 billion US$) on the other hand is being constructed on Build-Operate-Transfer (BOT) basis. Souteastern Anatolia Project, Financial Status of Gap http://www.gap.gov.tr/English/Frames/fr3.html.

to be insured by the Swiss Export Guarantee. This led to a discussion of Switzerland's role in the financing of GAP (see below).

2.4.2 Export Risk Guarantee (ERG)

Exporters of technology and facilities for international projects are faced with different risks due to the uncertain political and economic conditions in the buyers' countries. The export of highly-specialized and expensive goods is a substantial part of the economy in developed countries and therefore crucial for the general employment situation. Countries created the Export Risk Guarantee to maintain these jobs, which relieves the exporters of certain risks that are beyond their control, or their customers' control abroad.

ERG in Switzerland

The Swiss Export Risk Guarantee
In Switzerland the instrument of the Export Risk Guarantee (ERG) was founded in 1934 with the above-mentioned goal of maintaining jobs by enhancing exports. ERG is a legally dependent self-supporting fund of the Swiss Federal Government. Only between 1.5 and 2% of total exports from Switzerland are covered by ERG. For each policy issued, the applicant has to pay a risk based premium which goes into the ERG-fund. As the fund was established without any capital base but very high commitments, it was decided that the fund could borrow money from the State treasury at regular interest rate whenever needed in order to keep enough liquidity to pay-out claims.

Today, the ERG-Fund carries a loss of approx. 454 Mio. CHF in it's balance sheet. This loss is the balance of a 900 Mio. CHF loss which resulted from the currency risk cover, which the fund had to take over, when the gold standards in the 70ties was dropped. Since 1984 ERG can no longer provide cover for currency risks.

In 1991 the Swiss Parliament decided to approve a debt reduction facility in the amount of 700 Mio. CHF to the poorest countries. This amount was credited to the ERG-fund, which in turn deleted some rescheduling credits to 27 countries. With this action, together with the ongoing amortization payments from creditor countries in the past few years and the premium payments for new policies, the fund was able to reduce it's Loan amount from 1.6 Bio. CHF in 1988 to today's 550 Mio. CHF. On the other hand, the fund has approx. 2.5 Bio. CHF outstanding credits to countries which had to ask for international financial support from the IMF and the Paris Club. These credits or reschedulings have amortization periods up to 25 years as agreed from the creditor countries in the Paris Club. Therefore the Loan amount from treasury is covered by the outstanding credits, even if some of these credits have to be written down.

The main difference between a private credit insurer and the Export Credit Agencies (ECA's) like ERG is, that ECA's have the possibility to reschedule (refinance) the claims they have to pay for the political- and transfer risk. It is estimated that the ERG-fund has cost the tax payer approx. 1.2 Bio. CHF over the past 64 years, which averages out at 18 Mio. CHF per year for export support and assistance to transition economies. This amount has to be compared to other subsidies in other parts of the Swiss economy, and the high degree of export dependability of the Swiss industry. [63]

When a country has difficulty in servicing its external debt, it tries to convince its creditors to reschedule the debt payments. In the case of low-income countries, most of the debt stems from

[63] In discussion with Peter W. Silberschmidt, Managing Director of the Swiss ERG Agency 27.Nov. 2000

official creditors. These creditors are represented in the Paris Club, which has developed a framework for the rescheduling negotiations. Switzerland is a member of the Paris Club and represents the interests of the Swiss ERG-Agency. In the case of a country not servicing its debt, the exporter is reimbursed by the ERG-Agency for the part of the claim that was guaranteed. The ERG-Agency then becomes the creditor. A Paris Club rescheduling can only take place, if there is an economic program with the IMF. This ensures that the country is using the breathing space granted by the rescheduling to take the necessary steps to improve the economic situation. At the same time, the World Bank usually provides additional money through different programs.

The legal basis of the ERG is the "Bundesgesetz über die Exportrisikogarantie" (national export risk guarantee law).[64] The ERG is also subject to international rules like that of the Berne Union, and the OECD. The Berne Union[65] works for international acceptance of sound principles of export credit insurance. The OECD-agreement on guidelines for officially supported export credits[66] seeks by regulation to prevent national privileges. 15 countries have signed this agreement including Switzerland. With the new OECD guidelines in 1998 the premiums were harmonized between the different countries.

Existing Swiss ERG's for Turkey

At the end of 1998, a sum of 6537.5 Mio SFr. was committed by the Swiss ERG-fund, mainly in the sectors of mechanical (77.6%) and chemical engineering (18.1%). The Swiss ERG commitment in Turkey already amounts to 1208.2 Mio SFr, which is the highest sum committed to any one country in 1998 (this means almost one fifth of the total committed sum) [67].

Swiss ERG for the Ilisu-project

At the end of November 1999 the Federal Council decided to issue ERGs to the companies Asea Brown Boveri (ABB) and Sulzer Hydro for a amount of 470 Mio SFr, which saves 1230 'worker years' on condition that certain points are fulfilled[68]. In a reply to our request about the reasons for this the State Secretariat for Economic Affairs argued that:

- the Ilisu-project did not infringe upon the international law of nations
- the "no harm rule" is dependent on the implementation of the project
- the project did not contradict the "Convention on the Law of the Non-navigational Uses of International Watercourses"[69].

Critical aspects of the Ilisu-project like resettlements, water quality (no wastewater treatment until now), diseases (Malaria and Leishmaniosis) and cultural artifacts are being investigated. The Federal Council will grant the ERG to ABB and Sulzer Hydro on condition that the Environmental Impact Assessment and Report on Resettlements are positive and internationally acceptable.
At the beginning of 2000, Sulzer Hydro and ABB have sold their hydropower divisions to foreign companies. In a second letter to the State Secretariat for Economic Affairs (SECO) we

[64] Bundesgesetz vom 26. September 1958 über die Exportrisikogarantie http://www.admin.ch/ch/d/sr/c946_11.html
[65] The Berne Union, International Union of Credit and Investment Insurers http://www.berneunion.org.uk/
[66] Organization for Economic Cooperation and Development (OECD), Export Credits http://www.oecd.org/ech/docs/xcr.htm
[67] Geschäftsstelle für die Exportrisikogarantie Annual report 1998: http://www.swiss-erg.com/ueberuns/jb/d/jb98.pdf
[68] Eidgenössische Volkswirtschaftsdepartement, Presse- und Informationsdienst, ERG-Zusage für die Kraftwerke Ankara und Ilisu in der Türkei http://www.seco-admin.ch/Welthandel/d_aktuell/presse/pm981130.htm
[69] Full text: http://www.africanwater.org/UN_Convention_97.html

asked if this changed situation would affect the provisionally granted ERG. The answer was no, because Export Risk Guaranties can be given to foreign companies as long as the location of production is in Switzerland. The Exporter guarantees that a certain percent of the workforce will be employed in Switzerland.

Criticism for the Swiss ERG in the Ilisu-project

Basically there are two types of criticism: On the one hand those that are fundamentally opposed to the project (often NGO's), and on the other hand those that question certain aspects of the project, but who are waiting for further reports to decide on the gravity of the social and environmental impacts.

Several non-governmental organizations (NGO's), especially the Berne Declaration[70] criticized the decision of the Swiss ERG concerning the Ilisu-project. They claimed that this project infringes on the World Bank guidelines and the UN convention on several points, e.g. lack of an examination of alternative projects, the uncoordinated resettlements, and the damage of non-replicable cultural property[71]. As part of their monitoring of ERG's the Berne Declaration together with 63 NGO's from 23 countries proposed a reform of ERG's so that they include strict environmental and social standards[72]. A recent study by Prof. Astrid Epiney (on behalf of the Berne Declaration) concluded that the ERG for the Ilisu project does not comply with international law and the law of nations. Consequently, the Berne Declaration suggested that the Swiss Government should not grant an export risk guarantee for the Ilisu project.[73]
The World Commission on Dams has also pointed out that even if international standards are met, there still remains the questions of how diligently these guidelines are followed:

> *"Conflicts over dams stem also from the failure of dam proponents and financing agencies to fulfil commitments made, observe statutory regulations and abide by internal guidelines."*[74]

The newspaper Tages Anzeiger reported that the Swiss government has charged Ayse Kudat to control the resettlements[75]. Ayse Kudat has worked for the World Bank in several resettlement projects. An Environmental Impact Assessment is also being carried out, thus critics are waiting for the results of these reports.

ERG in other countries

The governments of Austria, Germany, Italy, Japan, Portugal, Sweden, the UK and the US also had to consider their official export credits and guarantees for the Ilisu hydropower project[76]. The homepages of these export credit agencies were searched for official statements in support of the Ilisu project. Unfortunately, only the ERG agency of the United Kingdom has published an official statement with background reports on the case of the Ilisu-project.

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[70] Erklärung von Bern http://www.evb.ch
[71] Peter Bosshard, Erklärung von Bern, Das Ilisu-Projekt: Ein Testfall für die Kohärenz der schweizerischen Aussenpolitik http://www.evb.ch/ilisu.htm
[72] Erklärung von Bern, Internationale Reformen für Exportrisikogarantien gefordert http://www.evb.ch/medien/26_10_99.htm
[73] Neue Zürcher Zeitung, 14.08.2000
[74] Dams and Development. A New Framework for Decision-Making. The Report of the World Commission on Dams. 2000 http://www.damsreport.org/docs/overview/wcd_overview_booklet.pdf
[75] Swiss Newspaper, Tages Anzeiger, 9.5.2000
[76] RiverNet, European Rivers-Network, http://www.rivernet.org/turquie/ilisu.htm

United Kingdom

The Export Credits Guarantee Department published two Government-commissioned reports about the ecological and social impacts of the proposed Ilisu hydroelectric dam.[77] The results of these reports are critical concerning the impact on archaeological features, the poor reservoir quality and the resettlements. They also declaim the lack of possible alternatives in the project design. Nevertheless, Stephen Byers, the Secretary of State of Trade and Industry, is minded to grant the export credit after carefully considering both reports. But he also requested some changes before the British Government consider supporting the export credit:

- an international accepted resettlement program with an independent monitoring
- provisions are made to maintain the water quality
- assurance of adequate downstream flows at all times
- a detailed plan to preserve as much as possible of the archaeological heritage of Hasenkeyf.

2.4.3 Policy of the World Bank in supporting the Ilisu-project

The World Bank did not support the Ilisu dam-project due to their policy on projects on international rivers. Since the construction of dams on international rivers always has an impact on the relationship between the countries sharing them, the World Bank released the Operational Policy 7.50 for projects on international waterways in October 1994[78]. The motivation for this policy is shown in paragraph 3: "The Bank recognizes that the cooperation and goodwill of riparians is essential for the efficient utilization and protection of the waterway. Therefore, it attaches great importance to riparians' making appropriate agreements or arrangements for these purposes for the entire waterway or any part thereof." And in Paragraph 8 (b) the conditions for the support are defined: "The other riparians have given a positive response to the beneficiary state or Bank, in the form of consent, no objection, support to the project, or confirmation that the project will not harm their interest." These conditions are not realized in the case of the Ilisu dam, therefore the World Bank does not support the project. In the Nile Basin, on the other hand, the Nile countries are heading towards cooperation and the World Bank is taking a supportive role in the development of an international river. Financing that depends on prior cooperative agreements is thus acting as a motor of cooperation in the Nile Basin[79].

The sources of external financing are given below (for all the GAP Projects, not just Dams):

US Exim Bank	111 million $
Swiss Commercial	467 million $
Swiss-German Commercial	782 million $
European Investment Bank	104 million $
World Bank	120 million $
Council of Europe Social Development Fund	183 million $
Italian Government	85 million $
French Government	33 million $

Souteastern Anatolia Project, Financial Status of Gap
http://www.gap.gov.tr/English/Frames/fr3.html

[77] UK Government-commissioned reports examining the issues surrounding the proposed Ilisu hydro-electric dam in Turkey. http://www.ecgd.gov.uk/whatsnew/data/ilisu.htm
http://www.ecgd.gov.uk/downloads/ILISUerm.pdf

[78] World Bank Operational Policy 7.50
http://wbln0018.worldbank.org/Institutional/Manuals/OpManual.nsf/toc2/5F511C57E7F3A3DD8525672C007D07A2?OpenDocument

[79] See the Nile Basin Initiative, www.nilebasin.org

2.4.4 Summary

For countries that cannot finance large projects on their own, the BOT (Build Operate Transfer) model offers a new possibility in financing. For longterm projects such as for the Ilisu dam, however, (implementation about 8 years, operating phase about another 12 years) the BOT model is probably not economically viable. The BOT financing model might also be coupled with a substantial loss of control over the project by the government.

In the case of the Ilisu dam, which is a part of the GAP project, the Swiss government provisionally committed an export risk guarantee (ERG) of 470 Mio SFr. to ABB and Sulzer Hydro in November 1999, setting conditions that are still in the process of investigation. Several NGO's protested against this ERG. The Swiss government is waiting for reports that should clarify the environmental and social impacts. As far as we could find out, no reports have been commissioned by the ERG-fund or the government concerning the international implications of the Project (water amount, seasonal flow, water quality). It is interesting to note that the World Bank does not support projects that are not based on an international agreement over shared water resources. **In line with this it is suggested to only grant the ERG on condition that Turkey agrees to letting a set amount of water – agreed upon with Iraq – flow to Iraq at all times.**

3 Conclusions

3.1 Assessment of the GAP project

In the following we try to assess the impacts of the GAP project, in relation to the initial official goals.

- **Overall Project**: 40% of the overall project has been finished at present. Therefore the original date by which the project was to be finished (2010) has had to be postponed to 2047.
- **Irrigation**: Only 12% of the expected irrigated area is under irrigation today (1999).
- **Electricity**: Already 60% of the expected electricity production is achieved today.
- **Economic inequalities between the South-east and the West of Turkey**:
    - There are still twice as many functionally illiterate people in the GAP area as in the rest of Turkey.
    - The unemployment rate is still very high, especially in urban areas.
    - 3.3% of the people have more than 500 ha each, 40% have none.
    - Investments are focused on big cities, small villages do not get much.
- **Erosion, Sedimentation, Salinization, Wastewater:** Serious environmental problems arose during the implementation of the dam projects.
- **Archeological Impacts**: Excavations cannot be finished and important cultural heritage will be drowned.
- **Displacement of people:** So far 200 000 were resettled because of the dams built in the GAP region. About 70% of the resettled people are unhappy with their new life. The main reason for this is low income at their new location.
- **Financing problems***:* As the Turkish government could not afford to finance the whole GAP project by itself, international financing was sought. By undertaking this step the responsibility and the control of the project was partly moved outside Turkey into the hands of foreign investors, private companies and foreign funding agencies.
- **Information policy:** No transparent information policy has been observed regarding the social and ecological problems.
- **International effects:** During periods when dams were being filled, Syria and even more so Iraq suffered from lower levels of water flow. There are no legally binding agreements with theses downstream countries, thus they are vulnerable to negative impacts of Turkish water development projects.

3.2 Summary

Originally there were probably three main reasons for the GAP project: First of all the economic strengthening of the South-east. GAP intended to alleviate the Kurdish–Turkish problem through the improvement of the economic wellbeing in this region, populated by many Kurdish people. The second purely economic reason was an increase of the Turkish electricity production and irrigated agriculture. The third reason was probably the strengthening of Turkey's international position in relation to Syria and Iraq. Being in control of the water flow of the two main rivers of Syria and Iraq puts Turkey in a powerful position. As soon as the first parts of the project were realized, new problems arose due to the large size of the project. Erosion, sedimentation, salinization and decreasing water quality are examples of environmental problems, the displacement of people and the destruction of archaeological sites represent social problems. As these problems were not investigated properly and as there was no transparent information policy, the financial impacts were misjudged and many problems remain unresolved. Turkey is the most powerful country in the region, thus there was no pressure to make binding international agreements on water that is shared with Iraq and Syria. The World Bank, for example, does not support projects on international rivers with out prior agreement between the concerned countries. Partly due to this the financing of the GAP project became difficult. In the case of the Ilisu dam the government awarded the contract to a Swiss consortium consisting of former Sulzer Hydro and former ABB Power Generation. The finance package for Ilisu will be arranged by the Union Bank of Switzerland (UBS). The Ilisu contractors have submitted applications for coverage to the export credit agencies (ECAs) of Switzerland, Germany, the UK, the U.S, Austria, Italy, Japan, Portugal and Sweden. By undertaking this step the responsibility and the control of the project was partly moved outside of Turkey into hands of private companies and the respective ECAs supporting them.

Looking at this historical development of the GAP project, it seems that some aspects have to be reconsidered. The following three points indicate that such a process is already taking place in Turkey:

- The former State Minister Salih Yildirim mentioned that the economic steps don't fit the regional realities and a many mistakes have been made in determining the priorities in the region. Further he said "politicians put their political calculations before the realities in the region"[80].
- Due to the rapidly increasing electricity consumption, Turkey has had to look for new solutions. As reported in the Neue Zuercher Zeitung (NZZ March 2000) plans for building nuclear power plants have been posited. Due to financial constraints these have been shelved again (NZZ July 2000).
- The construction work on the Ilisu dam should have begun this year, but so far nothing has happened.

3.3 Outlook - What could be done to improve the situation?

- **An assessment of the economic, ecological, political and social advantages and drawbacks of the project is needed. This would provide the basis for a more appropriate decision making process.**
- An improvement in the information policy towards the local people and the outside world would help public participation (Arhus convention).
- Negotiations and a binding agreement over shared water resources with Iraq and Syria are needed. If the international implications of a certain project (e.g. Ilisu) are based on the implementation of the project, then the conditionalities of this implementation should be agreed upon with the countries concerned (e.g. Iraq). As a country such as Switzerland is

[80] Cumhuriyet, 18.02.99

economically involved in a project that has political implications, it should also become politically active and support efforts at securing an international agreement between the countries concerned. By being involved in the Ilisu project, Switzerland becomes co-responsible for any conflicts between Turkey and Iraq related to this project.

- An Export Risk Guarantee is an important tool in export economies, but the lack of binding agreements with strict social, political and environmental stipulations prevents the promotion of sustainable projects. Export Risk Guarantees should only be granted when such agreements have been met and their implementation guaranteed.
- The losses due to bad electricity distribution infrastructure should be reduced, the potential of demand-side management should be looked into and wind or photo voltaic–power plants should be built.