

## **Ecosystem and Ecocity Planning in the Southeastern Anatolia Region in Turkey**

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### **Abstract**

In the recent years, there have been many opportunities flourishing through the development of Turkey. One of these is unvalued rich agricultural and hydro-sources in the Southeastern Anatolia Region. The Southeastern Anatolia Project (GAP), one of the most important projects to develop the remarkable natural resources of the world, is considered as a chance to make use of rich water and agricultural resources of the Southeastern Anatolia Region.

In the recent years, the concept of promoting sustainable human settlements and eco-city planning approach have been included into the GAP Project. And by applying these concepts in real projects caused remarkable results through development of the region.

The aim of this study is analyze the concepts of promoting sustainable human settlements and eco-city planning approach in the GAP Project that has been still processed.

In the first section, the region of Southeastern Anatolia and the GAP Project will be introduced briefly. In the second section, the stages of GAP Project and the project existing will be analyzed. In the third section, the projects and sub-projects used for promoting sustainable human settlements will be introduced.

In the last and fourth section, a series of policies and strategies for providing the process of settlements which is optimal and harmonizes with eco-system will be given.

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### **Keywords**

Promoting Sustainable Human Settlements and Eco-City Planning Approach, Land Use, Southeastern Anatolia Region and Southeastern Anatolia Project(GAP), Regional Development and Human Resources.

### **JEL Codes**

O13, O18, Q15, Q24, R14, R52, N55,

### **Brief of southeastern Anatolia region and GAP project**

The Southeastern Anatolia Project (GAP) is a multi-sector and integrated regional development effort approached in the context of sustainable development. Its basic objectives include the improvement of living standards and income levels of people so as to eliminate regional development disparities and contributing to such national goals as social stability and economic growth by enhancing productivity and employment opportunities in the rural sector. The project area covers in the basins of the Euphrates and Tigris and in Upper Mesopotamia.

The GAP had originally been planned in the 70s consisting of projects for irrigation and hydraulic energy production on the Euphrates and Tigris, but transformed into a multi-sector social and economic development program for the region in the 80s. The development program encompasses such sectors as irrigation, hydraulic energy, agriculture, rural and urban infrastructure, forestry, education and health. The water resources development component of the program envisages the construction of 22 dams and 19 hydraulic power plants and irrigation of 1.8 million hectares of land. The total cost of the project is estimated as 32 billion US \$. The total installed capacity of power plants is 7476 MW and projected annual energy production reaches 27 billion kWh (GAP ADMINISTRATION 1993b).

The project rests upon the philosophy sustainable human development, which aims to create an environment in which future generations can benefit and develop. The basic strategies of the project include fairness in development, participation, environmental protection, employment generation, spatial planning and infrastructure development.

The agricultural development objectives of the GAP include the following: Raising levels of income in the rural sector; providing inputs for industrial enterprises in the region; creating employment opportunities so as to minimize out-migration and encouraging export oriented production in the region (ACMA 2001).

## **Stages of the GAP Project**

The GAP had originally started as an energy production and irrigation project seeking to utilize the rich land and water resources of the region. It was later converted into an integrated regional development project upon the completion of the GAP Master Plan in 1989. The Master Plan is an overall guide for the course that regional development will follow and for plans, programs and projects to be developed on more specific terms. The basic development scenario adopted by the Master Plan is to transform the region as a agriculture based industrial center (GAP ADMINISTRATION 2002).

At present, the GAP is a human centered and integrated regional development project carried out along with the principles of sustainable human development. The development envisaged under the GAP has the goal of creating opportunities for the people of the region fully materialize their preferences and economic potentials. Other than dams, hydroelectric plants and irrigation schemes over the rivers of Euphrates and Tigris, the concept of "Southeastern Anatolia Project" is conceived as a regional development drive aiming the multi-faceted and sustainable socio-economic development of the Region on the basis of a multi-sectoral and integrated approach which covers such diverse areas as urban, rural and agricultural infrastructure, transportation, industry, education, health, housing, tourism and investments in many other fields (GAP ADMINISTRATION 1999).

The State Hydraulic Works (DSI) is engaged in the program for developing land and water resources in the region. The program consists of two parts each of them covering projects related to the basins of either the Euphrates or the Tigris. The program envisages the construction of 22 dams, 19 hydraulic power plants and an irrigation system that will bring 1.8 million hectares of land under irrigation. Upon the completion of the project, 29 % of the total water potential of Turkey will be managed through the facilities on the Euphrates and the Tigris, which together flow more than 52.9 billion cubic meters of water a year. The planned irrigation area corresponds to 20 % of total irrigable land in Turkey and annual energy production to 22 % of total electric energy potential in Turkey.

The GAP region extends over an area of 75,000 km<sup>2</sup> and a wide range of crops each requiring different climatic conditions are raised in this area including olive, pistachio, hazelnut and persimmon. The region has 3.2 million hectares of land fit for crop culture. Forested areas make up 1.3 million hectares while 2.3 million hectares of land consists of pastures and ranges.

The GAP focuses on efficient utilization of these natural resources. For the first time in Turkey the management, operation and maintenance of new irrigation systems have been directly transferred to Irrigation Districts, which are organizations formed by local farmers. In 1998, the region accounted for 41.6 % of the total cotton output of Turkey. Favorable climatic conditions in the region make it possible to reap two crops a year. The region is also quite fit for animal husbandry. In this context, research projects led by the GAP Administration focus on genetic improvement and development of advanced breeding techniques.

According to studies made, upon the completion of irrigation projects in GAP, the area brought under irrigation will be equal in size to the total area so far brought under irrigation by the State. This will naturally bring along significant changes in agricultural output and crop design. Such irrigation-led crops like soybean, groundnut, corn, sunflower and fodder crops will be the basis of flourishing agro-industries (GAP ADMINISTRATION & UNDP 1997).

Gradual implementation of the GAP Project, which envisages irrigation on 1.8 million hectares of land and creation of new water reservoirs, will significantly alter the land use and water regime in the region. Also in this process, population movements, rapid urbanization and industrialization will bring along new transformations in both rural and urban areas. Other than advantages to be reaped after irrigation, there are some other points and problems to be considered: Problems emerging as a result of excessive and uninformed practices of irrigation; effects of climate change on crop farming and plant cover in the region; corresponding changes in the flora and fauna; erosion and adverse effects of uncontrolled growth on natural, historical and cultural properties. All these make it necessary to reconsider the project with a view to the dimensions of culture and the environment (ACMA 2000).

In terms of natural resources, Southeastern Anatolia is one of the most unique areas in Turkey. It is the border gate through which species peculiar to steppe and semi-desert areas enter Turkey and the region rooms in two different living environments, which is not found in other regions of the country. These are:

- Banks of the Euphrates and the Tigris, their flood plains and major tributaries of these two rivers,
- Steppe and semi-desert areas especially in the southern parts of the region (GAP ADMINISTRATION 1996).

## **Changes of the Socio-economic Structure in the Region by the GAP Project**

The Region is also named as the "Fertile Crescent" or "Upper Mesopotamia", and known to be the cradle of civilization in human history. Throughout history, the Region has served as a bridge ensuring passage from Anatolia to Mesopotamia. The Tigris and the Euphrates, two important rivers of Turkey flow through the Region. Both originating from the Eastern Anatolia, these two rivers reach sea in the Persian Gulf. Southeastern Anatolia receives less precipitation compared to the other regions of the country. Hence the idea was to utilize the rich water potential of these two rivers for irrigation and energy production purposes, and to regulate the otherwise irregular flow of both rivers.

The integrated project covers not only multi-purpose dam and irrigation schemes but also investments in such development related areas as agriculture, energy, transportation, telecommunication, health, education and urban

and rural infrastructure building. The basic development scenario of the GAP Master Plan is to transform the region into a “base” for agro-industrial products. In more concrete terms, the GAP envisages the following:

- irrigation of 1.800.000 hectares of land,
- production of 27 billions kWh energy,
- 106 percent increase in per capita income, and
- generation of employment for 3,8 million people (GAP ADMINISTRATION 2002)

### **Promoting sustainable human settlements by projects**

The projects and sub-projects used for promoting sustainable human settlements within the GAP Project are follows;

1. Eco-City Planning Approach for Adiyaman and Local Agenda 21
2. Structuring Sustainable Spatial Organization by Land Use Planning and Management
3. Grass-Roots/Urban Integration Programmes in Halfeti-Sanlıurfa
4. Sustainable Urban Living and Social Development Programmes in Batman
5. Participatory Urban Rehabilitation Project in Mardin (GAP ADMINISTRATION 2009).

### **Ongoing projects**

#### Project title: GAP biodiversity reseach project

To conduct an assessment in relation to biological diversity in the GAP region, identify priority areas in this respect and analyze the impact of the project on these areas; to make proposals for sustainable utilization of natural resources.

The region of Southeastern Anatolia has its uniqueness in terms of its natural endowments. It is the border zone through which species peculiar to steppe and semi-desert regions enter Turkey and thus it has two living environments where species not found in other parts of the country exist. These environments are:

- The courses of the rivers Euphrates and Tigris, their flooding plains and main tributaries.
- Steppe and semi-desert areas in the southern part of the region.

#### Project title: Studies on the present and prospective climatic features of the GAP region

To analyze changes in climate and hydrology, on the basis of regional climate models, caused by the projects on the development of water resources; to develop models on the present and future climatic conditions in the region; and to assess the possible effects of climate change on water resources.

#### Project title: Eco-city planning approach for Adiyaman

To identify environmental effects in the province of Adiyaman; to integrate the protection of ecological balances, creation of an environment where coming generations can fulfill their needs and the urban planning principles of Agenda 21 to the planning system.

The project covers the city of Adiyaman and its surroundings, particularly the Atatürk Dam Lake that is affected by urban development taking place in Adiyaman. Specific points of emphasis in the project include carrying capacity, protection-utilization balance and the concepts of Agenda 21.

#### Project title: Wild life project for the GAP region

To protect biological diversity in the region by creating new living environments for settled and migratory species, including those under the threat of extinction, which live particularly along the course of the Euphrates and around other rivers and dam lakes in the GAP region.

#### Project title: Environmental education project (Midyat & Nusaybin)

The project aims to increase the environmental health awareness and environmental sensitivity of children at the primary school level (age group 10-11) by implementing environmental education programs in Mardin-Midyat and Nusaybin.

### **Resettlement, employment and economic investments of people affected by Birecik Dam a project for planning and implementation**

The total number of people affected by this process was 30,003 (according to the 1997 Census) and 6,500 people from 850 households were subject to resettlement.

The principles of sustainability and participation were observed closely in the process of supporting socio-economic adaptation and resettlement. Furthermore, the people concerned and other relevant parties were kept informed about the process at all stages of the project and their participation to decision-making was sought. There was an information and consulting office functioning in Halfeti for this purpose.

To attain previously set objectives, activities were carried out under three separate but closely interlinked components:

- Social component relating to social life, organization and management,
- Economic component relating to employment and investments,
- Spatial component relating to resettlement (GAP ADMINISTRATION 1993c).

### Social component and related activities:

These activities can be summarized in three categories:

1. Research and surveys to assess the socio-economic structure of the region and attitudes and expectations of the people concerned: There was a questionnaire applied to the inhabitants of 13 settlement units directly affected by dam construction and impoundment. Information was gathered through face-to-face interviews with 1,307 households and in-depth interviews were conducted with various groups.
2. There were community meetings in individual settlements in order to inform people about the construction and expropriation processes, their rights deriving from these processes, alternatives for settlement and other activities; and to solicit their opinion on social, economic and spatial planning. All draft plans were presented to the discussion of people and their final shape was given under the light of these opinions and suggestions.
3. There were various training and support programs to facilitate the social and cultural adaptation of people to their new environments after resettlement. A Multi-Purpose Community Center (CATOM) had been established in Halfeti at a very early stage to draw inputs to the planning and implementation of the project. The following are some training courses-activities carried out for this purpose:
  - Driving
  - Beekeeping
  - Food processing
  - Photography
  - Chess
  - Saz (a musical instrument) playing
  - Painting
  - Demonstrative mushroom culture
  - Tiling
  - English
  - Cutting-sewing
  - Hair dressing

The CATOM that used to be at the center of Halfeti moved to a new place after resettlement and is presently continuing its activities in its new place (GAP ADMINISTRATION 1993b).

### Spatial component and related activities:

In this component, the first principle was to identify new settlement areas in the same region in line with the preferences of the people. Then, with the participation of people, new places of settlement were determined. Following this, the basic maps of these identified places were taken in cooperation with the Directorate General of Agricultural Reform (TRGM) and Directorate General of Rural Services (KHGM), which was followed by parcel and development plans. Actual settlement in these places took place, depending upon the preferences of the people concerned, through technical and/or credit support to those constructing their houses or settlement by the means of the State.

A sub-regional development plan of scale 1: 25,000 was developed by considering all relevant natural, social, environmental and spatial data and infrastructure in the area and this plan was approved on 31 May 1999. The plan covers all settlement units affected by Birecik Dam and reflects decisions relating to urban and rural land use patterns for a term extending to 2017. A note added to the plan includes a list showing corresponding organizations in charge and investments needed for each decision. Prior to the official approval of the plan, the document was presented to representatives from all related organizations and agencies and their opinions and criticisms were taken to give the plan its final shape (GAP ADMINISTRATION 1993a).

### Halfeti district center:

The maximum water code of the dam is 385 meters. After impoundment, Basbostan neighborhood of the district center of Halfeti completely remained under water while Cekem neighborhood was largely affected. The neighborhoods of Simaliye and Rustiye were affected partly by the waters of the dam. The project considered alternative settlements for those parts of Halfeti center affected by the dam. Finally Karaotlak location at a distance of 8 km to the district center was preferred for having 2,790 decares of available land.

With the technical and logistics support of GAP-RDA, the TRGM took the basic map of the new area as the basis of the development plan. This development plan was completed and approved by the relevant authority (Council of Ministers) on 29 September 1998 and then transferred to the Mass Housing Administration (TOKI) for the construction of houses. Upon the intervention of the Governorate of Sanliurfa to take over construction, developments took another course and finally 220 dwellings (each 100 m<sup>2</sup>, 3 rooms and a saloon), 1 basic education school, a three-story hospital building and 30 shops of varying sizes were constructed and delivered to their residents and users as of the year 2001.

### Pollution control in the Dam Lake and Tributary Streams:

The Birecik dam had originally been planned only for irrigation and power generation purposes. But later, it was considered that drinking and use water needs of the centers of Gaziantep and Nizip could be provided by this reservoir. This radical change had serious implications on the activities of the GAP Administration in designing alternative places of settlement and the resettlement process thus fell also within the scope of the Regulations on the Control of Water issued pursuant to the Law No. 2872 on the Environment.

To ensure smooth progress in project activities, there was need to conciliate the provisions of the Regulations stated above and original data from the project area. Consequently a joint observation-survey work was carried

out in the area from 20 to 24 April 1998 with the participation of specialists from relevant parties. Data obtained in field survey-observation was evaluated in a series of meetings held with the Directorate General of Environmental Protection and taken as a base in the scale 1: 25,000 sub-regional development plan.

#### Institutional framework and coordination:

The GAP Administration had to perform rather heavy coordination functions in relation to the project mainly for the diversity of parties involved in it. Considering this, it was decided to create a "Higher Commission for Resettlement in Birecik Dam" upon the approval of the Prime Ministry. Secretarial works of this commission were undertaken by the GAP Administration. The higher commission met 8 times to discuss issues relating to the project and its progress and took relevant decisions to solve emerging problems.

Apart from this higher commission, there was also a Project Monitoring Committee in the region and this regional committee made meetings to discuss various problems and suggestions. The committee also held wider meetings attended by the local representatives of governmental agencies including the Governorate of Sanliurfa, District Governors in the area, mayors, NGOs, village headmen and people affected by the dam lake. There is some projects;

1. Participatory urban rehabilitation project in Mardin
2. Survey of archaeological settlements in Southeastern Anatolia
3. Environmental plan for Acirli (Midyat - Mardin) historical site
4. Project for support to the re-settlement, employment and socio-economic development of population affected by Ilisu dam (GAP ADMINISTRATION 1996).

### **Policies and strategies for optimal human settlement and ecocity approaches**

In the Southeastern Anatolia Region for providing optimal settlements and harmonizing them with eco-systems the following policies and strategies can be proposed;

Ecocity development has four stages:

1. Concept initiation and comprehensive planning,
2. Ecoscape planning and legislation,
3. Eco-engineering design and development,
4. Ecosystem monitoring and management (DI CASTRI 2000)

Ecocity development needs five motivations:

1. Administrative authorizing,
2. Scientific supervision,
3. Industrial sponsoring,
4. Citizens' participation and
5. Medium motivation (GRIMM 2000)

Strategies for eco-cities

- a) Planned and safe city
  1. Protection of heritage sites, monuments, etc
  2. Pedestrianization of commercial areas
  3. Restriction of certain hazardous industries/ processes/ activities
  4. Environmental management plans (incorporation of environment considerations in master plans, sectoral plans)
  5. Proper traffic and transport systems
  6. Training and capacity building in planning and development authority (ROSELAND 2000).
- b) Pollution free city
  1. Polluter pays (fines)
  2. Clean fuel for vehicles
  3. Battery operated and low emission vehicles in certain zones
  4. Bicycle ways
  5. Green rating of industries (MIGUEL 1999).
- c) Clean cities
  1. Green belt scheme
  2. Protection areas national parks, zoological / botanical gardens
  3. Open spaces
  4. Water body/ river front open spaces landscaping (ROSELAND 2000).
- d) Energy efficient city
  1. Alternate energy sources (wind mills solar energy)
  2. Piped gas supplies to the house holds
  3. Preparation of environmental actions
  4. Planned and safe city
  5. Pollution free city
  6. Clean city
  7. Green city
  8. Energy efficient city (ICLEI 2000).

### Inter sectoral and institutional mechanism

1. Central and state government
2. Central and state pollution boards
3. Environmental authorities
4. Urban development authorities
5. Transport authorities
6. Health authorities
7. Town and country planning boards
8. Forest department
9. District administration (HAUGHTON 1997).

### Priority actions

1. Identification of responsibilities
2. Involvement of all stake holders, central state government, district administration, planning development authorities municipal corporation, industries, overseeing and coordination chief secretary
3. Resource conservation
4. Adoption of eco-friendly technologies
5. Budgetary requirements
6. Monitoring and surveillance mechanism (JARI 1999).

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