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Environmental Master Plans for Preserving Natural and Cultural Environment: The Zonguldak, Bartın and Karabük Planning Region

Mehmet TUNÇER[1], Arda YALÇUK [2♠]

[1] *Abant İzzet Baysal University, Faculty of Engineering and Architecture, Department of Architecture, Gölköy, BOLU*

[2] *Abant İzzet Baysal University, Faculty of Engineering and Architecture, Department of Environmental Engineering, Gölköy, BOLU*

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ABSTRACT

This study discusses the scenario, strategies and policies to be developed for the preservation of the natural and the cultural/historical environments which are of significance in the 1/100000 scale Environmental Master Plans prepared by the Ministry of Environment and Forestry in recent years through the case of Zonguldak, Bartın, Karabük Planning Region for which the plan was completed in 2007.

Keywords: Environmental master plan, preservation, natural environment, historical sites, strategy, policy.

1. AIM AND SCOPE

The Environmental Master Plan for the Provinces of Zonguldak, Bartın and Karabük (ZBK) (1/100000) estimates the economic, demographic and spatial development pattern within the sub-region of Western Black Sea Region by taking particularly into consideration the new investments an developments in the mining, energy, irrigation, tourism and agricultural sectors. The authors were project coordinators for this plan prepared by UTTA Planning, Design and Consulting, Ltd. and Jeotek Ltd. between 2005 and 2007.

Similar to the strategic planning approach, general strategic estimations were made and main decisions were taken in the plan regarding the natural, cultural and historical environment, social and economic sectors, spatial systems and the nearby settlements. Within the scope of this study, upper-scale sub-regional plan decisions were taken into consideration with more detailed spatial references and their effects on the nearby settlements were investigated. Accordingly, within the boundaries of plan area, the aim of the Environmental Master Plan of the Provinces of Zonguldak, Bartın and Karabük is:
to assess urban and rural development to ensure sustainable development, take measures to prevent migration and to ensure economic development in the planning region, assess the developments in the mining, industry, agriculture, services, tourism and transportation sectors, establish the use-preservation balance by preserving water resources on a watershed basis, agricultural lands and forests, determine the strategic and land use decisions to ensure sustainability, make use of natural, historical and cultural environment for cultural tourism and eco-tourism, and to establish a basis for the large scale plans, (Tunçer et al, 2006).

The goal in the ZBK Planning Region is to strengthen the economic structure of the region and to further create new employment opportunities, to raise the income level and ensure capital accumulation in the region, to promote social solidarity by preventing out-migration and reducing the intra-regional differences and to mobilize the resources of the region. Moreover, the main strategy is the integrated management of natural environment and water resources on a *watershed basis*.

2. AN OVERVIEW OF THE ENVIRONMENTAL PROBLEMS IN THE PROVINCES OF ZONGULDAK, BARTIN AND KARABÜK

The Provinces of Zonguldak, Bartın and Karabük are located in the North-West part of Karadeniz Region of Turkey (Map

♠Corresponding author, e-mail: ayalcuk@gmail.com

1). The environmental problems in the provinces of ZBK, according to the Environmental Status Provincial Reports used in the preparation of the Environmental Master Plan and the Environmental Reports prepared by the planning group, are as follows (Demirci, 2006; Environmental Status Provincial Reports).

Plan 1: The Provinces of Zonguldak, Bartın and Karabük in Turkey.

2.1. Environmental Problems in Zonguldak Province

2.1.1. Water Pollution

Zonguldak is an industrial city with heavy industrial facilities. Water pollution in the province is at significant levels. The reason for pollution in the surface water resources in Zonguldak Province is the direct release to the receiving environment of the wastewater, composed of domestic wastewater from the residential areas and industrial wastewater from the industrial plants, without any treatment. The main surface water resources in Zonguldak Province are Alaplı, Devrek, Gülüç, Kozlu and Filyos Creeks.

Chemical analyses were conducted at six points to determine the level and extent of current pollution in Filyos Creek. The analysis results of Yenice Creek showed high levels of heavy metals, firstly iron and secondly manganese. The reason for such high parameters of iron and manganese is the KARDEMIR facilities that discharge the wastewater without treatment to Yenice Creek. The pollution in Yenice Creek reduces the quality of water as it merges with Filyos Creek. According to the analyses of the samples taken from other points from Filyos Creek, it was observed that the parameters of heavy metals zinc and iron, of sodium, among cations, and, among the other analyzed parameters, nitrite nitrogen were high. Thus, the discharged domestic and industrial wastewater contaminate Filyos Creek, Yenice and Devrek Creeks that merge with this creek, and Alaplı and Gülüç Creeks and Acılık River.

The mountainous and rugged topography of the province and the scattered pattern of settlements result in a lack of or a partial service of sewage systems in the area. Most of the wastewater collected by the municipalities that have sewage systems in the province is discharged to the surface water resources largely without being subject to any treatment. Zonguldak is one of the provinces with the highest COD content in the sewage water in the Black Sea Region. The level of nitrogen in the sewage system of Zonguldak Province, furthermore, is higher than the other provinces in the Black Sea Region.

2.1.2. Air Pollution

In Zonguldak Province, coal production takes place since more than 170 years, and the main reason for pollution is coal and coal-based industrial activities. In the early years of industrialization in Zonguldak, the locations with raw material were selected without preconditions and the coal-based plants were established near the mines. In Zonguldak, where urbanization occurred after industrialization, the development took place around the industrial plants, so the industrial plants and mines were located in the city center amongst the settlements. Hence, it brought about air pollution, as well as visual and noise pollution. As urbanization took place after industrialization and in an unplanned manner, eventually the industrial facilities remained in the city. The most important industrial organizations causing air pollution in the Zonguldak Province are Erdemir Enterprises, Çatalağzı Thermal Power Plant, Çaycuma SEKA Paper Mill, Yurtbay Brick Factory and Filyos Fire Brick Plant. Another factor that causes air pollution in Zonguldak Province is the pollutants emitted to the atmosphere by combustion of fuels used for heating.

2.1.3. Land Pollution

One of the most important causes of land pollution in Zonguldak Province is the lack of regular solid waste storage areas. Solid waste from residential areas is mostly stored by using hazardous waste storage methods. The location of these irregular areas of solid waste collection without considering the site selection criteria and the altogether collection of the domestic, industrial and medical waste irregularly cause land pollution, as well as water, air and visual pollution.

2.2. Environmental Problems in Bartın Province

2.2.1. Water Pollution

The most important factor causing pollution both in surface water resources and groundwater in Bartın Province is the discharge of the domestic wastewater from the residential areas and industrial wastewater from the industrial plants to the streams and their tributaries without any sewage treatment and the consequent contamination of the sea through the rivers. The most important surface water resource in Bartın Province is Bartın Creek and Ulus, Gökırmak, Arıt and Kocanaz Creeks that feed this creek.

2.2.2. Air Pollution

Air pollution monitoring stations are not yet established in Bartın Province. Therefore, there is no information regarding the concentration of pollutants such as SO2 (sulfur dioxide), PM (particulate matter), CO (carbon monoxide), NOx (nitrogen oxide), hydrocarbons and lead emissions and these pollutant parameters could not be monitored. However, during the winter months, especially in the days of atmospheric stability, air pollution is observed. The increase in pollution during the winter is due to the fuels and the heating systems in the province.

2.2.3. Land Pollution

The causes of land pollution in Bartın Province are the misuse of fertile agricultural lands, the use of agricultural fertilizers and pesticides and the lack of a regular solid waste storage site.

There is currently no storage area in the province and the solid waste collected by all the municipalities is irregularly stored in the stream beds and vacant sites. The solid waste collected in the province is mostly discharged in the stream beds. There are heavy industrial facilities that cause air pollution in the organized industrial zone (OIZ). In general, the industries located in the OIZ are plastic, furniture, PVC doors and windows, textile, food and paint industries. Fuel oil, coal and liquid fuels are used in the OIZ.

2.3. Environmental Problems in Karabük Province

2.3.1. Water Pollution

The main surface water resources in Karabük Province are Araç , Soğanlı and Yenice Creeks. Araç and Soğanlı Creeks merge into Yenice River and Yenice River together with Devrek Creek form Filyos River, the most important and longest surface water resource in the province. The cause of the pollution of these surface water resources in Karabük Province is the direct discharge of the domestic wastewater from the residential areas and industrial wastewater from the industrial plants to the receiving environment without any treatment. In addition, the polluting gases and dust such as SO2 and NOx falling to the Earth's surface together with rain cause the pollution of surface water resources. In Karabük Province, except for the central district municipality and Municipality of Safranbolu, the domestic wastewater from all the district and town municipalities is discharged into Soğanlı and Araç Creeks and the tributaries of Yenice River. Soğanlı and Araç Creeks that run through Karabük Province merge into Yenice River, which then forms Filyos River together with Devrek Creek. Thus, the pollution caused by the direct discharge of the wastewater collected by the municipal sewage system and of the wastewater from the residential areas without sewage systems affects Filyos River and consequently contaminates the Black Sea.

2.3.2. Air Pollution

Karabük Province is an industrial city and the constantly evolving industry brought about problems related to migration. Especially after the establishment of the Karabük Iron and Steel Enterprises (KARDEMİR), the migration inflow increased and a rapid increase in population was observed in the province. As the migrants wanted to settle close to the industrial plant, KARDEMİR factory remained in the city center. Both population growth and the rapid industrialization of the province caused several problems, including air pollution. The main causes of air pollution in Karabük Province are the emissions from the fuels used for residential heating, from the fuels used in the industrial facilities and traffic emissions released into the atmosphere. However, it should be noted that the pollution caused by the industrial facilities, such as KARDEMİR, precede the effects of residential heating on pollution.

2.3.3. Land Pollution

In Karabük Province, the causes of land pollution are the lack of regular solid waste storage sites, hazardous waste storage methods and the excessive use of fertilizers and pesticides for increasing agricultural production. Moreover, the significant level of air pollution in the province plays a part in the level of land pollution. Although the surface water resources used for irrigation purposes in agriculture are currently suitable, the uncontrolled discharges into these surface waters negatively affect the quality of water and it causes land pollution in the agricultural areas irrigated by these surface water resources.

All the district and town municipalities in Karabük Province provide solid waste collection services, but the collected solid waste is stored by irregular storage methods. The irregular storage areas in Karabük and Safranbolu are vacant areas. The amount of solid waste collected per person during the winter months is higher than the one collected during the summer months.

3. PRESERVATION OF THE NATURAL, HISTORICAL AND CULTURAL ENVIRONMENT BY A STRATEGIC PLANNING APPROACH IN ENVIRONMENTAL MASTER PLANS

3.1. Understanding the Environmental Potential and Decision-Making on Watershed Basis

The State Planning Organization (DPT) has so far adopted the provincial administrative unit. However, due to environmental problems and the processes influenced by the concept 'sustainability', currently the *watershed* scale is taken as the basis in the 'sustainable regional growth (or development)' studies. The Regional Development Specialization Commission Report (DPT, 2000) states that the most appropriate 'Regional Planning Strategy' that could eventually reduce the inter-regional socio-economic disparities, the decisions that prioritize the centers and sectors, thus rendering these centers and the prioritized sectors the driving force of development, and the decisions considering these sectoral and regional priorities should be made on a watershed basis.

The aim of preparing plans on a watershed basis at a regional scale and in watersheds covering several provinces and river basins is shaped by the economical and rational utilization of especially the limited fresh-water resources (underground and surface) considering the increasing water needs, the necessity of knowing the use areas of these resources according to a *watershed plan* in order to make use of water and effectively use the water resources (SKKY, 2004), the necessity of taking precautions in the upper watersheds to protect the coastal areas, the possibility of ameliorating the low-quality water resources - given the economic and technical feasibility -, the necessity of determining the suitability of the current quality of the water resources to the quality criteria of the use areas, and the possibility of better protecting the forests, agricultural lands and the biodiversity that constitute these with the planning decisions made on a watershed basis.

Another aim of planning at a watershed scale is to determine the internal relationships and watershed capacity values of the natural resources in the three watersheds in Zonguldak, Bartın and Karabük and the effects of the human intervention on the environmental values of the watersheds, and to investigate the demands that will occur on the natural resources in the watershed, facilities and certain services.

Parallel to the plan at a watershed scale, it is aimed to develop a monitoring and evaluation system. The development of this system would be an important task of the Ministry of Environment and Forestry and of the other central and local administrations following the preparation of the Environmental Master Plan. The planning stages are composed of data collection, identification of aims and strategies, taking land use decisions, and evaluating and monitoring the outcomes of the implementation.

With the land use decisions, it should be aimed to establish a balance between the environmental assets of the watersheds and the development trends of the settlements through determining the natural areas to be protected (agricultural areas, forests, vegetation, etc.) and the areas inappropriate for settlement (slopes, geological hazardous areas, such as landslide areas) and taking into consideration the social and economic structure of the settlements located in the watersheds (Tunçer et al., 2006).

4. GOALS, SUB-GOALS AND STRATEGIES OF THE ENVIRONMENTAL MASTER PLAN FOR THE PROVINCES OF ZONGULDAK, BARTIN AND KARABÜK

4. 1. Environmental Goals

'Environmental preservation' should be the main goal in the environmental master plans (EMP) to be prepared. Ecological features and natural resources should be adopted as the main resources for economic and social development.

'Environmental Goals' should be addressed, examined in detail and assessed in the first place in a plan where environment is the primary input. For this end, the Environmental Goals of the Environmental Master Plan are listed below. These goals, together with the sub-goals and design criteria, are explained below (Tunçer et al., 2006).

4.1.1. Protection of Water Resources

Protection of water resources will be accomplished through the prevention of pollution of biological diversity and water resources on which this diversity depends in the ZBK Planning Region, appropriate disposal, recycling and elimination of solid and liquid waste, protection of natural assets, rendering these assets utilizable and maintaining them for the future.

4.1.2. Protection of Surface Water (sea and artificial lakes)

Sea pollution in Zonguldak and Bartın is at extreme levels in some parts. It is important to protect the current artificial lakes and those planned and under construction in the western part of the Black Sea Region, which often is damaged due to the floods and overflows. Thus, it is necessary to take measures in the coastal area against pollution caused by its hinterland, control land development and ensure that the extent and the degree of development do not negatively affect the flora and fauna of these areas. Therefore, Coastal Management Projects are significantly strategic projects proposed in the plan.

4.1.3. Protection of Groundwater Resources

The surface and underground water resources should be determined and protected scrupulously in the planning region. Water resources bear an important potential for the prevention of water-related crises in the future. Another increasingly influential factor causing water pollution is the disposal of solid and liquid wastes from the urbanized areas and the industrial facilities to the surface and underground water sources in the region. Moreover, it is known that artificial fertilizers that cause land pollution penetrate into water resources through irrigation or rainfall. It is an important environmental

goal to protect groundwater resources, ensure their sustainability and to prevent pollution.

4.2. Goals Regarding Environmental Problems

4.2.1. Prevention of Water Pollution and Water Quality Improvement

Prevention of sea pollution and pollution of water resources of vital importance in the planning region, improvement of the quality of water resources through elimination of pollution and maintaining this quality constitute an approach appropriate to the importance and sustainability of water resources. In addition to the current legal measures, this issue is determined as an important goal to define the measures to be taken with the EMP (Tunçer, 2006).

4.2.2. Solid Waste Collection, Recycling and Elimination

There are important initiatives in order to collect, recycle and eliminate particularly urban solid waste in the planning region. The municipalities collaborate for the establishment of a common landfill facility. The collection, recycling and elimination of solid waste is an important environmental goal of the EMP and the related strategies are developed.

4.2.3. Liquid Waste Collection and Treatment

Rapid realization of the ongoing projects of treatment facilities for liquid waste, which is the most observable and proportionally the largest pollutant, was set forth as one of the most important goals that could pioneer and encourage the accomplishment of other goals. Moreover, this issue is considered a 'Strategic Project' in the plan.

4.2.4. Prevention of Air Pollution

It is identified that the industries with outdated technology located in the city centers of especially Zonguldak and Karabük and the low-quality coal used in residential areas increase air pollution. Measures such as preventing over-population in areas where air currents cannot be effective and ensuring the use of natural gas in all the settlements are taken as decisions in the EMP. Especially through increasing the use of natural gas in residential areas and workplaces air pollution could reduce air pollution gradually. In addition, the plan suggests effective measures be taken for the prevention of air and water pollution caused by the ERDEMİR and KARDEMİR facilities.

4.2.5. Prevention of Land Pollution

The irregular use of artificial fertilizers for enhancing the efficiency of land is a rather important cause of land pollution. Besides, the limited amount of the 'Absolute Agricultural Lands' and their proximity to Bartın Creek and Filyos Creek, and threats such as erosion, flood and overflow are considered crucial factors in land protection. Prohibition of the use of all sorts of pollutants or elimination of them without polluting the land seems to be the optimal solution. (Tunçer et al., 2006).

4.2.6. Prevention of Pollution Caused by Industrial Plants

The pollution caused by the mining activities and the port in Zonguldak, and by ERDEMİR in Ereğli, and KARDEMİR in Karabük is significant. There are few treatment facilities in the Organized Industrial Zones in the planning region. In order to accomplish the goal of preventing the pollution already caused and will be caused by the industrial plants, pollution caused by the current plants should be prevented and the proper functioning of the systems in the treatment facilities should be ensured, as the land is inadequate and expensive, and the environment should be protected.

4.2.7. Use of Alternative Renewable Energy Resources (hydroelectric, wind and solar energy)

Using renewable alternative energy sources is an important goal that would support environmental protection and the reduction or elimination of different types of pollution (Göksu, 1993). An important strategy of the EMP is the use of the wind and solar energy potential especially in the coastal parts of Bartın as an increasingly popular alternative energy resource. The utilization of the hydropower resources through the use of the potential of the water resources in the region is of great importance. This issue as well is proposed as a 'Strategic Project' in the plan.

4.3. Goals Regarding Ecosystems

4.3.1. Developing plan decisions for the protection, improvement and recreational use of the forests in the planning region

The forests constitute approximately 64% of the Zonguldak, Bartın and Karabük Planning Region. The forests are protected by the Forestry Law. Abandonment of or land development in the areas between forests and the above mentioned woodlands due to inefficiency, would have a negative impact on the green areas. It is an environmental goal to protect the forests and the trees in the forests, regardless of their species.

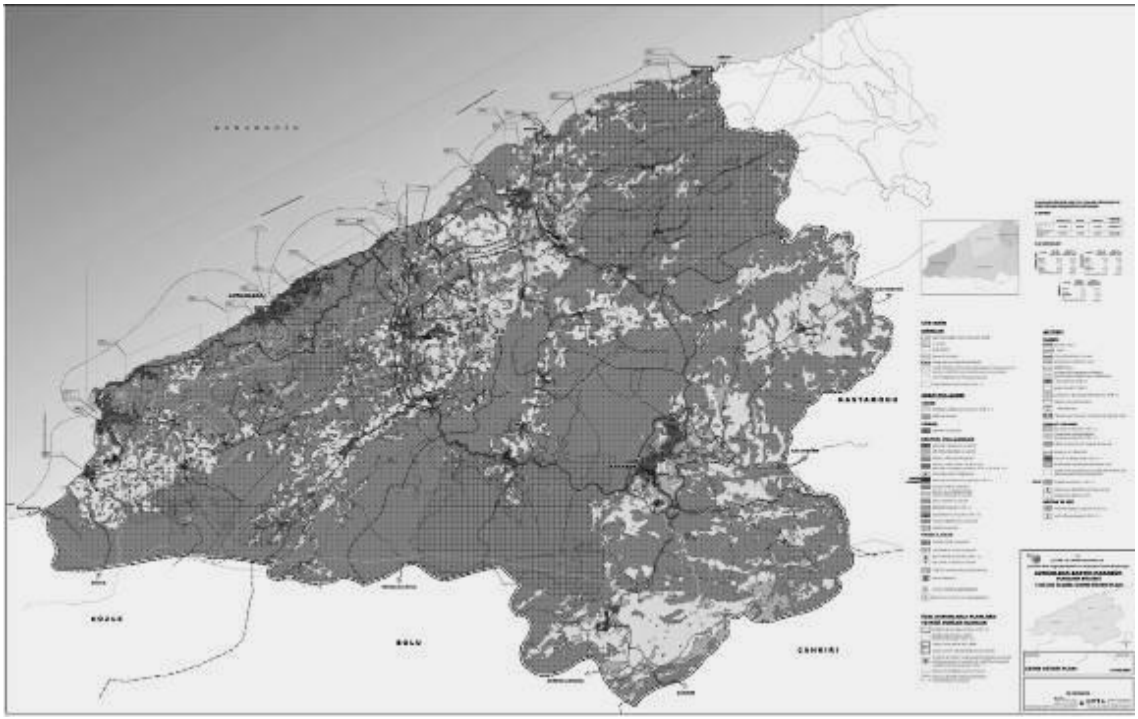
4.3.2. Protection of Flora and Fauna

Flora and fauna are one of the most important elements among the 'Environmental Assets'. Preservation of ecological balance is possible through protection of flora and fauna. Thus, a goal towards protection of environmental assets is not sufficient in general and flora and fauna should be taken into consideration within a separate goal.

4.4. Goals Regarding Urban, Archaeological, Natural and Cultural Assets

4.4.1. Protected Areas

Development Plans for Conservation should be prepared in accordance with the principles of preservation and terms of use, restrictions on land development, rehabilitation, renovation, the implementation phases and programs, the design principles regarding open space systems, pedestrian circulation and vehicle transportation and infrastructure facilities, density and plot designs, local ownership and financing the implementation of the project.



Plan 2. Zonguldak Bartın Karabük Planning Region (1/100 000) Environmental Master Plan

Environmental Master Plan of the ZBK Planning Region (1/100 000) given as a sample, and the following Plan Strategy is driven from that Master Plan (Plan 2).

STRATEGY 7: CULTURAL AND HISTORICAL ENVIRONMENTAL PROTECTION AND CULTURAL TOURISM: It is suggested that the outdated 'Development Plans for Conservation' be reconsidered and put in practice. For the sustainable protection and development of Safranbolu, which is in the list of World Heritage Cities, cultural tourism should be planned by considering the environs of the city and together with Yörük Village which bears one of the most authentic examples of local architecture. It is suggested that the structures in these settlements be protected through determining and documenting the assets in rural settlements similar to Safranbolu Yörük Village in order to preserve the local architecture. Traditional handicrafts will be developed. Yörük Village and Safranbolu and their surroundings are defined as cultural tourism and eco-tourism areas within the framework of prioritized development of the tourism /accommodation areas to the south of Amasra. Sub-scale tourism planning, compatible with the natural environment and based on low density development, will be made in this area.

.5. DISCUSSION AND CONCLUSIONS

A 'Watershed Management Model' is proposed as the primary planning approach for the Environmental Master Plan of the ZBK Planning Region (1/100 000). Watershed management will be based on the processes of natural resources of natural regeneration and sustaining their generations and the aim will be determining the use-preservation balance. In addition, it is planned to tackle and assess the historical and cultural assets and the urban and archaeological protected areas by means of strategic projects. 'Integrated Natural Resource Management' is defined as "the planning , development and management of the sustainable use of the natural resources by considering the main principles of ecology in a catchment basin to ensure the social, cultural and economic development of a society". This approach is an important method to take into consideration during the upper-scale planning stages. A plan which is more applicable, feasible, flexible and protective for the watersheds could be prepared by utilizing the abovementioned method in the future EMPs. Sustainable regional development could take place with the application of the strategies at sub-scales and the preparation of the related programs, plans and projects.

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