



INTERACTIONS BETWEEN LOCAL PEOPLE AND LAKES: AN EXAMPLE FROM TURKEY

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Abstract. The interaction of rural settlements by the Egirdir Lake and surroundings has been discussed in this study that has been conducted in order to support the studies of the Egirdir Lake Management Plan that is stated as a result of two-year study and to provide local participation for these studies. The method used in this study is based on questionnaire, interviews, and direct observations. Besides several meetings about rural settlements and the Egirdir Lake were conducted among local people, stakeholders and expert groups. According to the results of this study, the Egirdir Lake surroundings have been an important centre of attraction for human settlements from the past to the present. The people that established settlements around the Lake benefited from the Lake for various purposes. The benefit from the Egirdir Lake had not reached the sizes that could affect the hydrology of the Lake until 1960s. However, start of benefiting from the Lake for the purpose of agricultural irrigation in those years and the variation of benefit in the following years have been a significant element of pressure on the Lake. By reasons of these benefits, the Lake has consistently showed water deficit, and the pollution of the Lake has reached considerable sizes as well. When effectively managed by means of the Lake Management Plan, prepared with a participatory approach, the Lake can be protected from these negative effects.

Keywords: the Egirdir Lake, pollution, Lake Management Plan, participation, rural settlements, Turkey.

1. Introduction

The wetlands which are vital for protecting biological diversity and other ecosystems (Povilaitis and Querner 2008) provide a significant contribution to the economy of the area they are situated. For this reason people chose the areas that have water resources as settlements throughout the history. This fact which eased the life of human beings caused water resources to be destroyed because of the negative human effect. Due to unplanned and unconscious use, many water resources in Turkey are either dried or polluted. For instance: Amik and Avlan Lakes; Kestel, Gavur, Yarma, Aynaz, Otamış and Eşmekaya reed beds have completely lost their function today. Beyşehir, Tuz, Eber, Akşehir and Bafra Lakes are getting dried and polluted fast (Divrak 2007). If the required precautions are not taken, these natural water resources will completely lose their functions after a short time. Forasmuch as the current outcome of the Eber Lake was reflected in literature years ago; it was predicted that if precautions are not taken, the Lake, that has mesotrophic features, shall turn into a swamp with eutrophic features (Anonymous 1989; Ozturk *et al.* 1996).

Because of these sad experiences in Turkey which are mentioned above, international agreements such as the *Ramsar Agreement* which Turkey is a party to, the steps are being started for planned management of the wetlands. However, there are significant problems in preparing the plans and putting these plans into practice because of lack of local participation. The main reason for not having local

participation is that the views and related expectations of the users and managers for the resources are different (Kangas *et al.* 2007). The term participatory management means the management of natural resources with full participation of local people and involvement of real stakeholders (Purnomo *et al.* 2005; Cihar and Stankova 2006). Lately, decision-makers are increasingly aware of the importance of recognizing local participation in defining management strategies and actions required for sustainable natural resources management.

The Egirdir Lake and its surroundings has been one of the leading settlement centres that people have fought over since before Christ. The main reason for this is that the Egirdir Lake area is described with the word *Cennetabad*, which means a part from heaven. Recent research about the Lake has shown that this Lake is also getting polluted and losing water rapidly. If the balance of protection is not provided, the resource managers who realize that this pollution and loss of water shall continue, have now understood that it is vital to manage the Lake in a planned way. The studies for preparing a multi-disciplined team and management plan started with a participatory approach in 2006 under the coordinatorship of the Ministry of Environment and Forestry were completed in 2008. In order to apply this plan successfully, it is necessary for the local people to adopt this plan and continue making a contribution, as they did for the planning process, by increasing their contribution.

In this context, the main aims of the study are determined as follows: (1) to detail the interactions of the

local people that live around the Lake (2) to make efforts for the provision of local participation (3) to assist in transferring local experiences into the planning process (4) to determine the required precautions to be taken by local people in order to make the Eğirdir Lake to have a better condition.

2. Study sites

The Eğirdir Lake is the second biggest Lake in Turkey as a fresh water resource. The Lake, which is a valley Lake, extends North-South (48 km), has a height of 917.7 m above the sea level, its coastal length is about 150 km, the deepest part is 16 km, surface area is about 487 km², average depth is 7–8 m and its maximum elevation is 913.3 m (Altunbas 2007). Although a significant part of the Lake is in Eğirdir County in Isparta Province, it also has borders with the Counties of Senirkent, Yalvac and Gelendost (Fig. 1). In this context, 4 towns and 24 villages are affiliated with Eğirdir County, 3 towns and 5 villages are affiliated with Senirkent County, 2 towns and 11 villages are affiliated with Gelendost and 5 towns and 15 villages are affiliated with Yalvac County, all of which interact with the Lake to form the research area.

3. Material and method

In this study the interaction of rural settlements with the Lake are discussed in two different facets. Firstly, is there any effect that the Lake has on the socio-economic structure of the rural settlements? Secondly, is there any effect of the local people who live in these settlements by the Lake? Studies for providing local participation in preparing the Lake Management Plan and implementation process have also been conducted within this interactive area.

As a method survey, interviews, observations and meetings with as large participation as possible are used. Furthermore, the study also benefitted from current research related to the Lake which determined the effect on local people of the Eğirdir Lake. Academics within the

framework of preparing the Lake Management Plan used printouts of the workshop, congress and work group meetings that were organized with the participation of non-governmental organizations, decision-makers and executives. The printouts of the meetings made with interest groups such as villagers, village administrators (village headman), fishery cooperatives, agricultural representatives, etc. were used in the planning studies. The meetings held with the village administrators and villagers produced particularly useful results for providing information on local participation for the planning process. Whether there has been a reduction in the size of the Eğirdir Lake or not has been checked with the help of comparative satellite images for 1975 and 2002.

The survey forms which are prepared to obtain information on many subjects such as social, economic, demographic, cultural features of rural settlements, their perceptions of the Lake and their expectations are completed by using a face to face interview method.

There are 17 060 occupied houses in the study area. We conducted a survey with 1022 people as we aimed to complete a survey with at least 10% of subjects for each village out of the total number of occupied houses in the village. We gave priority to filling the survey forms particularly from the head of the family. We used SPSS 15.0 and Excel software programs for evaluating the survey forms. We also conducted interviews of a structural and semi-structural quality with the help of two different information forms within the investigation. The first of these forms has been filled out by village headmen, cooperative managers or other administrators, and the second forms are filled out by the related authorities of public organizations and institutions and different interest groups.

With the help of these forms, we gathered information for issues such as the general problems of rural settlements, types of usage of the Lake, the perceptions of administrators for the Lake and the aims of the interest groups for the Lake.

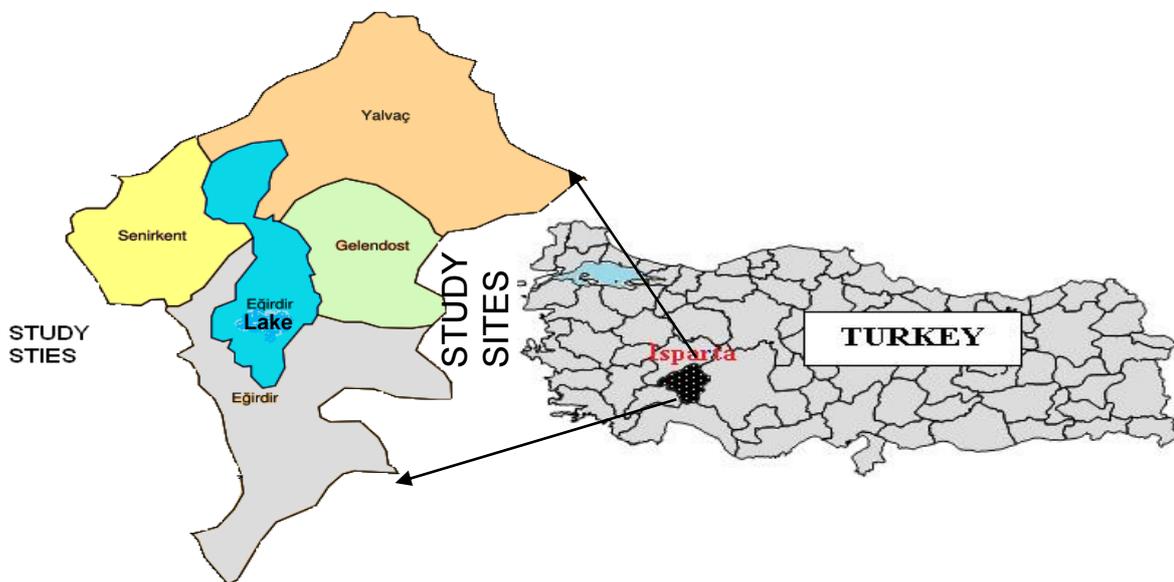


Fig. 1. Study sites

4. Results and discussions

The findings and discussion are presented in three main titles.

4.1. The effects of the Egirdir Lake on the rural settlements in the area

4.1.1. The effect of the Egirdir Lake on demographic structure

The areas suitable for stockbreeding had a significant role in the formation of the first settlements in the area. With the development of fruit growing, the areas that had irrigation facilities were chosen for new settlements. 70 256 people, in total, live in the rural settlements in the area, out of which 22 649 people live in Egirdir, 22 912 people live in Yalvac, 12 742 people live in Gelendost and 1195 people live in Senirkent Counties. The average house size is around 4.1, and this value is above the average for forest villages of Turkey. With the effect of the economic contributions that the Lake provides to the area, the rural settlements in the area are particularly more developed than the other forest villages of Turkey. As rural settlements in Turkey are not developed socio-economically, there is a wide migration from these settlements to the big cities. As the Egirdir Lake particularly enables the development of irrigated agriculture and fruit growing, its economic contributions to the area have made a difference to the migration issue. For the purpose of presenting this issue scientifically in the study, we used these questions: “Does anyone in your family migrate to another settlement area?” and “Do you think of migrating from your village to another settlement area soon? Or is there anyone in your family that wants to migrate out of the village?”. 39% of the people from Egirdir answered the first question as yes. 86% of them answered the second question as certainly no. The migration from rural areas to the big cities, which was the case in the past, has completely stopped in the settlement areas that have sufficient agricultural areas and irrigation water. Therefore, the Egirdir Lake provides a significant contribution for preventing the migration of the people in the area to the big cities, and the population in the area is increasing as well.

The area being economically developed has increased the importance of education as the literacy rate (90–100%) in the area is 20–25 points above the average of rural areas of Turkey. When we asked the villagers to describe themselves, a common description was that they are: “open to development and change, can easily adopt the changes and are hardworking people with an entrepreneurial spirit”. Village headmen in the village administration and mayors in the towns are the most effective people. The managers of co-operatives, imams and teachers are also accepted as the people whose advice is followed (by the villagers).

4.1.2. The effect of the Egirdir Lake on the living settings of the public: Physical substructure-superstructure

Many substructural and superstructural deficiencies which stand out in many rural settlements in Turkey are

not common in this area. Except in the quarters of villages which have scattered settlements, they are not faced with problems in terms of transportation, electricity and telephone (communication). The settlement units have a water-supply network except in some quarters. However, fresh water in some settlements can be inadequate in summer months. Although there are facilities such as a school and village clinic in rural settlements, there are personnel and material inadequacies. The main substructural problem in the area is that it does not have a sufficient drainage system.

4.1.3. The effect of the Egirdir Lake on rural occupation formation in the area

The relationship of local public with the Lake is described in Table 1. According to this, 35.8% of those who joined the survey have stated that they do not have any direct relationship with the Egirdir Lake, and 58.5% of them said that they benefitted from the Lake in some form or other. The most common use of the Lake is irrigation with an agricultural purpose. This form of use is followed by fishery product production.

Table 1. Relationship between local people and the Egirdir Lake

Relation with the Lake	%
Those that do not have any relation with the Lake	35.8
Those that produce fishery products	0.5
Those who benefit from the Lake for irrigation water	45.7
Those who benefit from the Lake for fresh water	0.3
Those who benefit from the Lake for natural tourism activities	0.5
Those who benefit from the Lake for both fishery products and irrigation water	7.0
Those who benefit from the Lake for irrigation water and fresh water	2.0
Those who benefit from the Lake for fishery product production, irrigation water and fresh water	2.2
Those who benefit from the Lake for fishery product production, irrigation water and natural tourism	0.3
Those that do not render an opinion	5.7
Total	100

An economic profession that provides income to the area is fruit growing. The leading factor that develops fruit growing is the Egirdir Lake. As, on the one hand, it meets the irrigation needs of the fruit gardens and, on the other hand, it makes a positive contribution to the climate of the area. Products such as apples, cherries, and peaches, etc. that are produced in the area are exported to foreign countries. Dry agricultural products are produced in the areas where there is no irrigation facility. The rural settlements that do not have irrigation water are quite behind the other villages in terms of socio-economic criteria.

The Egirdir Lake has a significant potential in terms of the production of fishery products. However, the diversity and amount of fishery products have considerably decreased because of the ecologic deterioration which has arisen in the Egirdir Lake. Although it has an important potential, ecotourism is one of professions that have not been developed in the area. The main reasons for this is

that new building facilities are not allowed to be built around the Lake as it is a fresh-water resource. The local people do not have sufficient information about ecotourism and they currently do not get support for this issue. With the start of application of the Lake Management Plan, significant positive developments are expected in tourism.

Developing tourism in the area will also make handicrafts (particularly rug-making which is a traditional form of occupation currently not undertaken) an important means of living again. Animal breeding in the form of dairy farming and stock breeding is deteriorating in the area day by day which makes the local population tend more towards agriculture. The most important factor which prevents the development of small-animal breeding is the restrictions for grazing in the forest and protected areas, together with the insufficiency of meadows. 47 of the rural settlements in the study area are classified as a forest village. Also, the government employs the people living in these villages for forestry activities. Forestry activities are an important source of income particularly for some villages of Egirdir.

The income from forestry activities is very low in Gelendost, Yalvac ve Senirkent as there are no production facilities for wood raw material and its derivatives or it is at a low level. On the other hand, the contribution of this profession to the basin is at a non-significant level, although there is an important potential for non-wood forest products in the area. The leather industry has been developed in Yalvac County. It is known that the industrial waste from this industry is one of the most significant factors in the pollution of the Lake.

4.2. Human effects on the Egirdir Lake and the present status of the Lake

The present status of the Egirdir Lake in the eyes of specialists, village administrators and local public is discussed under this title. Most of the evaluations made of

the Egirdir Lake agree that there is no contraction of the Lakes' borders. The satellite images for 1975 and 2002 also support this judgment. However, this means that the water in the Lake has not decreased in volume. The changes that arose until 1960s in the hydrology of the Egirdir Lake are completely accepted as meteorological in origin as the use of water from the lake for agricultural or electricity supply purposes did not exist until those years. The water was started to be taken from the Lake for electricity production in 1960s. The use for agricultural irrigation started in 1968. Also, an important part of the fresh water requirement for Isparta is met from the Lake. In consequence of the widespread use of the Lake, the water volume is showing a significant reduction in level (Kesici, E. and Kesici, C. 2006; LMP 2008). Egirdir Lake (Anonymous 1999). The Lake has produced first-class fresh water in the past, but now it is exposed to significant losses in terms of water quality with the onset of pollution.

The increase in the biomass that is observed in the Lake over recent years is accepted as a sign of eutrofication by many specialists. Some other signs that are accepted as indicators of pollution in the Lake can be listed in these forms: the deterioration in the appearance of the Lake, decrease of planktons, decrease in fish, increase in the concentration of pollutants such as pesticides and heavy metals (Anonymous 2006; Beyhan and Kaçikoç 2008). Pollution in the Lake will be greatly influenced by whether the local population sees it as significant and whether the solutions put forward in the planning process will be put into practice. It is also among vital conditions for achieving local public participation. The local public perception of pollution in the Lake were determined in the study. Information forms were used for determining the perception of village administrators, and survey forms were used for determining the perception of villagers. The findings are given in Tables 2 and 3.

Table 2. Perception of village administrators (*village headman, member of administration*) related to the Egirdir Lake

Settlements	Lake's present situation in comparison with the past				Lake's future situation (If necessary precautions are not taken)			
	Better (%)	Worse (%)	No change (%)	No opinion (%)	Better (%)	Worse (%)	No change (%)	No opinion (%)
Villages of Egirdir County	4.3	87	8.7	–	–	87	13	–
Villages of Senirkent County	–	25	–	75	–	25	–	75
Villages of Gelendost County	–	50	25	25	–	50	25	25
Villages of Yalvac County	10	35	–	55	–	45	–	55

Table 3. Local public perception related to the Egirdir Lake

Settlements	There is pollution in the Lake (%)	There is no pollution in the Lake (%)	No opinion (%)
Villages of Egirdir County	78.4	12.8	8.8
Villages of Gelendost County	51.5	16.9	31.6
Villages of Senirkent County	41.5	22.0	36.6
Villages of Yalvac County	22.5	8.3	69.2
Together with all the settlements	56.8	13.2	30.0

As can be seen in Table 2, village administrators either stated that the Lake is worse than in the past or they avoided giving any thought on it. A major portion of administrators believe that the future status of the Lake will get worse if precautions are not taken. Also, a significant part of the local public, especially those living in the settlement areas that are affiliated to Egirdir County, are aware that there is pollution in the Lake. The local public stated that they noticed pollution by change in the water colour, decrease in fish and other fishery products, a bad smell in the Lake and on the grazing pasture. In accordance with the views of specialists, recent literature and the local public perception, the main elements that cause pollution in the Lake are described below.

Heavy use of chemicals causes these components to permeate/penetrate easily into the land and water ecosystem (Laturnus and Gron 2007). It is known that chemical material waste used in agricultural activities around water resources has an important role in the pollution of these resources (Bulut and Aksoy 2008; Kumbur *et al.* 2008). The chemicals used in agriculture are formed of two main groups which are fertilizers and pesticides. One of the most important elements which contributes to the pollution of the Egirdir Lake is pesticides which are used in agricultural activities and that are used especially in the areas which are near to or have borders onto the Lake. Early alarm systems against potential diseases and the establishment of new chemical preparation units, all of which have been developed within the studies for the management plan in the area, have been the main recommendations which the local population have given the most credit (Alkan *et al.* 2007). Although the effects of chemical fertilization from the agricultural areas on the pollution in the Lake are not stated certainly as yet, it is stated that there is a possibility that these activities may cause nitrogen phosphorus pollution in the Lake (Coskan and Atilgan 2007).

Different interventions (such as opening artificial canals) made to the natural water resources in the areas, where there is intensive agricultural activity, and the use of inefficient irrigation methods not only reduces the agricultural fertility but also can cause these resources to waste the water (Povilaitis and Querner 2008; Abdullaev *et al.* 2009). The most common form of irrigation used in the agricultural activities around the Egirdir Lake Basin is surface irrigation. These applications not only cause the Lake to lose water significantly but also cause the organic materials and chemical waste in the agricultural areas to reach the water resources. In this context, the suggested solution, which requires local public participation, is to expand the drop irrigation method (closed system) which needs to be used generally in the area. This minimizes the water losses, and support for the villagers technically and financially is required.

Another factor which is significant in the pollution of the Lake is that waste products from the cold storages that are used in fruit growing, fruit-juice factories, the leather factory in Yalvac and the town and houses are all discharged into the Lake without treatment/treating/cleansing at a sufficient level. There is a sewage system

in a small part of the settlements, and waste from these villages is generally discharged into nature or water resources such as the Egirdir Lake instead of treatment facilities. Also, people throw poisoned chemical packages and many solid wastes into the environment and water resources in many villages. For this reason, educational studies have been started in villages alongside planning studies. Studies for collecting agricultural chemical packages and ensuring, that the chemicals are prepared at chemical preparation units, are one of the study fields that need to be given importance.

One of the other factors that has added to the deterioration of the natural structure of the Lake is the over fishing, which is continuing at the Lake now, and wrong interventions have been made surrounding this function (Bolat and Bostan 2007). The local public has noticed that the amount of fish stock in the Lake has decreased. Thanks to this, prohibition of hunting in the Lake for 3 years was enforced with participation of the local public and in co-operation with the Egirdir Lake Management Plan. It is supposed that the destruction of the forest that occurred in the basin where the Lake is located, especially in the upper parts, increased the amount of sediment in the waters that feed the Lake and negatively affected the water quality. It is known that the destruction of forest cover decreases absorption of rain waters by the earth and increase the surface flow (Okonski 2007).

4.3. The aims and applications presented for the Lake and rural settlements with a participatory approach

The Egirdir Lake Management Plan coordinator and planning team that gave priority to local public participation firstly organized several meetings in order to determine the way and methods to be followed in the planning studies. A nationwide workshop and a congress were organized in order to share the gathered experience later and take the views of different interest groups. In the light of the information obtained from this process, the way forward has become certain to ensure local public participation. In this context, the following was organized: (1) presentation meetings were organized within the areas of Counties that have a relation with the Lake; (2) meetings were conducted with the administrators of the rural settlements and villages; (3) meetings were arranged with the representatives of those that run business in fishery, animal breeding, tourism and agriculture, etc. (4) meetings were conducted with the representatives of public organizations and institutions that have a relationship with the Lake; (5) work-group meetings were held that were open to participation for everybody and arranged in the areas where everybody had an easy access. Also, the villagers were informed about the planning process and the expectations from themselves before the survey and interview studies.

Thanks to the studies stated above, it has been determined that the Egirdir Lake has been polluted rapidly, lost water, and the local public have noticed this issue as well. Making the local public aware of the fact that the Lake is dying rapidly created an empowering effect on

the local public and their attitude to participation in the planning studies. However, 79% of the subjects that joined the research stated that they want to work actively in a study for betterment of the Lake and they will obey the prohibitions and restrictions that are made for the use of the Lake with pleasure if it serves the betterment of the Lake (Table 4). Thanks to this, many of the aims and targets produced within planning and the restrictions related to the use of the Lake were determined with the participation of local public and other interest groups. Some of these are summarized below.

Table 4. Local public participation desire to improvement works connected with the Egirdir Lake

Settlements	I participate with pleasure (%)	I don't participate (%)	No opinion (%)
Villages of Egirdir County	84.2	13.7	2.1
Villages of Gelendost County	78.2	13.2	8.6
Villages of Senirkent County	90.2	9.8	–
Villages of Yalvac County	68.3	11.7	20.0
Together with all the settlements	79.2	12.9	7.9

It is necessary to decrease the amount of water used for agricultural activities as well as pesticides and artificial fertilizers in order to protect the quantity and quality of the Egirdir Lake water. To achieve this the following steps are planned: (1) to facilitate a change to move towards the methods that cause less water loss such as drop irrigation instead of surface irrigation for the irrigation of agricultural areas and give support to the villagers to achieve this; (2) to determine the best and most environmentally friendly chemicals and fertilizers to be used by the villagers which will support the application of organic agriculture by decreasing the use of these non-organic products; (3) to ensure that the chemicals are properly prepared in the chemical preparation units; (4) to support the villagers in the most biologically suitable methods in the fight against agricultural pests.

Reducing the solid and fluid domestic and industrial waste that are discharged into the Lake is one of the other important targets that are stated in the Lake Management Plan. In order to achieve this target, the predicted applications for the local public are of the following forms: (1) making the villagers aware of the cleanliness, health, etc. issues and (2) controlling the settlements around the Lake.

In order to provide sustainability of fishery in the Lake, fishing has been prohibited in the Lake for 3 years with participation of fishery cooperatives and the local public. During this time, it has also been planned to cancel the debts of fishery cooperatives and undertake studies for supporting the natural species of the Lake. These studies have commenced.

As it has been stated before, the area has a significant potential especially for ecotourism. In order to revive

this potential, it is necessary to make the public more aware and guide them in activities such as running a guesthouse, agro-tourism, nature, sports activities, etc. and ensure that the related education-support studies are in place. For this purpose, some positive steps have already been taken. As it is observed, some issues that have been brought to light by the planning process may cause significant local disquiet. Nonetheless, the studies have started to remedy these concerns (some of them are mentioned above) and with the local public being keen on saving the Lake will increase the ability to apply the plan and have success.

5. Conclusion

The Egirdir Lake is the most important natural resource on which many of local professions in rural settlements in the area are dependant. Economic dependence on the Lake increases day by day because of the development of fruit growing in the area. Almost all the rural settlements have an interest or expectation in the Lake today and in future. This status is one of the most important pressures that the rural settlements put on the Lake. It is possible to add other pressure factors such as the deterioration in the ecological structure of the Lake, production of uncontrolled fishery products, and discharging fluid and solid domestic and industrial waste into the Lake.

Putting the Lake Management Plan into practice, decrease of negative human effects on the Lake should be seen as an important opportunity for saving the Lake. The local public's awareness of negative changes in the Egirdir Lake and their willingness to have an active role in the studies for solving the problems of the Lake are the main guarantee of the applicability of the Management Plan. Yet, it is necessary to further increase the awareness level with educational studies and support the local public with suitable projects in order to prevent local public negative perception around losses of interest related to the resource that may arise because of some prohibitions and restrictions which are introduced during the term of the Plan.

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References

- Abdullaev, I.; Kazbekov, J.; Manthritilake, H.; Jumaboev, K. 2009. Participatory water management at the main canal: A case from South Ferghana Canal in Uzbekistan, *Agricultural Water Management* 96: 317–329. doi:10.1016/j.agwat.2008.08.013
- Altunbaş, S. 2007. Egirdir gölü yönetim planı aşamaları [Phases of Egirdir lake management plan], in *Egirdir Lake Management Plan Symposium*, 22 May 2007, Isparta, 16–17.

- Anonymous 1989. *Türkiye'nin sulak alanları* [Wetland's Turkey]. Turkey Environment Issues Society, Publication No: 89.06. Y. 0011. 29.
- Anonymous 1999. *İçme suyu kaynağı olarak Egirdir Gölü'nün korunması projesi* [Egirdir Lake conservation Project as its drinking water resources]. Hacettepe University. Environment Application and Investigation Office. Ankara.
- Anonymous 2006. *Isparta çevre durum raporu* [Isparta environmental situation report]. Isparta Governorship, Environment and Forestry Country Directorate, Isparta.
- Alkan, H.; Altunbas, S.; Korkmaz, M. 2007. Egirdir yöresindeki kırsal yerleşimlerin sosyo-ekonomik yapıları ve Egirdir-Kovada göllerine yaklaşımları üzerine bazı tespitler [Socio-economic situation of the rural settlements in the Egirdir region and their attitudes relation to Egirdir and Kovada lakes], in *Lakes Congress 9–10 June 2007*, Isparta.
- Beyhan, M.; Kaçıkçıoğlu, M. 2008. Egirdir gölü su kalitesi [Egirdir lake water quality], in *Egirdir Lake Management Plan (2008-2012)*, Lake Management Plan Series: 1. Isparta. ISBN 978-975-585-956-9.
- Bolat, Y.; Bostan, H. 2007. Geçmişten Günümüze Egirdir Gölü Balık Faunası ve Balıkçılık Profili [From past to day Egirdir lake fish fauna and fishing profile], in *Egirdir Lake Management Plan Symposium*, 22 May 2007, Isparta, 23–24.
- Bulut, E.; Aksoy, A. 2008. Impact of fertilizer usage on phosphorus loads to Lake Uluabat, *Desalination* 226: 289–297. doi:10.1016/j.desal.2007.02.112
- Cihar, M.; Stankova, J. 2006. Attitudes of stakeholders towards the Podyji/Thaya River Basin National Park in the Czech Republic, *J Environ Manage* 81: 273–285 .
- Coskan, A.; Atılğan, A. 2007. *Egirdir'de Tarım ve Çevresel Etkileri* [Agriculture at the Egirdir and its influences], in *Egirdir Lake Management Plan Symposium*, 22 May 2007, Isparta, 22–23.
- Divrak, B. B. 2007. Suya Doğru Bakmak [Accurate look towards water], in *Egirdir Lake Management Plan Symposium*, 22 May 2007, Isparta, 10.
- LMP 2008. *Egirdir gölü yönetim planı (2008-2012)* [Egirdir Lake Management Plan (2008-2012)]. Lake Management Plan Series: 1, Isparta. ISBN 978-975-585-956-9.
- Kangas, A.; Laukkanen, S.; Kangas, J. 2007. Social choice theory and its applications in sustainable forest management – a review, *Forest Pol and Eco* 9 (2006): 77– 92. doi:10.1016/j.forpol.2005.02.004
- Karasar, N. 1994. *Bilimsel Araştırma Yöntemi (6.Basım)* [Scientific research method (sixth printing)]. Nobel Publication Place, Ankara. ISBN 975-591-046-8.
- Kesici, E.; Kesici, C. 2006. Egirdir Gölü'nün doğal yapısına yapılan müdahalelerin gölün ekolojik yapısına etkileri, *E.U. Water Products Journal* 23: 99–103.
- Kumbur, H.; Özsoy, H.D.; Özer, Z. 2008. Mersin İli'nde tarımsal alanlarda kullanılan kimyasalların su kalitesi üzerine etkilerinin belirlenmesi, *Ekoloji* 17(68): 54–58.
- Laturnus, F.; Gron, C. 2007. Organic Waste Products In Agriculture – Monitoring The Waste Constituents Phthalate Esters In Soil-Crop System By Gas Chromatography And Ion Trap Tandem Mass Spectrometry, *Journal of Environmental Engineering and Landscape Management* 15(4): 253–260.
- Okonski, B. 2007. Hydrological response to land use changes in central European Lowland Forest Catchments, *Journal of Environmental Engineering and Landscape Management* 15(1): 3–13.
- Ozturk, M.; Secmen, O.; Leblebici, E. 1996. Eber Gölü (Afyon) bitki örtüsü ve kirlenme ilişkileri [Fauna of Eber lake (Afyon) and relations between fauna and pollution], *Ekoloji* 20: 14–16.
- Povilaitis, A.; Querner, E. P. 2008. Possibilities to restore natural water regime in the Žuvintas Lake and surrounding wetlands—modelling analysis approach, *Journal of Environmental Engineering and Landscape Management* 16(3): 105–112. doi:10.3846/1648-6897.2008.16.105-112
- Purnomo, H.; Mendoza, G. A.; Prabhu, R.; Yasmi, Y. 2005. Developing multi-stakeholder forest management scenarios: a multi-agent system simulation approach applied in Indonesia, *Forest Pol. and Econ.* 7: 475–491. doi:10.1016/j.forpol.2003.08.004

GYVENVIETĖS EŽERŲ APYLINKĖSE. NAUDOJIMASIS IR JIEMS DAROMA ŽALA (TURKIJOS PAVYZDYS)

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S a n t r a u k a

Nagrinėjamas Egirdir ežero ir jį supančių kaimo gyvenviečių nevienareikšmis ryšys – nauda turima iš ežero ir jam daroma žala. Tyrimas buvo atliekamas dvejus metus kurtam Egirdir ežero tvarkymo planui papildyti. Tyrimo metodas pagrįstas apklausomis, interviu ir tiesioginiais stebėjimais. Buvo organizuota keletas vietinių žmonių, tarpininkų ir ekspertų grupių susitikimų dėl Egirdir ežero tvarkymo. Šio ežero aplinka visada buvo svarbus traukos centras žmonėms įsikurti. Žmonės, apsistoję aplink ežerą, naudojami juo įvairiais tikslais. Iki 1960 m. tai ežero hidrologijai didesnės įtakos neturėjo. Situacija pablogėjo ežerą pradėjus naudoti žemės naudmenoms drėkinti. Labai suaktyvėjo ir ežero tarša. Efektyviai laikantis planingų tvarkymo priemonių, ežeras gali būti apsaugotas nuo neigiamo poveikio.

Reikšminiai žodžiai: Egirdir ežeras, tarša, ežero tvarkymo planas, dalyvavimas, kaimo gyvenvietės, Turkija.

ПРИОЗЕРНЫЕ ПОСЕЛЕНИЯ. ИСПОЛЬЗОВАНИЕ ОЗЕР И НАНОСИМЫЙ ИМ ВРЕД (НА ПРИМЕРЕ ТУРЦИИ)**Г. Алкан, М. Коркмаз, С. Алтунбас****Резюме**

Исследуется взаимосвязь сельских поселений вблизи озера Эгирдир и окружающей среды: польза, получаемая от озера, и наносимый ему вред. Исследование дополняет план обустройства озера Эгирдир и предоставляет сведения об участии местных жителей в подобных исследованиях. Метод, применявшийся в исследованиях, основан на опросах людей, интервью и непосредственных наблюдениях. Состоялись встречи местных жителей, посредников и групп экспертов по вопросам заселения поселений и обустройства озера Эгирдир. На основании исследований установлено, что окрестности озера Эгирдир были и остаются важным центром притяжения людей с целью поселиться там. Поселившиеся там люди используют озеро в различных целях. Использование озера Эгирдир до 1960 г. не оказало значительного воздействия на гидрологию озера, однако после того, как озеро стало использоваться для орошения сельскохозяйственных угодий, ситуация ухудшилась. Увеличилась загрязненность озера. Избежать негативного влияния на озеро можно, если эффективно применять меры, предусмотренные планом по обустройству озера.

Ключевые слова: озеро Эгирдир, загрязненность, план по обустройству озера, участие, сельские поселения, Турция.

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