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## **STUDY OF ATTITUDES AND PERCEPTIONS OF LOCAL COMMUNITY ACCORDING TO THE MANAGEMENT OF LAKE KERKINI (GR1260008), N. GREECE.**

**Anna LATSIOU<sup>1</sup>, Vassilis DETSIS<sup>1</sup>, Georgios EFTHIMIOU<sup>2</sup>, Despina SDRALI<sup>1</sup>**

<sup>1</sup>Harokopio University, Greece, [detsis@hua.gr](mailto:detsis@hua.gr),

<sup>2</sup>Agricultural University of Athens, Greece [efthimiou@aua.gr](mailto:efthimiou@aua.gr)

**Abstract.** Lake Kerkini is one of the most important lakes in Northern Greece hosting rich biodiversity. It is an artificial lake protected by international conventions and the EU and national legislation. It belongs to the European ecological network NATURA 2000 under code GR1260008.

Aim of this study was to investigate the attitudes and perceptions of the inhabitants of the settlements near Lake Kerkini, with respect to the management of the lake's ecosystems, with special focus on its integration into the Natura 2000 Network and its Management Body's (M.B.) actions. An anonymous questionnaire that was used as a survey tool was filled by inhabitants of the settlements located around the lake. The survey took place in the summer of 2019. The results of the survey showed that half of the residents knew about the NATURA 2000 network, while 1/3 of the respondents did not know what the NATURA 2000 network was. 13.22% of them did not know that Kerkini belongs to Natura 2000 network. 31.61% of respondents believed that the integration of the lake into the network has stimulated ecotourism and the local economy, while 1/4 of them (24.14%) believed that the area did not benefit from the protection status. Regarding the M.B. only 32.18% of the respondents are aware of its existence and actions, while there is a small percentage (7.47%) who believe that the operation of the Management Body impedes the daily life of residents due to imposed bans and restrictions. The majority of respondents, who were positive about: a) the NATURA 2000 network (89.1%) and b) the existence and operation of the MB (87.9%), were people active in the secondary and tertiary sectors.

**Keywords:** Kerkini Lake, protected area, management, attitudes, perceptions

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### **1. INTRODUCTION**

Research on the perceptions, and attitudes of the local community regarding Natura 2000 protected areas, has revealed both positive and negative approaches. In some cases the inclusion of an area in the Natura 2000 network was found to be an effective tool for maintaining biodiversity, ecological integrity and social cohesion and at the same time an obstacle to economic local development due to strict restrictions and inflexible regulations (Dimitrakopoulos et al. 2010; Grodzinska-Jurczak & Cent 2011; Pietrzyk-Kaszyńska et al. 2012; Geitzenauer et al. 2016). The protected areas are the subject of intensive scientific research and are of high educational interest (Efthimiou 2015, Mose & Weixbaumer 2007, Efthimiou et al. 2017).

In particular, the cases of severe restrictions were linked to low levels of trust both towards the Nature 2000 Network and the competent authorities (Kamal & Grodzinska-Jurczak 2014). In a study in Latvia (Pavasars 2013) the problem of lack of trust in authorities and management bodies is described by the existence of 'two parallel realities', the environmental protection condition in general and the environmental protection condition in the daily lives of rural people. The acceptance of the local community with regard to the inclusion of sites in the Nature 2000 Network depends on factors at the individual level, such as educational level, established interests, potential restrictions on land use, land ownership regimes, trust in institutions, socio-economic status, degree of satisfaction with the recreational experience, etc. (Torbidoni 2011; Pietrzyk-Kaszyńska et al. 2012; Geitzenauer et al. 2016) and is enhanced by effective participation, stronger cooperation for local interests, better cooperation between administrative authorities and appropriate information and educational campaigns (Kafyri et al. 2012; Marmureanu & Geamana 2012).

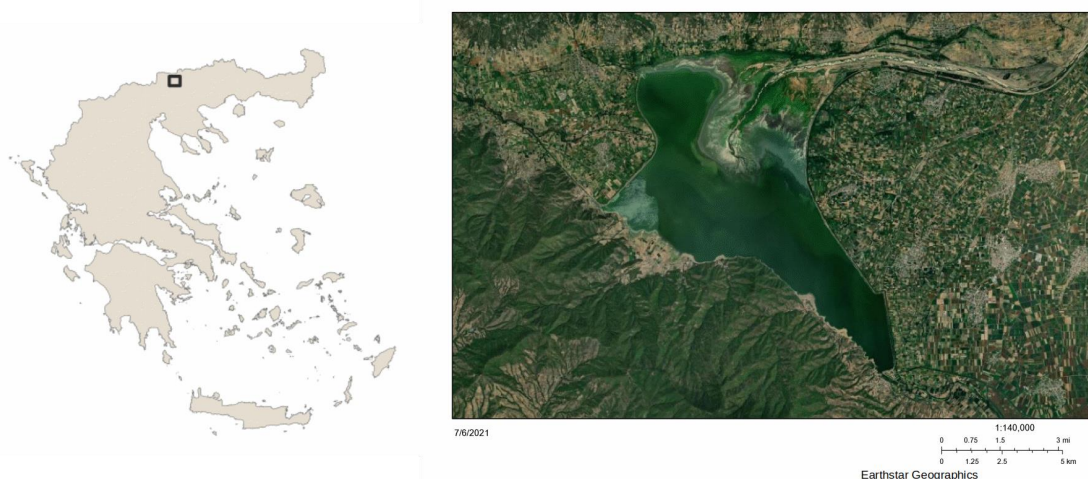
Vokou et al. (2014), in their research for the evaluation of the co-management framework *ανα*adopted and implemented in Greece over the last 10 years for the management of protected areas, found that only in 3 of the 28 Management Bodies (M.B.) the local community has accepted and understood the actions for the

protected areas of the country. One of the axes of their study was the relations between the local community and the M.B. Moreover, the survey showed that 44% of Management Bodies rarely undertook relevant information events for the local community.

Knowledge about the attitudes and perceptions of residents concerning management of wetlands – protected areas, is incomplete. The purpose of this research is to study the attitudes and perceptions of the inhabitants of the areas near Lake Kerkini, regarding issues related to the management of the wetland and in particular the integration of the area into the Nature 2000 Network and the actions of its Management Body.

## 1.1 Research area

Lake Kerkini is located in north-eastern Greece, in the north-west part of the Serres prefecture (Macedonia, Greece), 40 km from the city of Serres (Map 1). It is an artificial lake with the shape of an inverted abalone with the top in the Lithotopos gate and a central axis length of 15km. It was created by a barricade built in 1932 on the River Strymon, in order to contain and store the flood water flow of the river for irrigation during the summer months. It is mainly fed by the River Strymon that comes from Bulgaria and flows into the lake, in its northern edge. The largest number of water-buffaloes, which are considered an endangered breed in Greece, about 2700 animals, i.e. 82% of the country's water-buffalo, lives in the lake area.



Map 1. Location and satellite image of the study area

### 1.1.1 Ecological importance

The flora of the lake area is rich consisting of about 1300 species. Willows, poplars and plane trees are the dominant forest species. Four species are included in the Red List of Plants of Europe (*Minuartia saxifraga* (R), *Salvinia natans* (E), *Trapa natans* (V), and *Viola stojanowii* (R)). 11 species are protected by national legislation, while 18 Balkan endemic species have been recorded in the lake flora.

More than 300 bird species have been recorded in the National Park of Lake Kerkini. According to the Kerkini Lake Management Body 137 species breed, while 163 species use the wetland and the wider area as a stopover for rest and feeding during their migration journeys. Lake Kerkini is considered to be an important area of the pelican (*Pelecanus crispus*) in Europe. 32 species of fish have been recorded in the lake and 25 species of reptiles and 11 species of amphibians have been recorded in the area.

### 1.1.2 Institutional framework and management

Lake Kerkini has great ecological value, which is reflected in the institutional framework that governs it. It is protected by the Ramsar Convention and the Barcelona International Convention and it belongs to the European Network "Natura 2000" with code GR1260008.

The Kerkini Wetland is managed by the Management Body of Kerkini Lake, the Management Authority was founded by the laws 2742/99 (OJ 207A/7-10-1999) and 3044/02 (OJ 197A/27-08-2002). The area was established as Kerkini Lake National Park in the autumn of 2006.

The creation of the new dam and the raising of the lake's water level by at least three meters compared to the past, brought about strong changes in the main habitats and impacts on the biodiversity of the area. For example, the reeds and water lilies in the northwest part of the lake have shrunk drastically. Also according to the M.B. in the 20 year period 1980-2000, the riparian forest was reduced to half of its original area.

## 2. MATERIALS AND METHODS

The study was carried out by a survey using the questionnaire method. The questionnaire of this survey included close-ended questions on the views and perceptions of the inhabitants regarding the inclusion of the lake area in the Nature 2000 network as well as its management by the M.B. It was split in two parts. The first one included questions concerning demographic and social data (sex, age, education, occupation, marital status, place of residence) while the second included the questions dealing with the status and the management of the protected area. The survey was carried out on the inhabitants of the settlements of the lake area in the summer of 2019. The answers were all anonymous. A total of 174 questionnaires were collected; the statistical analysis was carried out with SPSS v.16.

## 3. RESULTS AND DISCUSSION

The analysis of the profile of respondents showed that 36.1% had compulsory education (9 years school), while 43.25% had higher education (university degree or similar). 78.16 % of the respondents were aged between 25 and 60, while 13.22% was over 60 years old. In the primary sector, 28.16% of respondents were active in the primary sector while 11.49% were unemployed.

### 3.1 Views on the inclusion of the lake in the Natura 2000 network.

54.02% of the sample is aware of the above mentioned information, 32.18% have heard about this information, but do not know what it is and 13.22% - a small percentage, has never heard that Lake Kerkini is part of the Nature 2000 Network.

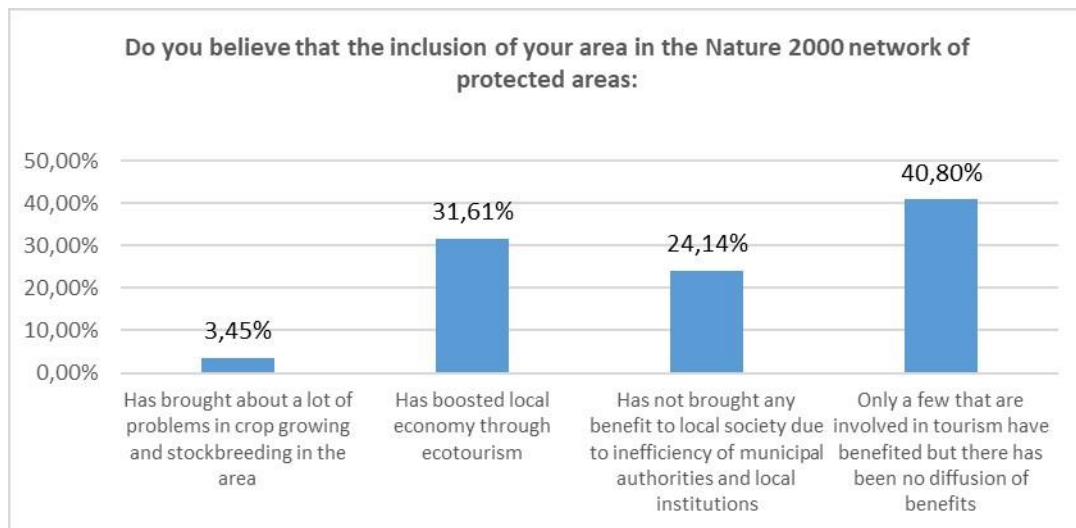
31.61% of respondents believe that the inclusion of Lake Kerkini in the network of nature protected areas has given impetus to the local economy with the development of ecotourism (Figure 1). On the other hand, 24.14% of respondents felt that this integration did not bring any benefit to the local community (there was no diffusion of the benefits overall in the local community) due to the inefficiency of municipal and local authorities and therefore benefited only the few involved in the tourism sector (40.80%) (Figure 1).

According to the views of the respondents on the protection of Lake Kerkini and in general the areas of the Nature 2000 network it would be useful to increase the percentage of organic farming. More specifically, in the wider area of Kerkini Lake, free events should be organized to inform farmers about the current funding programmes and the conditions for their inclusion (30.46%), 2) more farmers should benefit from the system of organic farming subsidies (27.59%) and 3) model farms should be established in the area to provide opportunities for education and experience gaining (25.86%).

### 3.2 Views about Kerkini Lake Management Body

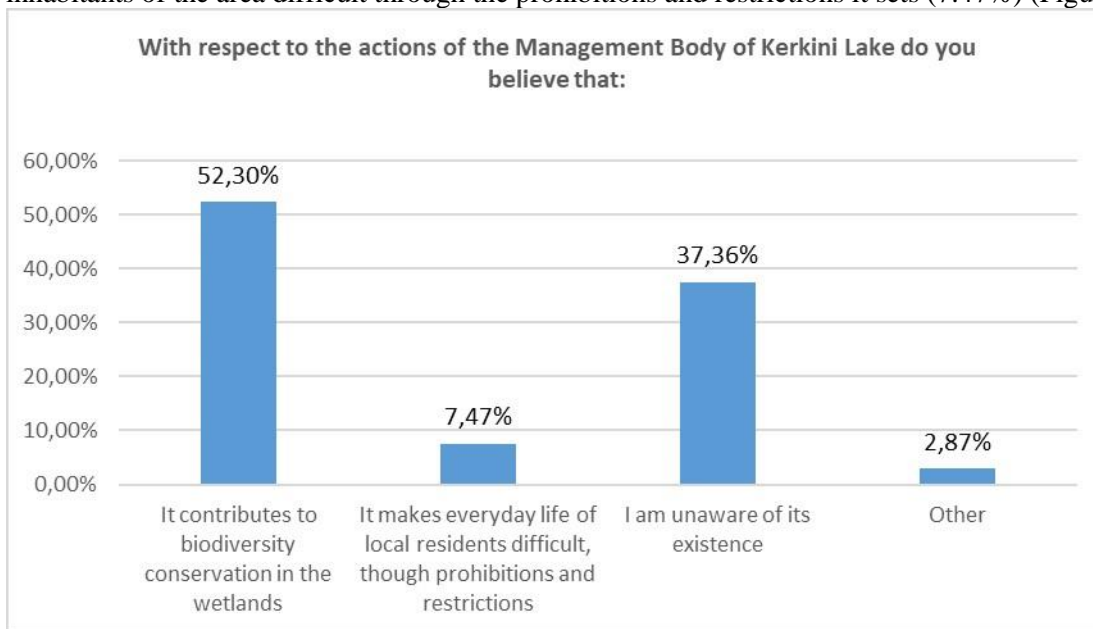
About of 40.23% of the sample has heard about this Institution, but does not know about its actions, while a significant percentage, 21.26% have never heard of the M.B. Only 1/3 of the respondents (32.18%) are aware of the existence and the actions of the management body of Lake Kerkini

Regarding the actions of the Management Body, 52.87% of the survey participants believe that they should include the guarding and supervision of the protected area and 24.14% believe that they should include the concern for solving the problems of farmers and stockbreeders of the area. 18.39% of the sample states that a core action of the Management Body should be the environmental education of the public and pupils, while there is also a small percentage, only 4.60%, who believe that the Management Body of Kerkini Lake cannot offer any assistance to the area with its actions.



**Figure 1.** Respondents' views on the area's integration in the Nature 2000 network (Latsiou, 2019)

Finally, when asked for the recording of the views on the existence and action of the M.B, 52.30% of the sample believes that the Management Body contributes with its actions to the conservation of biodiversity in the wetland (Figure 2). 44.83% of the sample contradicts the aforementioned view, as it has either not felt the presence of the Body through its actions (37.36%), or considers that it makes the daily lives of the inhabitants of the area difficult through the prohibitions and restrictions it sets (7.47%) (Figure 2).



**Figure 2.** Views on the existence and action of the Kerkini Management Body (Latsiou 2019)

### 3.3. Dependence of the view of inclusion in the Nature 2000 on the educational level and employment

As regards the investigation of dependence between the educational level and the view on the inclusion of the lake in the Natura 2000 network, a  $\chi^2$  was carried out and found that the two variables, the level of education and the perception of the inclusion of Lake Kerkini in the Natura Network are independent ( $p=0.911>0.05$ ).

The same statistical test was used to investigate whether or not there is a dependency between employment and the view of the inclusion of the lake in the Natura 2000 network, it was found that the two variables (employment and perception of the inclusion of Lake Kerkini in the Natura Network) are dependent ( $p=0.044<0.05$ ). Essentially, 89.1% of the positive perception of Kerkini Lake's inclusion in the Nature 2000 Network comes from people employed in the secondary or tertiary sector.

### 3.4. Dependence of the view on the action of the M.B Kerkini Lake on educational level and employment

The test  $\chi^2$  was used to investigate the relationship of the educational level and the perception of the action of the M.B.; the hypothesis of independence of these two variables was rejected ( $p=0.024<0.05$ ). More specifically, 69.2% of the positive perception of the management body's actions is expressed by people of high educational level and respectively 83.1% of the negative perception by people of lower educational level.

It was also found that the two variables, economic sector of activity and perception of the management body's action are dependent ( $p=0.025<0.05$ ). More specifically, the positive perception of the actions of the Management Body comes 87.9% from the people employed in the secondary or tertiary sector. The negative view of people in the primary sector for the M.B. reaches 45.8%. The later two findings are related. The educational level of people active in the primary sector is lower than in the other two.

## 4. CONCLUSION

The study found that more than half of the sample is aware of the fact that the area of Lake Kerkini is one of the Nature 2000 protected areas. Only 1/3 of the sample considers that the inclusion of Lake Kerkini in the Nature 2000 network has given a boost to the local economy through the development of ecotourism. The trend of the local community is relatively negative as it considers that this integration has not brought any wider benefit or that only the few involved in tourism have benefited. This trend may be due to the lack of information, the conflict of interest, the non-participation of the local community in the decision-making processes, the incorrect management of the M.B actions and the lack of trust in it or the misconception of the Natura 2000 objectives, reasons identified and bibliographically documented by previous research. For example, a relevant study in the protected area of the Dadia Forest National Park showed low levels of satisfaction of the local community towards the work of local authorities and the area's management body such as inefficient management (Andrea et al. 2013). In the survey of Efthimiou et al (2017) for knowledge and attitudes of forestry students on nature and protected areas in Greece, it was found that the majority of the sampled students showed a rather biocentric attitude to Protected Areas which is largely due to the object of their studies

In the present study the views of the sample on the actions of the Management Body of Lake Kerkini, is mostly divided into two groups. The larger one believes that it protects biodiversity, while a smaller consists of those who are unaware of its existence. A small group believes that it makes their everyday life difficult with the prohibitions and restrictions it establishes.

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