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## Changes in Selected Aspects of Environmental Management: The Case of Natura 2000 in South-Eastern Poland

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**Abstract:**

**Purpose:** The aim of the study was to check whether in recent years there have been changes affecting selected, important aspects of managing Natura 2000 areas at the local level towards their more effective protection, and whether the attitude of local authorities to these forms of protection as a potential factor stimulating the socio-economic development of communes is changing.

**Design/Methodology/Approach:** The panel study included a group of people managing the work of local governments in 87 municipalities located in the Lublin Voivodeship in south-eastern Poland. All these administrative units are characterized by the presence of Natura 2000 areas. The method of a diagnostic survey based on a questionnaire was used. The form contained closed-ended questions, one of the proposed options had to be selected at each point. The answers were assigned an appropriate score and statistically tested using the signs test based on the Bernoulli binomial distribution.

**Findings:** As a result, positive changes from the point of view of nature conservation were found, such as: an increase in the number of officials with appropriate education and substantive preparation, possession by local governments of newer documentation in the field of nature inventory, increasing the frequency of carrying out environmental impact assessments and a more favorable attitude of commune mayors to the presence of Natura 2000 areas in the context of its impact on local development. At the same time, there has been a deterioration in the timeliness of spatial development studies on which local development plans are based.

**Practical Implications:** The conclusions of the study can be used primarily by institutions responsible for the development and implementation of environmental policy. In particular, mechanisms should be taken to encourage local self-government authorities to even greater involvement in various activities for the protection of natural resources.

**Originality/Value:** The article indicates the trends of changes in the management of protected natural values at the lowest local government level. These changes will gain in importance with the implementation of formal Natura 2000 protection plans.

**Keywords:** Natura 2000, local authorities, nature conservation, environmental management.

**JEL codes:** Q01, Q15, Q20.

**Paper Type:** Research article.

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## **1. Introduction**

The Natura 2000 program has introduced a new form of area nature protection in all European Union countries. The legal basis for the implementation of the new solution was provided by two EU directives, namely: Directive 2009/147 / EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds and Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. The first document specifies the criteria for designating refuges for bird species threatened with extinction, while the second document specifies the rules for the protection of other animal species, as well as plants and natural habitats, and the protection procedures for areas of special natural importance, obliging each European Union Member State to take measures to prevent the deterioration of the condition of the habitats (Bird Directive; Habitat Directive).

The areas delimited by the European ecological network constitute a significant percentage of the total area in each Member State of the Community, in some countries even exceeding 30%. In Poland, these areas cover almost one fifth of the territory (European Environment Agency, 2020). The new situation posed additional challenges for entities managing socio-economic development at various levels of government, including the lowest local government level. It is worth mentioning that the process of delimiting Natura 2000 protected areas took place without the participation of local communities and various stakeholder groups, and only at a later stage, when, among others, management tools for these zones are designed, is it possible to compensate for this exclusion, depending on the solutions adopted in individual Member States of the Community (Lai, 2020)

The process of implementing the European nature protection program in Poland is not finished, because many areas still do not have a developed and implemented plan of conservation tasks (PZO). In mid-2017, this situation concerned slightly less than half of all forms of protection (there are almost 1,000 in total), and it is known that for 237 areas located in 12 different regions of Poland (voivodships), work on completing the PZO is not planned until the end of 2022 (GDEP, 2017). Although formally the institution that directly manages each Natura 2000 area is an entity under the name of the Regional Directorate for Environmental Protection, these areas are also subject to local self-governments, which, when making various administrative or investment decisions, must take into account their basic protective function and related restrictions in use. Therefore, it is very important that local authorities are adequately prepared to perform their functions in the conditions of the ecological network, demonstrating appropriate sensitivity to nature protection issues and readiness to introduce changes in management methods towards a more complete consideration of protective requirements.

The aim of the study, the results of which will be presented and discussed later, was to try to find answers to the following questions:

1. Are there any changes in the important aspects of managing natural resources in the local government units within which the areas of the European ecological network have been delimited, in order to ensure their more effective protection and pro-ecological use of them?
2. Does the perception of Natura 2000 protected areas and the potential impact of their presence on the development of municipalities change by local authorities?

## **2. Materials and Methods**

In order to collect research material, the method of a diagnostic survey based on a questionnaire form was used. The survey was conducted twice, with an interval of 11 years (2008 and 2019), on a group of people managing the work of the same local governments. The panel study was designed to identify changes taking place in the analyzed entities. The form used in both years contained the same closed questions. The respondents selected the answer options personally at each point of the questionnaire it was necessary to make only one choice. The data obtained in this way were subjected to a comparative analysis and statistical inference with the use of a sign test based on the Bernoulli binomial distribution (Aczel and Sounderpandian, 2009).

The sign test compares two populations and is formulated in terms of the probability that values in one population are greater than paired values in the other population. By assigning an appropriate score to specific variants of answers, it is possible to verify the fact of a change in the studied distributions by calculating the so-called probability mass based on Bernoulli binomial distribution and formula:

$$F(x) = P(X \leq x) = \binom{n}{k} p^k (1-p)^{n-k}$$

where:  $n$  - number of trials;  $k$  - number of successes in  $n$  trials with a constant probability;  $p$  - constant probability of success in a single trial.

In each case, the answers given to the same question in 2008 and 2019 by persons representing the same local government unit were paired, thus obtaining two distributions consisting of 87 samples. Each answer variant was assigned an appropriate score. A higher point rank in 2019 was considered as "success", a higher rank in 2008 - as "failure". For each test, the null hypothesis was adopted that the probability of more successes is less than or equal to the probability of more failures ( $p \leq 0.5$ ). The critical significance level ( $p$ -value) is the probability from the binomial distribution that the number of successes is greater than or equal to the number of successes observed and acting as the test statistic in this method. The following research threads were taken into account in the study:

- Preparation of administrative staff to make decisions respecting the principles of nature protection;

- Conducting and updating the nature inventory;
- The frequency of carrying out environmental impact assessments;
- Validity of the study of the conditions and directions of spatial development;
- Opinion on the impact of the presence of protected areas on future socio-economic development.

The research material consists of the results of a survey covering a group of commune heads, i.e. people managing the work of local governments in 87 communes located in the Lubelskie Voivodeship in the south-eastern part of Poland (Figure 1). The areas of the European ecological network Natura 2000 have been marked out in all communes, and the number of these communes constitutes about 60% of the total number of local government units with the location of these forms of protection in the region (GDEP, 2020). Such a selection of the sample and respondents was dictated by the aforementioned research goal.

**Figure 1.** Lublin voivodeship on the map of Poland



*Source:* Own creation.

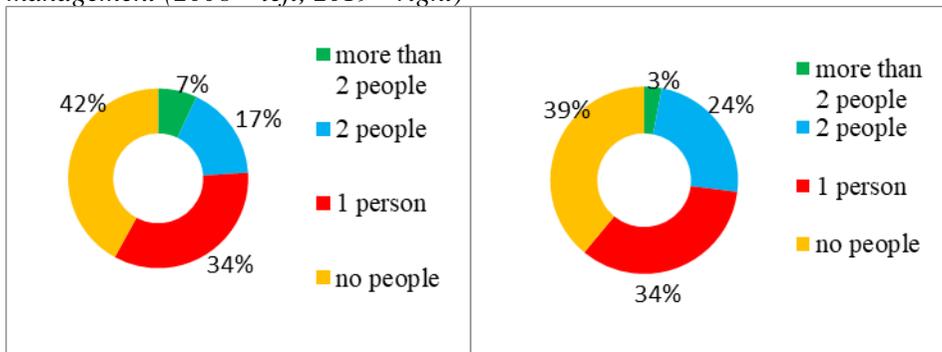
### **3. Results**

Comparing the indications on the number of educated or trained people in the field of environmental protection and employed in the commune office in 2008 and 2019, it can be stated that, despite the passage of years, in most cases offices still employ at most one person with appropriate education and qualifications enabling, at least theoretically, a proper understanding of the environment's needs based on knowledge. It is worth noting a slight decrease in the number of local governments that operate without the support of officials trained to solve problems in the field of environmental and nature protection (Figure 2).

The persons participating in the study defined the time period in which the last nature inventory was carried out in the commune. Compared to 2008, when the principles of taking the nature inventory were not yet regulated by separate

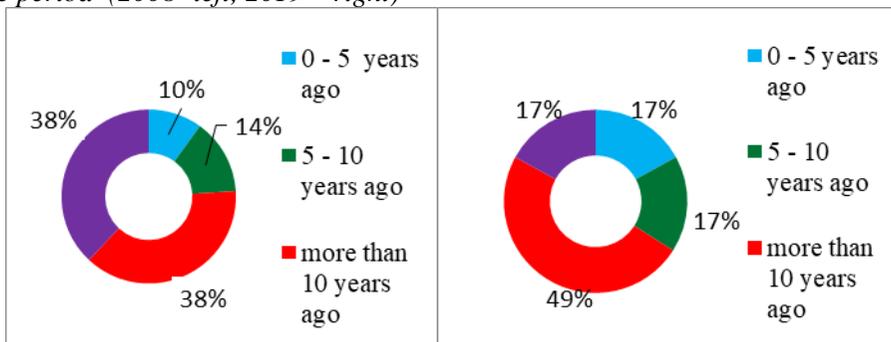
regulations (this happened in 2015 with the entry into force of the relevant act (Act, 2015)), it can be noticed in 2019, based on the respondents' indications, a clear decrease in the number of communes that have never conducted an inventory of nature. At the same time, the responses show that the share of local government units with more recent studies in the entire surveyed population has increased significantly (Figure 3).

**Figure 2.** Percentage of surveyed municipalities employing a certain number of people educated or trained in the field of nature conservation/environmental management (2008 – left, 2019 - right)



Source: Own creation.

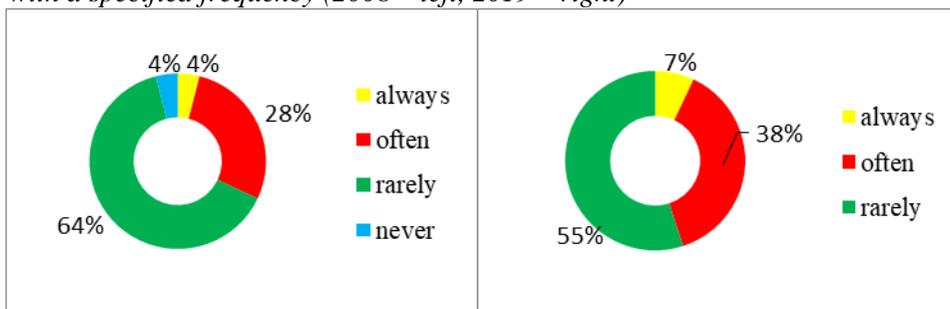
**Figure 3.** Percentage of communes that conducted a nature inventory in a specific time period (2008- left, 2019 – right)



Source: Own creation.

Based on the answers provided in the questionnaires, it can be concluded that the Act on environmental impact assessment of 2008 (Act, 2008) brought the intended effect, namely, it popularized the process of environmental impact assessment. In the study carried out in 2019, the number of selected options that relate to performing procedures frequently or always is almost half of all indications and is much higher than the corresponding indicator for 2008. One thing has not changed: in both years, mayors most often assessed the frequency of assessments, choosing the "rarely" option (Figure 4).

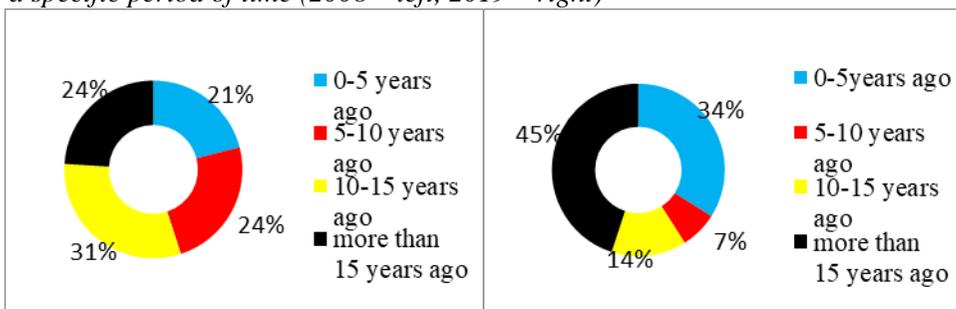
**Figure 4.** Percentage of communes that carry out environmental impact assessments with a specified frequency (2008 – left, 2019 – right)



Source: Own creation.

Commune heads who participated in the study in 2008 declared less often than in 2019 that the study of the conditions and directions of spatial development that they and their subordinates use dates back at the latest five years. On the other hand, the answers given more than a decade later show a significant increase in the number of communes in which the new study had not been adopted for over 15 years (Figure 5).

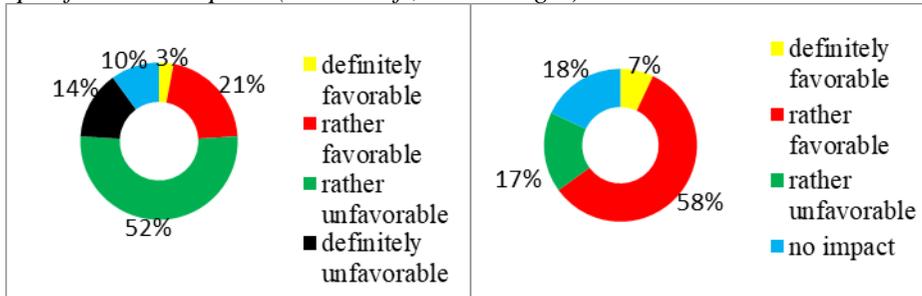
**Figure 5.** Percentage of communes that passed the currently valid land use study in a specific period of time (2008 – left, 2019 – right)



Source: Own creation.

As for the opinion on the potential impact of the presence of Natura 2000 protected areas on the socio-economic development of the commune, a far-reaching change in the distribution of indications in 2008 and 2019 was noted. While in 2008 the prevailing view was that the location of the areas of the European ecological network would rather or definitely have a negative impact on local development, 11 years later we see a significant increase in optimism in this regard. None of the respondents gave a decidedly negative answer, and in addition, the number of indications concerning a rather negative impact decreased significantly (Figure 6).

**Figure 6.** Opinion on the impact of the presence of Natura 2000 areas on the development of a commune according to the percentage of respondents choosing a specific answer option (2008 – left, 2019 – right)



Source: Own creation.

For the purposes of verification by means of the sign test, the following ranks were assigned to the individual variants of answers:

- Thread I: The number of people educated or trained in the field of environmental protection/environmental management and employed by the municipal offices: no person – 1, one person – 2, two people – 3, more than two people – 4;
- Thread II: Time of conducting the natural inventory: never – 1, more than 10 years ago – 2, 5-10 years ago – 3, 0-5 years ago – 4;
- Thread III: The frequency of carrying out environmental impact assessments: never – 1, rarely – 2, of ten – 3, always – 4;
- Thread IV: Time of approval of the study conditions and directions of spatial development: more than 15 years ago – 1, 10-15 years ago – 2, 5-10 years ago – 3, 0-5 years ago – 4;
- Thread V: Assessment of the impact of the presence of Natura 2000 sites on local development: no impact – 1, definitely unfavorable – 2, rather unfavorable – 3, rather favorable – 4, definitely favorable – 5.

Table 1 presents the parameters of the binomial distribution for the responses to individual threads. Only in the case of the time of adopting the study of the conditions and directions of spatial development, the assumed probability  $p$  is outside the right-hand rejection area. This means there is no basis for rejecting the null hypothesis and thus deterioration of the situation in terms of age and timeliness of basic planning documents on the scale of the entire studied sample. For the other distributions, the critical significance level dictates that we reject the null hypothesis and accept an alternative. So, in the light of the answers obtained in the questionnaire, the following should be considered statistically proven:

- an increase in the number of officials qualified to make decisions in the field of nature protection;
- reliance by local governments on more relevant and younger nature inventory documents;

- an increase in the frequency of conducting environmental impact assessments of investments;
- an increase in respondents' favor towards protected areas as a potential stimulator of the development of communes.

**Table 1.** Parameters of the binomial distribution for answers to selected items in the questionnaire (assumed probability  $p = 0,5$ )

Thread	Sample size (n)	Number of successes (k)	Number of failures (x)	Critical level of significance (p-value)
I	78	42	36	0,2858
II	60	42	18	0,0013
III	69	42	27	0,0456
IV	69	30	39	0,8858
V	66	45	21	0.0021

*Source:* Own creation.

#### 4. Discussion

On the basis of the results of the study it can be concluded that in the analyzed communes there has been an improvement in most of the analyzed aspects of natural resource management. The only exception is the validity of the basic spatial development documents. Moreover, some conditions for making administrative decisions appropriate for the protection of Natura 2000 areas have changed positively. This may result in the future reduction of the number of potential conflicts between infrastructural development and economic activity - nature protection. Conflicts of this type occurred both in Poland and in other European countries, especially in the initial phase of implementing the Natura 2000 program (Galloa *et al.*, 2018; Beunen, 2006; Beunen, Van Assche, and Duineveld, 2013; Gałęcka-Drozda *et al.*, 2019; Gotkiewicz and Wiśniewska, 2018; Izakovičová, Miklós, and Miklósová, 2018).

The improvement in the substantive preparation of the clerical staff through the increase in the number of people with appropriate education employed in magistrates, found on the basis of the indications in the questionnaires, is important in the context of the unfavorable planning situation of Polish municipalities. It is not only about the advanced age of spatial development studies found in the course of the analysis, but also about the impact range of legally binding local development plans. Until recently, they covered a small percentage of the total area of the smallest local government units in Poland (Prus, 2012). Currently, there is a clear improvement in the situation in this respect, however, as shown by the results of another study conducted recently in the Lubelskie Voivodeship, local development plans still do not cover the entire acreage of legally protected areas and objects (Witkowski, 2020). Under these conditions, decisions on the ways of using certain protected elements of the environment will be made by officials without direct reference to acts of local law. An additional problem is also the lack of plans for

protective tasks for a large part of the areas of the European ecological network, which means that municipal authorities do not know the rules of protection they apply. As the study showed, many offices either do not have a list of local natural values at all, or as a result of an inventory conducted many years ago, there are no current data on this subject. A properly conducted inventory could contribute to more effective protection of valuable flora and fauna species and habitats (Koreleski, 2009; Bary and Barberousse, 2015; Cutko, 2009).

As the study shows, in the years 2008-2019 in the analyzed communes, not only has the timeliness of spatial planning studies not improved, but the problem of frequent use of old planning studies, inconsistent with the changing reality, was even intensified. The increase in the number of local governments based on documents passed over 15 years ago is particularly worrying. This means that many of these documents could have been prepared without consulting local communities, as the requirement for such consultations was introduced by the Environmental Impact Assessment Act at the end of 2008.

Meanwhile, many authors emphasize the need to involve local leaders both in the processes of creating strategic development plans (Čiegis and Gineitiene, 2008) and planning processes directly related to protected areas and methods of their development (Cent *et al.*, 2007; Hongslo *et al.*, 2016; Proebstl, 2003; Andrade and Rhodes, 2012; Schneider *et al.*, 2020). Failure to ensure such participation may in the future lead to a negative perception by private entities of the needs of protection and the related restrictions, which may contribute to the generation of conflicts and an increase in the costs of the protection itself and a decrease in its effectiveness (Alkan, Korkmaz and Tolunay, 2009; Wätzold, 2010). Wider cooperation and better communication with private entities is important in a situation where they usually have limited knowledge and information about protected areas compared to public administration (Cioacănea *et al.*, 2016), and can additionally stimulate the pro-ecological behavior of private owners of areas subject to conservation rigors (Hoffman, 2017).

Another significant change in the approach of local authorities to matters related to nature protection seems to be increasing the frequency of conducting environmental impact assessments. This is an improvement compared to what happened several years ago, when municipal authorities in Poland often avoided evaluation procedures despite the frequent occurrence of solid grounds for doing so. Also at present, as the questionnaires show, many local governments still do not treat this procedure as a necessary step on the way to issuing an environmental decision. It should be noted that the impact assessment should cover not only those projects that may directly threaten protected areas, but also those that may indirectly affect the condition of ecosystems.

Therefore, it is important that the assessment also covers projects planned in the immediate vicinity of the European network areas, which is in line with the

guidelines of the European Union (Möckel, 2017). In this context, attention is drawn to, *inter alia*, the problem of integrity and ensuring connectivity between the protected areas and the surroundings (Simeonova *et al.*, 2017), as well as the need to jointly assess the impacts of a greater number of projects on the Natura 2000 site in the event of possible cumulative negative effects (European Commission, 2002).

Representatives of local authorities participating in the study now assess the potential impact of the presence of Natura 2000 sites on local development more positively. Such an attitude to the European ecological network, or more broadly to protected areas, is confirmed, for example, by another study discussing the attitude of authorities to protected areas in one of the regions of Greece. It not only writes about the fears of local governments regarding the need to respect various requirements, but also about openness to alternative sources of income and the possibility of reconciling environmental protection requirements with economic interest (Christopoulou and Trizoni, 2007). Perhaps it is a signal of increasing environmental awareness, which some studies seem to indicate (Engen, Fauchald and Hausner, 2019; Kubacka and Macias, 2016). Treating the presence of valuable natural values as a base on which to build economic growth is very important and opens up prospects for the development of new, additional forms of activity in rural areas.

Supporting entrepreneurship by local magistrates based on the proper use of protected species and habitats should be considered one of the priorities of the sustainable development policy (Guzal-Dec, 2016). The development of ecotourism and organic farming seems to be particularly promising here, which can be treated as a specific protection tool by promoting a positive human impact on the environment, as well as a way to increase the level of environmental education while improving the material conditions of farm owners (McKinney, 2016; Brodzińska *et al.*, 2020). However, the introduction of such solutions requires the cooperation of local authorities with the public sector and joint involvement in the implementation of relevant projects (Gios *et al.*, 2006). There is untapped potential in this regard in Poland, as farm owners have so far invested less in tourism than in other non-agricultural economic activities (Zioło and Jaworska, 2015).

## **5. Conclusion**

On the basis of a panel study conducted on a group of mayors managing communes in the south-eastern part of Poland, it can be concluded that there is a gradual improvement in the quality of management of areas subject to protection regimes under the Natura 2000 program. There is a need for further research in this regard, the more so that for many Natura 2000 sites plans of protective tasks are developed and only after these plans come into force it will be possible to thoroughly analyze the degree of compliance with the provisions contained therein by local authorities.

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