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ECOSYSTEM SERVICES PERCEPTION. THE EXAMPLE OF LOCAL GOVERNMENTS REPRESENTATIVES IN MAŁOPOLSKA VOIVODSHIP

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POSTRZEGANIE USŁUG EKOSYSTEMÓW. PRZYKŁAD PRZEDSTAWICIELI SAMORZĄDU LOKALNEGO W WOJEWÓDZTWIE MAŁOPOLSKIM

STRESZCZENIE: Koncepcja usług ekosystemów w ostatnich latach zyskuje na znaczeniu i popularności zarówno w kontekście badań naukowych, jak i w działaniach praktycznych. W Polsce wciąż jednak nie jest powszechnie znana i jest rzadko uwzględniana w debacie publicznej dotyczącej polityk środowiskowych. W niniejszym artykule zaprezentowano wyniki badań dotyczących systemu ochrony przyrody, w tym wybranych aspektów usług ekosystemów, przeprowadzonych wśród przedstawicieli samorządów lokalnych województwa małopolskiego. Wskazano czynniki różnicujące postawy i poziom świadomości względem usług ekosystemów, jak też rekomendowano, jak wyniki niniejszych badań mogą być pomocne w działaniach praktycznych.

SŁOWA KLUCZOWE: usługi ekosystemów, samorząd lokalny, opinie, postawy, ochrona przyrody

Introduction

The concept of ecosystem services has been given more and more attention both in academia¹ and in practical actions². In Poland, this scientific approach received some interest among scientists³ and non-governmental organizations⁴ but still is not widely used neither in policy-making, nor in public debate on environmental governance. Yet, ecosystem services concept delivers a clear and systematic theoretical framework for analyzing, assessing and valuating benefits from nature to human kind and societies as well as for decision making processes. So far, the research and actions taken in the field of ecosystem services have faced several main constraints, one of the major is – continuously questioned – grounds for economic and monetary valuation of non-market goods. Monetary valuation of cultural, spiritual, aesthetic or religious values is particularly undermined and it is confronted with a lot of methodological challenges. Majority of valuation techniques of ecosystem services is based on people's choices – either directly (by asking people about their willingness to pay) or indirectly (by observing and estimating prices of complementary goods)⁵. Another sort of techniques that have been developed are so-called noneconomic social valuations, that are claimed to have been included in the decision making processes⁶. Social valuation can be based on traditional social science methodology (individual in-depth interviews, questionnaires, focus groups interviews) or on more transdisciplinary techniques such as those based on GIS, e. g. Social Values for Ecosystem Services (SolVES) or Public Participation GIS (PP GIS)⁷.

In the following paper we present the data collected among representatives of local level authorities using internet, mail or face-to-face questionnaires (mix mode approach). The main aim of the manuscript is to discuss factors that might differentiate the level of awareness of or attitudes towards some ecosystem services on the example of local authorities representatives in Małopolska voivodship.

¹ e.g.: Constanza et al. *The value of the world's ecosystem services and natural capital*, "Nature" 1997 No. 387, p. 253-260; B. Fisher, R.K. Turner, P. Morling *Defining and classifying ecosystem services for decision making*, "Ecological Economics" 2009 No. 68, p. 643-653; R. B. Norgaard *Ecosystem services: From eye-opening metaphor to complexity blinder*, "Ecological Economics" 2010 No. 69, p. 1219-1227.

² e.g.: TEEB activities, UNEP-WCMC reports and actions.

³ e.g.: A. Graczyk *Świadczenia ekosystemów jako dobra ekonomiczne*, „Ekonomia i Środowisko” 2010 No. 1(37) p. 64; A. Mizgajski *Świadczenia ekosystemów jako rozwijające się pole badawcze i aplikacyjne*, „Ekonomia i Środowisko” 2010 nr 1(37) p. 10.

⁴ e.g. project and portal uslugiekosystemow.pl by Sendzimir Foundation.

⁵ T. Żylicz *Wycena usług ekosystemów. Przegląd wyników badań światowych* "Ekonomia i Środowisko" 2010 No. 1(37) p. 31.

⁶ G. Brown, J.M. Montag, K. Lyon, *Public Participation GIS: A Method for Identifying Ecosystem Services*, "Society and Natural Resources" 2011, p. 633-651.

⁷ G. Brown and D. Weber *Public Participation GIS: A new method for national park planning* "Landscape and Urban Planning" 2011 No. 102, p. 1-15; B.C. Sherrouse, J.M. Clement, D.J. Semmens *A GIS application for assessing, mapping, and quantifying the social values of ecosystem services*, "Applied Geography" 2011 No. 31, p. 748-760.

Methods

We conducted a study among local governments' representatives from Małopolska voivodship. The questionnaire was sent to all (182) municipalities of Małopolska voivodship and addressed to both officials responsible for environmental issues in the municipality and local politicians (mayors or local government representatives). In total, 144 questionnaires from 108 communities were filled in and sent back (response rate by municipality: 59%). The research questions considered among all the performance of nature conservation system, the role of various institutions and actors and the relations between ecological and administrative scale. Although the perception and level of awareness of ecosystem services were not the main area of interest, there are some crucial outcomes that contribute to a discussion on noneconomic social valuation of ecosystem services. Due to the research goals, majority of analysis relates to nature conservation system and its performance at the local level.

Statistical analysis included frequency analysis and Principal Component Analysis (PCA). PCA was conducted using Varimax rotation with Kaiser normalization; the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was checked to be greater than 0,5.

Results

Local level representatives recognize – to a wide extent – the impact of nature conservation system on various aspects of community life. The impact on tourism and recreation, education and forestry is assessed to be positive by majority of respondents (accordingly: 82%, 68% and 60%). The highest proportion of both negative and no impact of nature conservation is seen in relation to labor market and development of small and medium enterprises (SME) sector. Interestingly, the impact on agriculture and life conditions in the neighborhood is also seen differently – the share of 'no impact' is significantly high (50% and 32%), (Figure 1).

The results of PCA enabled to distinguish three independent components that explained 80% of the total variation among the original variables. KMO measure of sampling adequacy was 0,657. Three principal components were named: (1) Nature conservation system is effective, (2) Nature attracts tourists and increases recreational values of the neighborhood and (3) Due to nature conservation the water and air are clean. The second and third relate to perception of ecosystem services such as recreational values and touristic opportunities provided by nature (cultural services) or water and air purification (regulatory services). The components' loads and questions included into each component are shown in Table 1.

Figure 1.

Responses to the question: "How do you assess the impact of nature conservation system on functioning of other aspects of community life?"

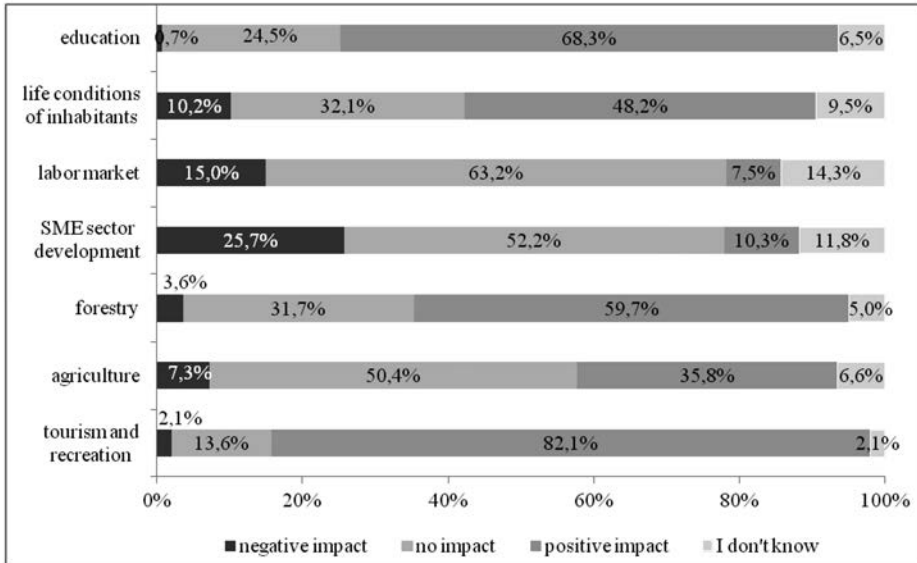


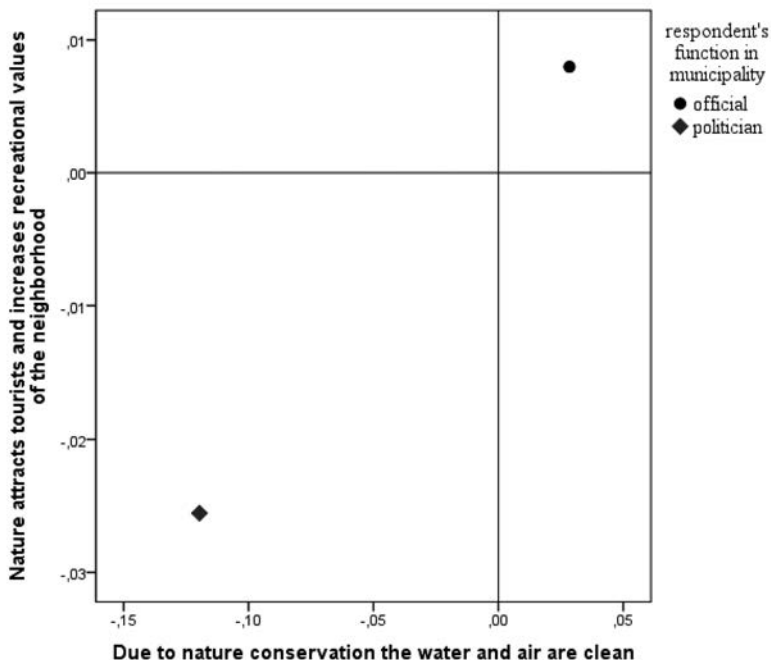
Table 1.

Questions analyzed in PCA. Loadings of less than 0,3 were excluded from the table

	1	2	3
Nature conservation system in my municipality protects wildlife effectively	0,937		
Nature conservation system in Malopolska protects wildlife effectively	0,908		
Nature conservation system in Poland protects wildlife effectively	0,839		
Local government in my municipality copes well with making decisions relating to nature conservation that is within its responsibilities	0,725		
The surrounding nature makes the municipality a better-known place		0,920	
Nature in the municipality and the surrounding area attracts tourists		0,913	
Nature conservation in the municipality increases the recreational value the neighborhood		0,764	
Due to nature conservation there is clean air in the neighborhood			0,944
Due to nature conservation there is clean water in the neighborhood			0,917
variation explained	33%	26%	20%

We analyzed whether respondents with different characteristics (such as a professional or social role in municipality or view on nature conservation influence on local development) or from different municipalities (with or without Natura 2000 site(s)) differ also in support or opposition towards second and third component. In most analysis the differences are visible but not fundamen-

Figure 2. Scatter plot of respondents' support for two components in relation to respondents' function in municipality.



tal. For instance, local politicians (mayors or other representatives of local governments) less clearly recognize both cultural and regulatory services than local officials responsible for environmental issues (Figure 2).

In municipalities where Natura 2000 sites are designated, both politicians and officials claim clearly that nature conservation attracts tourists and substantially increases recreational values of the neighborhood (cultural services) while in municipalities without Natura 2000 sites respondents do not recognize those services but they appreciate more regulatory services (water and air purification due to nature conservation), (Figure 3).

Neither officials nor politicians appreciate any of the ecosystem services, if they claim that nature conservation hinders local development (Figure 4). Those who disagree with the limitation of local development tend to notice cultural as well as regulatory services. The tendency to see touristic and recreational values by people from the municipalities with Natura 2000 sites is also visible in Figure 5. Irrespective of Natura 2000, those who agree that nature conservation hinders local development do not recognize any of described ecosystem services (Figure 5). Finally, respondents who assess that nature in their municipality is unique clearly tend to perceive both cultural and regulatory ecosystem services (Figure 6).

Figure 3.
Scatter plot of respondents' support for two components in relation to respondents' function in municipality and the fact of having Natura 2000 sites within municipality

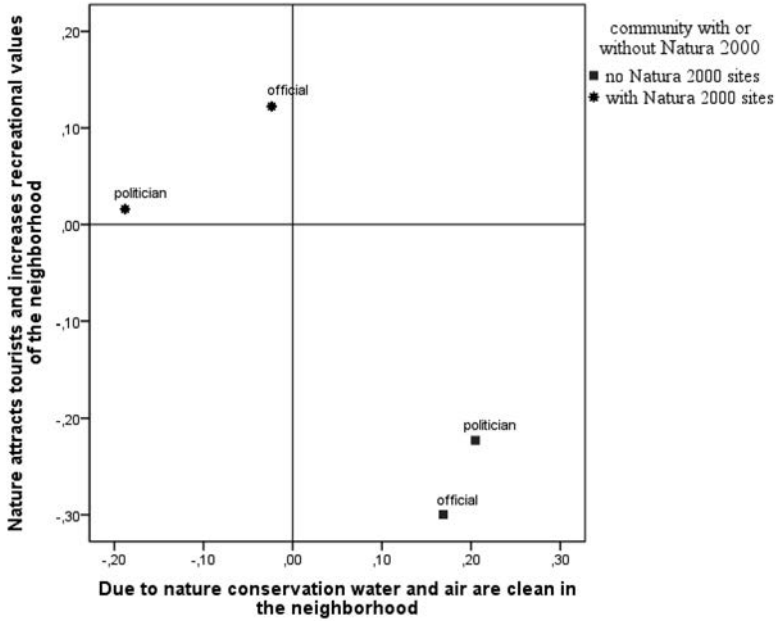


Figure 4.
Scatter plot of respondents' support for two components in relation to respondents' function in municipality and the attitude toward the statement "Nature conservation hinders municipality development"

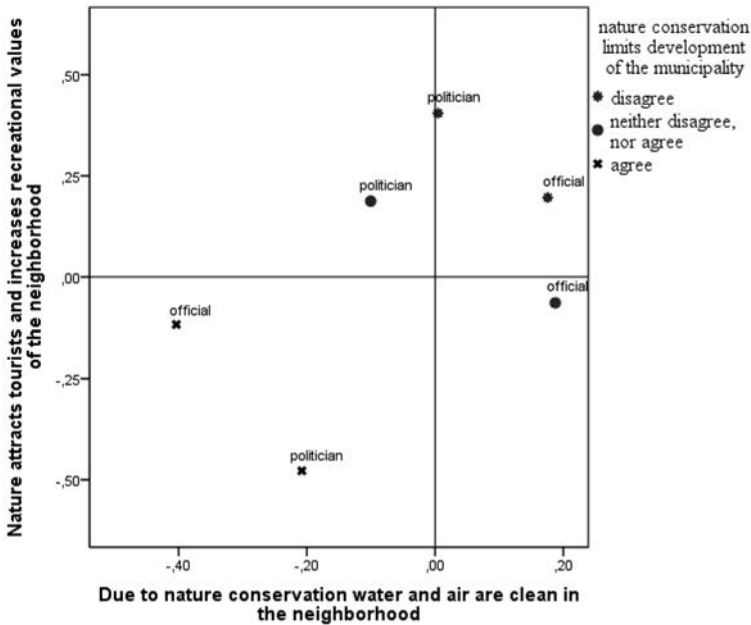


Figure 5. Scatter plot of respondents' support for two components in relation to respondents' attitude toward the statement "Nature conservation hinders municipality development" and Natura 2000 presence in the municipality

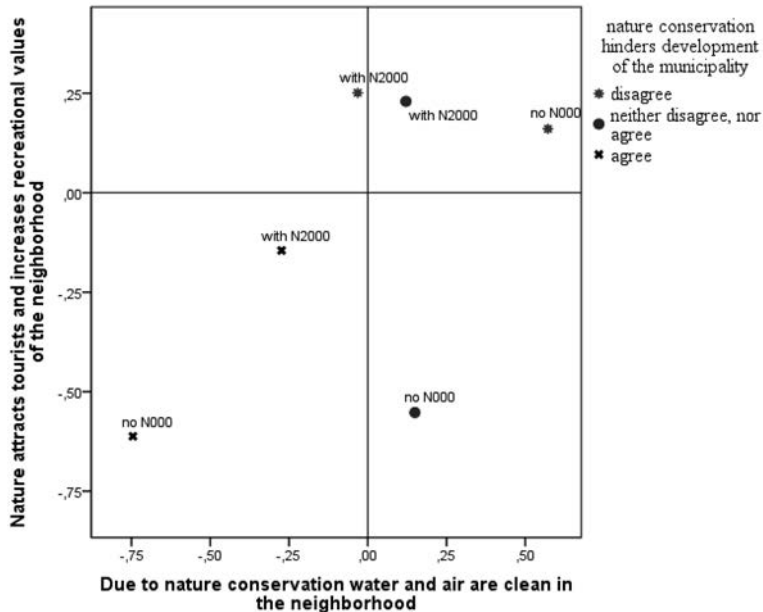
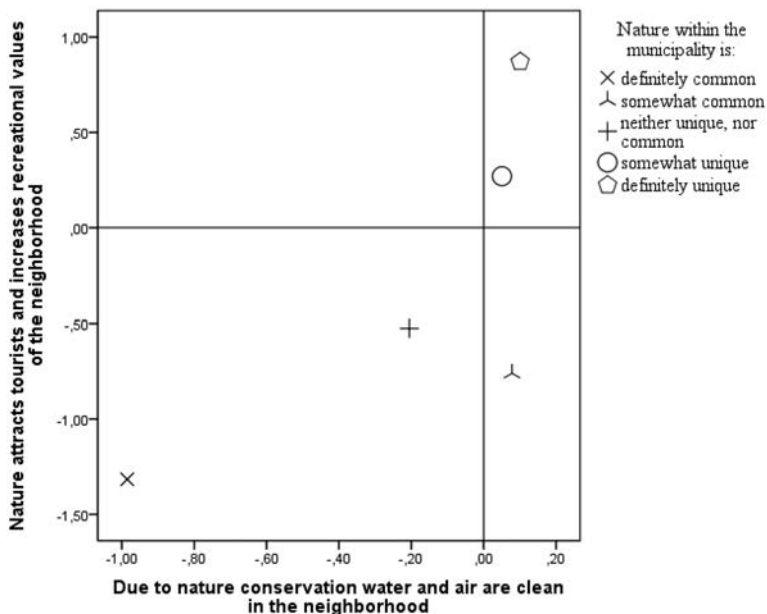


Figure 6. Scatter plot of respondents' support for two components in relation to respondents' assessment of uniqueness of nature in the municipality.



Discussion

Nature conservation management has been and still is mainly based on bio-physical and economic values whereas social aspects are often left behind. Both scientific and local communities started to recognize and thus actively expect a broader perspective to be used while conservation policy development. This particularly comprises local and economic values originating from relations between culture and nature and people and the place they identify themselves with. Although ecosystem services issues are still novel in Poland, investigated respondents had some knowledge and recognition on them. The relations between personal characteristics or local factors and recognition of chosen ecosystem services are not linear and unambiguous. In case of the study presented herein, services are perceived differently depending on local circumstances (e.g. protected areas) as well as on individual characteristics (a professional/social role in the municipality, experience with and opinion on nature conservation system etc.). Undoubtedly these are not the only factors affecting ecosystem services perception. E.g. the question on causality still remains – whether people were aware of touristic and recreational values before or after Natura 2000 sites had been designated in their place of living? There is no straightforward and correct answer – it has been already found that local circumstances and differences often require broad and multifactor analysis and interpretation at the local level⁸⁹. Although a number of public participatory approaches to decision making within nature conservation sector has been proposed, a further research on priorities for identification and valuation of ecosystem services among local communities available at their localities should be undertaken. Such noneconomic valuation would firstly help when we try to assess those values that fall outside of the sphere of markets and secondly mitigate a potential conflicts. Knowing a perspective of various actors, it would be easier to negotiate an eventual environmental policy for a particular locality.

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⁸ A. Pietrzyk-Kaszyńska, J. Cent, M. Grodzińska-Jurczak, M. Szymańska *Factors influencing perception of protected areas – The case of Natura 2000 in Polish Carpathian communities*, “Journal for Nature Conservation” 2012 No. 20, p. 284-292.

⁹ C.M. Raymond, B. A. Bryan, D. H. MacDonald, A. Cast, S. Strathearn, A. Grandgirard, T. Kalivas *Mapping community values for natural capital and ecosystem services*, “Ecological Economics” 2009 No. 68, p. 1301-1315.