

## IMPACT OF THE NATURA 2000 NETWORK ON SOCIAL-ECONOMIC DEVELOPMENT OF RURAL COMMUNES IN POLAND

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### Abstract

The study deals with issues related to the impact of Natura 2000 sites on local development of rural communes in Poland. The purpose of the study is an attempt at comparing the level of social-economic development of rural communes in which Natura 2000 sites are located within their borders against other communes where there are no such sites, based on an analysis of selected indices. The selected indices of social-economic development were analysed in 424 rural communes in six Polish provinces. The study uses statistical data from the Central Statistical Office from the years 2000-2013. The analysis indicates that rural areas with Natura 2000 network sites do not differ from other units of local government as far as the level of social-economic development is concerned and in some cases show even better results. In the 'Natura' communes – compared to units where there are no such sites – the level of total income is higher, along with the commune's own income, and there is a higher level of investment expenditure. The conducted analysis allows for the statement that the presence of Natura 2000 sites does not hinder economic development of communes and only modifies the manner of preparation and implementation of an investment. It does not constitute a barrier to human activity on the condition that any such activity complies with the principles of sustainable development. This testifies to the higher economic activity of inhabitants in comparison to other units.

**Key words:** environmental network Natura 2000, social-economic development, rural communes.

### Introduction

The concept of development is complex and multidimensional. It is most often determined as a process of positive changes, encompassing a quantitative increase and qualitative progress in a given area in the life of its inhabitants and operations of its economic entities (Parysek, 2001; Cieślak et al., 2013). It may be stated that social-economic development on a local level takes place in the economic, social, political and environmental dimensions (Takamori and Yamashita, 1973; Potoczek and Stępień, 2008). These dimensions are not uniformed and they are closely interconnected. These dependencies contribute to the creation of new, durable development potential that should result in more complete satisfaction of the needs of the local community and also prevent a negative impact on the environment (Szewczuk et al., 2011; Goraj et al., 2014). Natural resources and environmental quality have a direct influence on the dynamics and development of rural territories (Sánchez-Zamora et al., 2014).

However, it is necessary to draw attention to the fact that intense economic development has led to the loss of numerous ecosystems, and thus to a significant deterioration of biological diversity. For the purpose of protecting threatened parts of the natural environment, the Natura 2000 environmental network was designed for the EU. Within the scope of the programme it is possible to undertake activities that efficiently protect natural habitats and species. The Natura 2000 programme in Poland was officially implemented in 2004, i.e., at the moment of Poland's accession to the European Union. The designation of Natura 2000

sites is based on the distribution and population size of threatened species and habitats. Other components do not play an important role when designating sites encompassed by the programme. Thus, economic or social determinants cannot constitute an argument preventing the inclusion of a given site in the Natura 2000 network (Brînzan, 2006).

In Poland, this relatively new form of nature preservation is usually located in areas with a high forestation rate, low number of inhabitants, and weaker soils, and in areas where infrastructure is underdeveloped and entrepreneurship is slight (Bołtromiuk, 2012), which are characteristic features of rural areas. Thus, the basis for discussion and analyses is the purported thesis that rural communes with Natura 2000 sites develop more slowly and their level of development is lower in comparison to other local government units that do not have such sites. The authors can confirm the accuracy of this thesis via an analysis of the basic indices testifying to the low level of social-economic development. However, the fact that no visible differences between these indices for communes with or without the Natura 2000 sites may prove that the designation of valuable natural sites does not have a direct impact limiting development and in some cases may even stimulate it in such areas (Getzner and Jungmeier, 2002; Pawlewicz et al., 2011).

The objective of the study is an attempt to compare, through an analysis of basic indices, the level of social-economic development of rural communes with Natura 2000 sites and other rural communes in the same provinces without Natura 2000 sites.

## Materials and Methods

The examined communes are located in six provinces in Poland (Lower Silesia, Lubuskie, Podkarpackie, Podlaskie, Warmia and Mazury, and Western Pomerania). These are provinces where the degree of coverage with Natura 2000 sites is much higher than in other regions of the country and exceeds 20% of the province's surface area. The analysis encompassed 424 rural communes, including 294 communes with Natura 2000 sites within their borders. In the study, statistical data from the Central Statistical Office (Bank ..., 2015) was used, allowing for a determination of the indices of social-economic development along an x-axis (years 2000-2013) and one y-axis (divided by groups of local government units, i.e., 'Natura' communes and other communes from the area analysed, as well as the average values for communes in Poland as a control). Data regarding financial values was adjusted and presented in the form of fixed prices; the base period is the year 2000. This allowed for the elimination of the impact of current prices on the dynamics of the examined categories and enabled them to be compared, taking into account changes in their physical sizes in various periods. In the case of certain indices, the analysis refers to a shorter period as a result of a lack of data for the years 2000-2001. The indices selected for analysis referred to the finances of the communes (total income and own income, investment expenditure), technical infrastructure (water network and sewerage), entrepreneurship and the activity of the inhabitants (number of economic entities).

## Results and Discussion

### *Commune Income*

The basis for the operation of communes is their income, thanks to which these units of local government may implement tasks that aim to satisfy the collective needs of their inhabitants. Therefore, the financial policy of a local government unit should rely on the procurement of sufficient funds to enable the implementation of the tasks imposed on it. The amount of total income shows the 'affluence' of a commune and provides basic information about the financial standing of a local government unit. On the other hand, a commune's own income testifies to its financial independence as well as the prudence of local authorities and the economic activity of its inhabitants and their assets (level of taxes and local fees). The amount of its own income ensures independence in the decision-making process and creates opportunities for a more complete satisfaction of the needs of the community and an increase in the standard of the services provided (Sobczyk, 2009). Especially important is the fact that an increase in the total income of a commune does not have to be related

to an improvement in financial standing. This is the result of a higher authority mandating a task for the commune to implement. The local social and economic situation, the economic standing of a commune and the dynamics of a commune's development are better reflected by own per capita income. If the level of income increases, the local economic base grows along with the development potential. However, it is necessary to note that environmental protection, via the introduction of Natura 2000 sites, raises fears among some with respect to rapid economic development. However, there are numerous premises that may testify to a positive relation between the existence of Natura 2000 sites and the level of social-economic development of local government units in areas where such sites are located (Russo et al., 2011; Kurowska et al., 2014).

In the communes analysed between 2000 and 2013, it is possible to observe an increase in actual total income and their own income per inhabitant. It may be concluded that in the examined local government units where the Natura 2000 network is functioning, the situation is better with respect to income in comparison to the situation of other communes, as well as the average value for rural communes in Poland. These determinants were present both before and after the year 2004. Additionally, after 2004, the gap between the income of local government units with Natura 2000 sites and other communes started to increase, to the advantage of the former (Figure 1). The influx of European CAP and structural funds greatly influenced an improvement in these indices.

### *Investment Expenditure*

One factor signalling the level of local development is the start of investment activities as reflected in the amount of a commune's investment expenditures. These outlays are used to develop new infrastructure in a commune and to restore and extend the existing infrastructure. Investment projects are necessary for the implementation of commune's tasks. Undertaking projects allows these units of local government to provide their inhabitants with access to services, possibly offered at the highest level. Apart from that positive benefit, investment, in particular the extension of technical infrastructure is one of the most important factors influencing the further investment attractiveness of a commune and its future 'affluence' (Markowski, 2001).

The analysis has shown that the level of investment expenditures between 2000 and 2013 in the area studied and across Poland varied. Until 2004, it was possible to observe an increase in such outlays; subsequently, the years 2005 and 2007 were marked by stagnation, whereas in 2008 growth was noticed, lasting until 2010. After this period, the growth rate

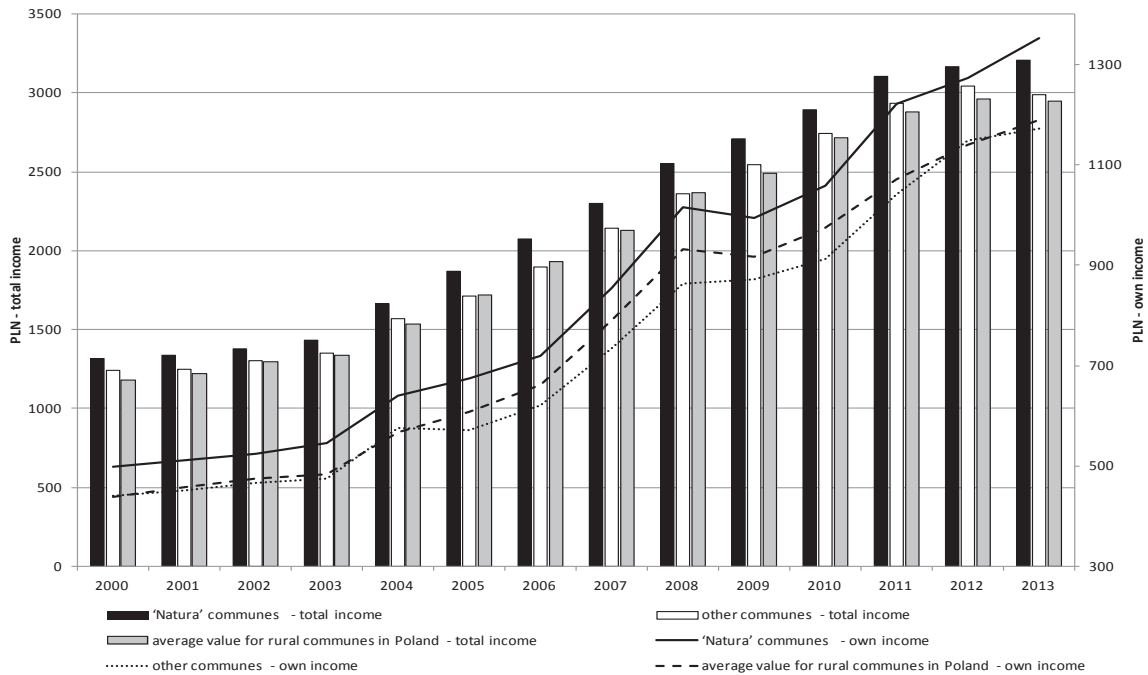


Figure 1. Actual total income and own income per inhabitant in the communes analysed between 2000 and 2013 (PLN, constant prices).

Source: authors' calculations based on Bank Danych Lokalnych, Access: 20.01.2015.

of investments started to decline (Figure 2). On the one hand, this is a result of the use of finances near the end of the then-current EU budget period; on the other hand, it is saturation of investments. Subsequent investments may generate unnecessary costs, overburdening the budget of the local government and forcing it to incur credit. At the same time, they may not significantly improve the quality of life of the inhabitants, and infrastructure should be extended by taking their needs into account.

A review of the collected information has indicated that for investment expenditures in communes with

Natura 2000 sites, the index between 2000 and 2012 was higher than in other analysed communes. It was only in the year 2013 when a reverse trend was observed. On the other hand, comparing the value of the expenditures by local governments assigned to investments against the average in Poland, it is possible to state that in 'Natura' communes, these expenditures were lower (Figure 2). This results from the dominance of agricultural and nature in such communes, which may not require the extension of technical infrastructure.

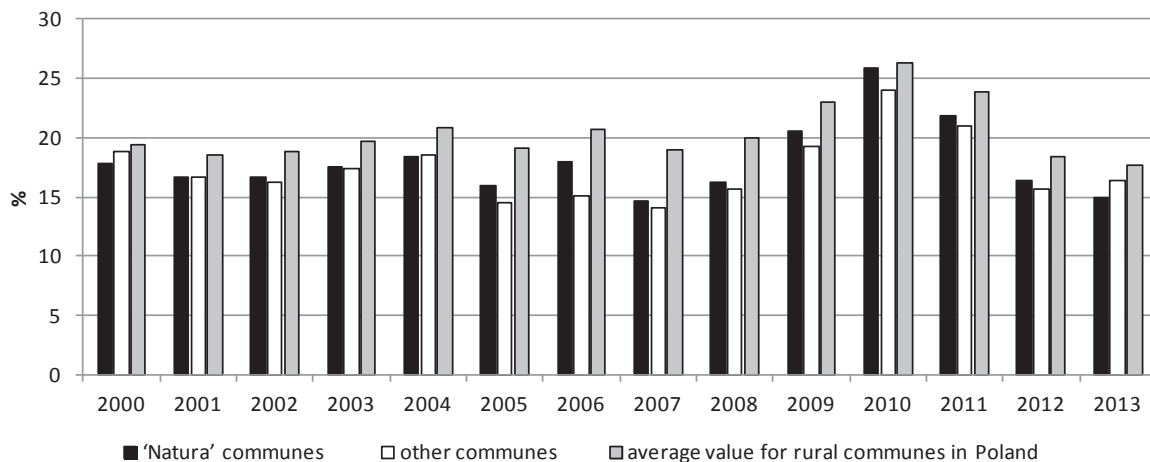


Figure 2. Investment expenditure in total expenditure in the communes analysed between 2000 and 2013 (%).

Source: authors' calculations based on Bank Danych Lokalnych, Access: 20.01.2015.

*Technical Infrastructure (Water and Sewage Networks)*

Technical infrastructure plays an important role in the shaping of settlements and the social-economic development of every area. Its significance increases especially in non-urbanized areas, not only on account of development of the rural sector but primarily due to the creation and solidification of other forms of activity, enabling so-called multi-functional development of rural areas. In this respect, it is necessary to attach particular importance to water and sewage management, which not only influences the quality of life of the inhabitants but also the quality and the condition of the natural environment. Access to infrastructure of this type creates development conditions for other forms of non-agricultural activity and the management of rural areas, thereby increasing not only investment attractiveness but also the level of competitiveness between regions (Kłos, 2012).

Although infrastructure plays such an important role in the economy, the condition, range and devices incorporated in such infrastructure are greatly insufficient. This is particularly noticeable in rural areas. The need to construct or extend network infrastructure in such areas is common but satisfied gradually, in line with the funds held by a commune and its priorities as determined by local authorities and the communities themselves (Piszczek and Biczkowski, 2010). This tendency is observable in the analysed area. For 'Natura' communes and other communes,

there is constant, systematic growth in coverage of water and sewage infrastructure, even though, as was mentioned earlier, it is still insufficient. With respect to local government units where Natura 2000 sites are located, these delays were and are much greater both before and after 2004. This is primarily caused by the fact that investments in valuable natural areas pose many difficulties (Kistowski, 2008). Additionally, it is important to note that in these areas the increase in the water supply network is greater than for the sewage network (Figure 3). This may be influenced by the fact that the development of the water supply network has always had greater significance in the hierarchy of people's needs. On the other hand, investments related to sewerage have been perceived by the public as an additional financial burden, not as an element increasing the quality of life or limiting the degradation of the natural environment (Świątek, 2003). Another premise for this is provided by economic issues, namely that the cost of constructing a sewage network is three times higher in comparison to a water supply network (Piszczek, 2008).

*Economic Operation*

A very important element of social-economic development is the activity of economic entities in a given region. It is possible to indicate a certain dependency related to this: a large number of economic entities registered in a commune report

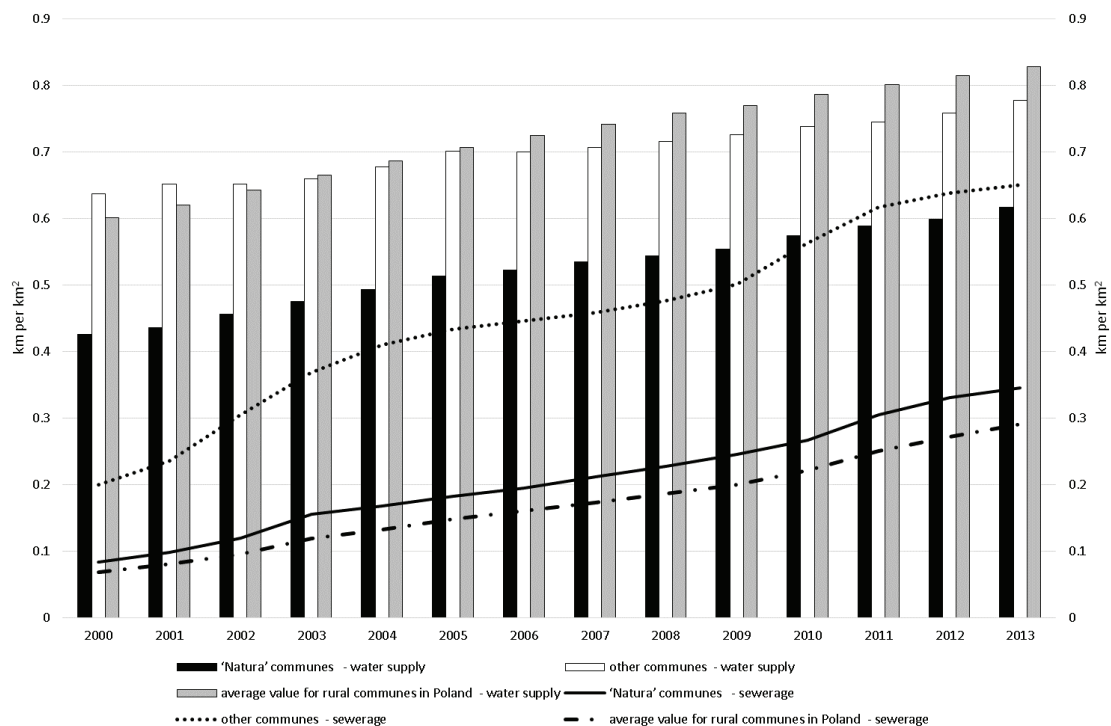


Figure 3. The length of the water supply system and the length of the sewerage network per 1 km<sup>2</sup> in the communes analysed between 2000 and 2013 (km per km<sup>2</sup>).

Source: authors' calculations based on Bank Danych Lokalnych, Access: 20.01.2015.

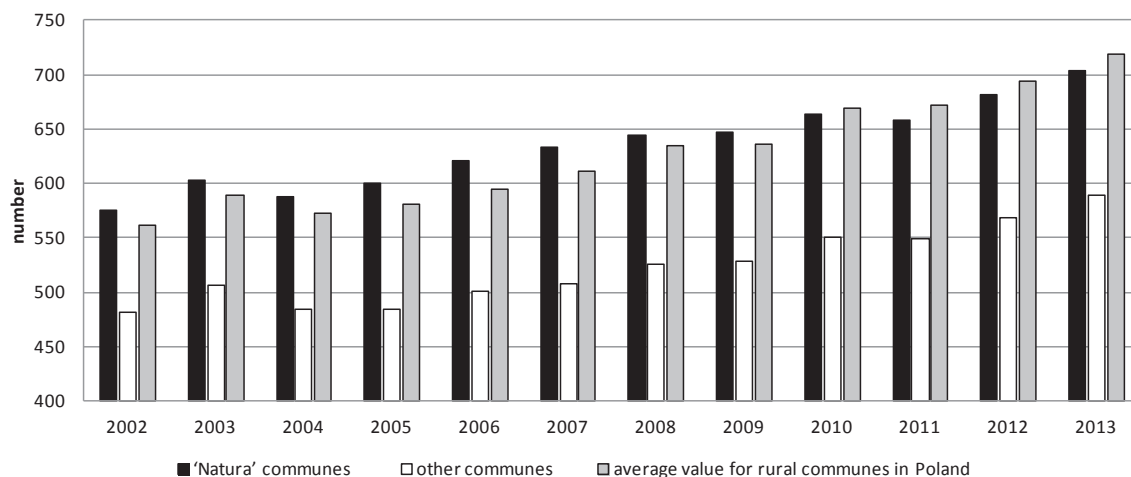


Figure 4. The number of registered economic entities per 1000 inhabitants in the communes analysed between 2000 and 2013 (number of entities).

Source: authors' calculations based on Bank Danych Lokalnych, Access: 20.01.2015.

have high economic activity among its inhabitants and there exist good conditions for the development of entrepreneurship (Karmowska, 2011) in the area. Social and economic conditions of local government units in the area where there are protected sites are usually characterized by limited advantages. This is the result of the low level of urbanization, small population density, insufficient number of non-agricultural economic entities and high unemployment related to the lack of opportunity.

It is possible to encounter an opinion that for the majority of local communities, Natura 2000 is yet another site encompassed by environmental protection policy that limits the free management of an area and, at the same time, is associated with a natural barrier to development (Weber and Christophersen, 2002; Mouro and Castro, 2010). In the public's opinion, the development of economic activity in communes with Natura 2000 sites means numerous barriers that exclude local economic development or significantly limit it. Such a limitation may be quantitative (slowing down the pace of development) as well as qualitative (reduction of possible paths of development). Meanwhile, new possibilities which may be, under certain conditions, used for the purpose of developing economic activity are often overlooked (Kettunen et al., 2009; Dan et al., 2012; Chmielewski et al., 2014). The most obvious for such areas is the development of tourism or the production of organic food. Changing consumer consumption preferences and a rise in 'green' tourism and recreation have created opportunities for many rural areas, particularly areas with high quality natural assets. Despite the economic crisis, the stability of this factor is currently being reinforced becoming a key element linked to the resilient nature of rural areas. The increased awareness

of the importance of environmental sustainability is now a booming reality (Kocur-Bera, 2012; Sánchez-Zamora et al., 2014).

The results of the analyses indicate a growing trend in the number of registered economic entities, both in units with Natura 2000 sites and in other units. Between 2002 and 2013, the index of registered companies per 1,000 inhabitants in 'Natura' communes did not differ from the average for all of Poland and fluctuated around 570 in 2002, rising to 710 in 2013. It is worth noting that the number of registered companies in other communes in the analysed area was much lower, reaching 481 in 2002 and almost 570 in 2013. A dynamic increase in the number of registered new economic entities, comparable to the average in Poland indicates that operating in areas that include a part of the Natura 2000 network does not constitute a barrier to the economic activity of inhabitants. It is possible to note that economic activity in the analysed areas is systematically improving, which is evidenced by the increasing number of economic entities. This tendency is noticeable in 'Natura' communes and in other communes, yet to the advantage of the former. A slight drop could be observed in 2014, which could have been caused by Poland's accession to the European Union and entrepreneurs' difficulties with adjustment to new requirements (Figure 4).

## Conclusions

The analysis has shown that rural communes with Natura 2000 sites do not differ with respect to the level of social-economic development from other units of local government. This is visible by the fact that in the 'Natura' communes, compared to communes without such sites, a higher level of total income and their own income of communes was observed overall, along with

a higher level of investment expenditures. On account of the characteristics of the area of the examined units, i.e., low degree of urban development and low population density, a smaller index for water supply and sewage networks was noticed in these communes. Therefore, it can be stated that the presence of Natura 2000 sites does not hinder the economic development of communes and only modifies the manner of preparation and implementation of investments.

Investments have to be conducted in a manner that least interferes with the environment and has the least negative impact on it. Natura 2000 sites are not a barrier to human activity, on the condition that the activity complies with sustainable development tourism. This is confirmed by the communes' higher economic activity than other units in the examined area, analysed on the basis of the number of registered economic entities per 1,000 inhabitants.

The use of financial assistance from the EU budget is also significant, and which is intended to improve the social and economic situation of these areas. It is necessary to remember that in the current

financial period, EU funds intended for environmental protection are going to be reinforced. This calls for the inclusion of the environment and landscape as one of the basic axes of development policy in rural areas. Thus, the conclusion that the natural environment is perceived as a barrier by the local community may be a reason for increasing EU assistance to specific regions and which, in turn, may contribute to an improvement of local living and management conditions for the inhabitants of rural areas.

Summing up, the results of the studies confirm the lack of a correlation between the presence of a Natura 2000 site and a weaker economic situation for a rural commune. The results of the analysis presented above only show the direction and scope of changes in the social-economic development of local government units on the basis of basic indices over the course of several years. In order to determine clearly the causes of such changes, in-depth studies are necessary. It is possible to conclude that the article is a starting point for subsequent, broader analyses.

## References

1. Bank Danych Lokalnych. Główny Urząd Statystyczny. (Local Data Bank. Central Statistical Office). Available at: [http://stat.gov.pl/bdl/app/strona.html?p\\_name=indeks](http://stat.gov.pl/bdl/app/strona.html?p_name=indeks), 20 January 2015. (in Polish).
2. Bołtomiuk A. (2012) Natura 2000 – the Opportunities and Dilemmas of the Rural Development within European Ecological Network. *Problemy Ekorozwoju – Problems Of Sustainable Development*. Vol. 7, No. 1, pp. 117-128.
3. Brințan O. (2006) Natura 2000 network an opportunity for rural space sustainable development. *Bulletin of University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca. Agriculture*, 62, pp. 179-183.
4. Chmielewski W., Głogowska M., Wrana K. (2014) Modele rozwoju gospodarczego w gminach z obszarami Natura 2000 (Models of Economic Development in Municipalities with Natura 2000 Areas). *Woda-Środowisko-Obszary Wiejskie*. Vol. 14. Book 2 (46), pp. 17-34. (in Polish).
5. Cieślak I., Szuniewicz K., Gerus-Gościewska M. (2013) Evaluation of the Natural Value of Land Before and after Planning Procedures. In: *Rural Development 2013. The Sixth International Scientific Conference Proceedings*. Aleksandras Stulginskis University, Akademija, Kaunas. Vol. 6, Book 3, pp. 228-233.
6. Dan R., Lucius I., Todorova M., Martini M., Piazza A., Koukos I. (2012) *Guidance on assessing socio-economic benefits for better access to structural funds for biodiversity*. INTERREG IVc SURF Nature project. 52 p.
7. Getzner M., Jungmeier M. (2002) Conservation policy and the regional economy: the regional economic impact of Natura 2000 conservation sites in Austria. *Journal for Nature Conservation*. 10/1, pp. 25-34.
8. Goraj S., Nowak M., Gwiazdzińska-Goraj M. (2014) Functional changes in rural areas in North-Eastern Poland. In: *Research For Rural Development. Annual 20th International Scientific Conference Proceedings*. Vol. 2. pp. 140-146.
9. Karmowska G. (2011) Badanie i pomiar rozwoju regionalnego na przykładzie województwa zachodniopomorskiego (Research and the Measurement of Regional Development on the Example of Zachodniopomorskie Province). *Roczniki Nauk Rolniczych, Seria G*, Vol. 98, Book 2, pp. 85-93. (in Polish).
10. Kettunen M., Bassi S., Gantioler S. Brink P. (2009) *Assessing socio-economic benefits of Natura 2000 – a toolkit for practitioners* (September 2009 Edition). Output of the European Commission project Financing Natura 2000: Cost estimate and benefits of Natura 2000. Institute for European Environmental Policy (IEEP), Brussels, Belgium, 191 p.
11. Kistowski M. (2008) Problemy lokalizowania inwestycji na terenach cennych przyrodniczo (Problems Locating Investments in Environmentally Valuable Areas). In: Gwiazdowicz M. (eds), *Ochrona przyrody (Nature protection)*. Studia Biura Analiz Sejmowych Kancelarii Sejmu, Vol. 10, Wyd. Sejmowe Kancelarii Sejmu, Warszawa, pp. 139-163. (in Polish).

12. Kłós L. (2012) Wpływ infrastruktury technicznej na atrakcyjność obszarów wiejskich (Influence of Technical Infrastructure on Attractiveness of Rural Areas). *Studia i Prace WNEiZ*. Vol.25, pp. 179-192. (in Polish).
13. Kocur-Bera K. (2012) Uwarunkowania inwestowania na obszarach Natura 2000 (Conditions for Investing in Natura 2000 Areas). *Studia i Materiały Towarzystwa Naukowego Nieruchomości (Journal of the Polish Real Estate Scientific Society)*, Vol. 19, nr 4, pp. 83-95. (in Polish).
14. Kurowska K., Kryszk H. Marks-Bielska R., Kietlińska E. (2014) Spatial Analysis of Afforestation in Poland under Rural Development Programme 2007-2013. In: Research For Rural Development. *Annual 20th International Scientific Conference Proceedings*. Vol. 2. pp. 14-21.
15. Markowski K. (2001) Zarządzanie finansami gminy w aspekcie inwestycji komunalnych w Polsce w latach 1996–1999 (The Financial Management of The Municipality in Terms of Municipal Investments in Poland in 1996-1999). In: Zarzycki D. (eds) *Zarządzanie finansami: cele, organizacja, narzędzia*. Wyd. Fundacji Rozwoju Rachunkowości w Polsce, Warszawa, pp. 335-348. (in Polish).
16. Mouro C., Castro P. (2010) Local Communities Responding to Ecological Challenges – A Psycho-social Approach to the Natura 2000 Network. *Journal of Community & Applied Social Psychology*. Vol 20. pp. 139-155.
17. Parysek J.J. (2001) Podstawy gospodarki lokalnej (Basics of the Local Economy). *Poznań. Wyd. Naukowe Uniwersytetu Adama Mickiewicza*. pp. 240. (in Polish).
18. Pawlewicz A., Pawlewicz K., Kościńska J. (2011) Funkcjonowanie gospodarstw rolnych na obszarach 'Natura 2000' w opinii rolników z terenu powiatu olsztyńskiego (The Functioning of the Farms in Natura 2000 Areas of the District Olsztyn in the Opinion of Farmers). In: Andrzej Graczyk (eds) *Kryzys a rozwój zrównoważony rolnictwa i energetyki*. Prace Naukowe UE we Wrocławiu, Vol 231, pp. 113-124. (in Polish).
19. Piszczek S., Biczkowski M. (2010) Infrastruktura komunalna jako element planowania i kształtowania rozwoju obszarów wiejskich ze szczególnym uwzględnieniem terenów chronionych (Municipal Infrastructure as a Part of Planning and Designing of Rural Development With Particular Emphasis on Protected Areas). *Infrastruktura i ekologia terenów wiejskich*. Vol 14, PAN, Kraków, pp. 41-56. (in Polish).
20. Piszczek S. (2008) Rozwój sieci wodno-kanalizacyjnej na obszarze Krajeńskiego Parku Krajobrazowego (The Development of the Water-sewage System in the Krajna Landscape Park). In: Świątek D., Bednarek M., Siłka P. (eds) *Współczesne problemy badawcze geografii polskiej – geografia człowieka*. PAN. IGiPZ. Polskie Towarzystwo Geograficzne. pp. 115-121. (in Polish).
21. Potoczek A., Stepień J. (2008) *Podstawy strategii rozwoju lokalnego i regionalnego (Basics of Local and Regional Development Strategies)*. Bydgoszcz. Wyd. Uczelniane Wyższej Szkoły Gospodarki. 207 p. (in Polish).
22. Russo P., Carullo L., Riguccio L., Tomaselli G. (2011) Identification of Landscapes for Drafting Natura 2000 Network Management Plans: A Case Study in Sicily. *Landscape and Urban Planning*. Vol 101, pp. 228-243.
23. Sánchez-Zamora P., Gallardo-Cobos R., Ceña-Delgado F. (2014) Rural Areas Face the Economic Crisis: Analyzing the Determinants of Successful Territorial Dynamics. *Journal of Rural Studies*. Vol. 35. pp. 11-25.
24. Świątek D. (2003) Infrastruktura obszarów wiejskich województwa mazowieckiego (Rural Infrastructure Mazowieckie Voivodship). In: Śmigielska M., Słodczyk J. (eds) *Geograficzne aspekty globalizacji i integracji europejskiej*, PTG. Opole. pp. 463-469. (in Polish).
25. Szewczuk A., Kogut M., Ziolo M. (2011) *Rozwój lokalny i regionalny. Teoria i praktyka (Local and Regional Development. Theory and Practice)*. Wyd. CH Beck. 432 p. (in Polish).
26. Takamori H., Yamashita Sh. (1973) Measuring Socioeconomic Development: Indicators, Development Paths, and International Comparisons. *The Journal of the Institute of Developing Economies*. Vol. 11, pp. 111-145.
27. Weber N., Christophersen T. (2002) The Influence of Non-governmental Organisations on the Creation of Natura 2000 During the European Policy Process. *Forest Policy and Economics*. Vol 4 (1), pp. 1-12.







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## FOREWORD

The four independent reviewers estimated each paper and recommended 89 articles for publishing at the proceedings consisted of 2 volumes, which started life as presentations at the Annual 21st International Scientific Conference “Research for Rural Development 2015” held at the Latvia University of Agriculture, in Jelgava, on 13 to 15 May 2015.

In the retrospect of four months later, we can count the Conference as a great success. The theme – Research for Rural Development - attracted participation more than 185 researchers with very different backgrounds. There were 147 presentations from different universities of Lithuania, Estonia, Poland, Turkey, Greece, Slovakia, Nepal, Russia, Czech Republic, Kazakhstan and Latvia.

Thank you for your participation! I’m sure that you have learned from the presentations and discussions during the conference and you can use the outcomes in the future.

The cross disciplinary proceedings of the Annual 21st International Scientific Conference “Research for Rural Development 2015” (2 volume since 2010) are intended for academics, students and professionals. The subjects covered by those issues are crop production, animal breeding, agricultural engineering, agrarian and regional economics, food sciences, veterinary medicine, forestry, wood processing, water management, environmental engineering, landscape architecture, information and communication technologies. The papers are grouped according to the sessions in which they have been presented.

Finally, I wish to thank Organizing and Scientific Committee and the sponsors for their great support to the conference and proceedings.

On behalf of the Organizing Committee  
of Annual 21st International Scientific Conference  
“Research for Rural Development 2015”

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Latvia University of Agriculture

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