



A Comparative Analysis of the Environmental Competitiveness of Lubelskie and Zachodniopomorskie Voivodeships

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1. Introduction

Since the end of the 1960s, interest in environmental resources and values as factors determining economic processes has been growing systematically. The genesis of this phenomenon might be identified in studies on economic growth barriers. Revision of neoclassical growth models was performed at the end of the 1970s, to take into account environmental components in recommendations for macroeconomic policy. An effect of these changes was the appearance of the concept of so-called sustainable development [7, 9].

The problems of environmental protection have become one of the most important issues to be discussed in all fields of human activity. This has created demand for information about people's attitudes towards the environment and basic natural phenomena. That is why the need of implementation a full programme of teaching about the environment is indicated. Moreover, there is a conviction that activities in this field should be undertaken on local or regional levels, since then it is possible to identify relationships between the state of the environment and existing development opportunities[8, 11].

2. Natural capital as a factor influencing the attainment of competitive advantage on a mesoeconomic level

Natural capital is a hybrid concept. On the one hand, this is a concept derived from economics; on the other hand, it emphasizes the significance of environment quality as a preliminary condition for human welfare and long-term sustainable economic activity. Natural capital differs from anthropogenic capital for a few reasons:

Firstly, as the name suggests, it is a gift of nature; thus, as a rule it cannot be duplicated in the course of human activity, but may be subject to some modifications.

Secondly, natural capital is not only a resource in the physical meaning, but also a set of processes fulfilling many significant functions. Capital created by humans may to a certain degree replace some elements of natural capital, but this is connected to the need to bear the high costs of substitution.

Thirdly, changes in the natural environment caused by human activity are often irreversible, which eliminates the undertaking of so-called second chance activities [6].

A basic feature of natural resources is the fact that they cannot be produced, but constitute a significant contribution in production processes. A higher resource use index means faster depletion of available reserves of these resources. In this respect, the contribution of natural resources to production processes differs substantially from other production factors: labor and real-financial capital [10].

The economists examining the area of natural capital agree that it is a source of function or services significant for the economic system and human life. Loss of these functions may considerably affect the chances for future development. According to the current state of knowledge, natural capital is a key resource in the development process. This way of understanding natural capital is also gaining increasing acceptance in economic sciences [3].

Despite there being many and various classifications of environmental functions, the systematic taking into account four basic categories should be considered:

1. Regulatory functions – concern the capacity of natural and semi-natural ecosystems for regulation of basic ecological and vital processes.

2. Habitat functions – natural ecosystems ensure protection and space for reproduction for wild plants and animals, and thus contribute to the protection of biological and genetic diversity and evolutionary processes.
3. Production functions – transformation of carbon dioxide, water and nutrients in various carbohydrates structures is observed in the process of photosynthesis and nutrient uptake by autotrophs. They are a source of numerous environmental goods, i.e. food, raw materials, energetic resources and genetic material.
4. Information functions – since a considerable part of human evolution occurs beyond the place of residence, natural ecosystems may be perceived as a source of values of a cognitive, psychic and esthetic character [1].

According to A.P. Wiatrak, regional policy should treat natural factors and their influence on given region competitiveness in a particular manner. It is worth considering here the issues connected to reasonable exploitation of the natural resources used in the production process, adaptation of the production system to the resources present in a given region and to the environment's potential [12].

3. Significance and determinants of environmental competitiveness of regions

Achieving, a competitive advantage over other regions based on existing environmental potential, the ability of its use in social-economic growth and development processes and a low level of anthropopression may be defined as **the environmental competitiveness of the region**. Here, it seems to be justified to demonstrate factors determining the environmental competitiveness of regions. These factors may be enumerated as follows:

1. Natural conditions – landscape differentiation (land relief, lakes, rivers), air temperature, precipitation and other aspects connected to microclimate, presence of energetic resources and fossil fuels.
2. Geodetic-soil conditions of the region – structure of land management, e.g. contribution of agricultural/forest areas in general area of the region.
3. State of water resources and extent of their pollution – amount and quality of underground and ground water resources, amount of generated industrial and municipal wastes discharged into water and soil,

4. Quality of atmospheric air – amount and structure of pollution emitted into the atmosphere, intensity of UV-B radiation, frequency of so-called acid rain occurrence; number of plants especially burdensome for the environment, level of pollution neutralized and retained by reducing devices,
5. Amount of waste produced, as well as their structure,
6. Naturally valuable areas, forestation rate and land afforestation,
7. Intensity of road and industrial noise,
8. System of environmental protection and water management – number of waste water treatment plants in urban and rural areas; sewage networks; devices reducing levels of pollution emitted into the atmosphere [2].

Taking into account the above factors, different research and analytical methods may be applied for an assessment of the environmental competitiveness of particular regions. This will allow identification of those regions which are characterized by relatively high environmental potential, and thus may direct their development strategies towards processes making use of environmental resources and values.

4. An assessment of the environmental potential of Lubelskie and Zachodniopomorskie voivodships

4.1. Characteristics of the research method

Analysis was performed of indices of the condition and protection of the environment and also pressures placed on the environment in particular regions for an assessment of the environmental competitiveness of Polish voivodships using a rating method for this purpose (point one). Points from 1 to 16 were attributed to the voivodships within particular indices, depending on the position occupied on a national level with respect to a given factor. Then, the points attributed within particular indices were totalled for each voivodship. Due to the limited availability of data from the year 2004, the following factors were chosen for the analysis [4, 5]:

1. The frequency of organic farms within the overall area of the voivodship (as %),

2. The proportion of forested land within the overall area of the voivodship (as %) (forestation rate),
3. The proportion of lands under surface waters within the overall area of the voivodship (as %) (forestation rate),
4. The proportion of devastated and degraded lands requiring reclamation and management within the overall area of the voivodship (as %),
5. The proportion of agricultural lands threatened by wind erosion within the overall area of the voivodship (as %),
6. The proportion of agricultural and forested lands threatened by water erosion within the overall area of the voivodship (as %),
7. The proportion of agricultural and forested lands threatened by gully erosion within overall area of the voivodship (as %),
8. Consumption of artificial fertilizers in the economic year 2003/2004 and 2008/2009 (in kg/1 ha of agricultural land),
9. Exploitable underground water resources in Poland (in cubic hectometers per year),
10. Water withdrawal for the needs of the national economy and population (in $\text{dm}^3/1 \text{ km}^2$),
11. Consumption of water for production purposes in closed cycles (as % of total consumption),
12. Water consumption in households (in m^3 per capita in cities),
13. Amount of industrial and municipal wastewater discharged into waters or into the ground (in m^3 per 1 km^2 of voivodship area),
14. The proportion of treated wastewater in those requiring treatment (%),
15. Population in cities connected to wastewater treatment plants (as % of total population of cities),
16. Population in villages connected to wastewater treatment plants (as % of total population of villages),
17. Degree of reduction in generated particulate pollutants in especially noxious plants (as %),
18. Degree of reduction in generated gaseous pollutants in especially noxious plants (as %),
19. Area of special natural value protected by law (as % of voivodship area),
20. The area of parks, lawns and estate green belts (in m^2 per capita),

21. Industrial waste generated during a year (in t/km²),
22. Recovered waste (as % of generated wastes),
23. Waste accumulated so far on own landfill areas (in t/km²),
24. The proportion of municipal waste collected selectively in relation to the total amount of collected municipal waste (as %),
25. Levels of recycling of packaging waste (as %),
26. The proportion of plants exceeding permissible noise levels in relation to the overall number of entities of this type controlled (all %).

Points from 1 to 16 were attributed to the voivodships within particular indices, depending on the position occupied at a national level, while:

- for indices from 1 to 3, 9, 11, from 14 to 20, 22 as well as 24 and 35 – the maximum number of points were attributed to voivodships with higher levels of the examined index,
- for indices from 4 to 8, 10, 12, 13, 21, 22, 23 and 26 – the maximum number of points were attributed to voivodships with the lowest levels of the examined index.

Table 1 presents a summary of the results for Lubelskie and Zachodniopomorskie voivodships, developed in the spreadsheet Microsoft Office Excel 2007.

4.2. Analysis and discussion of the results

Lubelskie and Zachodniopomorskie voivodships belong to those regions characterized by an average level of environmental competitiveness. In 2010 they were in 8th and 9th position, respectively, in a ranking of Polish voivodships, while in comparison to the base year, Lubelskie region noted a drop of 2 places, while Zachodniopomorskie improved its position by 4 places (table 1).

Ratio analysis demonstrated that in 2010 Lubelskie region obtained superior results with respect to 15 of 26 indices (nearly 58%), while Zachodniopomorskie voivodship with respect to 12 indices (slightly over 46%).

Table 1. Indices of the condition and protection of the environment and also pressures placed on the environment in the studied regions

Tabela 1. Wskaźniki stanu, presji i ochrony środowiska w badanych regionach

Index number	Points in relation to the country			
	Lubelskie		Zachodniopomorskie	
	2004	2010	2004	2010
1	13	12	15	13
2	3	3	13	13
3	2	3	15	14
4	14	12	13	11
5	4	4	12	12
6	7	7	6	6
7	8	8	7	7
8	8	11	7	6
9	10	10	14	14
10	11	10	3	3
11	9	9	1	1
12	14	13	3	3
13	13	13	3	3
14	13	10	2	13
15	12	8	2	12
16	4	4	16	15
17	6	2	8	9
18	15	15	12	10
19	5	5	3	3
20	13	12	6	6
21	8	6	5	5
22	15	8	1	2
23	12	12	4	4
24	4	12	10	8
25	9	9	7	8
26	14	12	1	10
Total points	246	230	189	211
Position in Poland	6	8	13	9

Source: own calculations based on [4, 5]

The strengths of Lubelskie voivodship in a range of environmental factors include: a significant reduction in gaseous pollutant emission produced by industry especially emissions harmful for the environment (2nd position in the country – 15 pts); a relatively low level of water consumption in households per capita (4th position – 13 pts); and a low proportion of industrial and municipal wastewater discharged into the water or soil (4th position – 13 pts).

Taking into account the presence of naturally valuable areas in the voivodships (e.g. Polesie, Roztocze, Vistula and Bug valleys), the high biological diversity and differentiated landscape, it seems to be justified to promote Lubelskie voivodship as a region attractive as regards tourism and recreation. An additional advantage in this area is also the high proportion of parks and estate green belts.

With respect to the promotion of the tourist functions of Lubelskie voivodship, it is worth emphasizing that so far we have dealt with disordered tourism and excessive urbanization of naturally valuable areas, which has resulted in the degradation of numerous resources and values of the environment. The reason for such a state remains an insufficient awareness and lack of acceptance by local societies of the idea of environmental and landscape protection. Moreover, there is an information gap concerning the possibility of natural capital utilization in regional development processes.

Lubelskie voivodship is characterized by a relatively high proportion of ecological sites in the voivodship (nearly 0.18%) in comparison with the national average of 0.11%. This undoubtedly predisposes this region for development of the processing and distribution of organic food.

It may be concluded, based on a comparison of the examined regions, that one of the advantages of Zachodniopomorskie voivodship is its well developed system of protection against wastewater emission, which is proved by the relatively high percentage of citizens of cities and villages using wastewater treatment plants and the high proportion of purified wastewater in those requiring purification. This is important when considering the next index determining the environmental potential of this region's development.

Zachodniopomorskie voivodship is in third position in the country in terms of the proportion of land under surface waters (over 3.2% of the

overall area of the voivodship), with a national average of nearly 1.8%. Moreover, taking into account the relatively high proportion of forested land, it may be concluded that there are some premises for continuation of this region's development based on various forms of tourism, recreation and leisure.

As with Lubelskie voivodship, in Zachodniopomorskie one should search for its development possibilities in the area of organic agriculture and processing. When compared to Lubelskie voivodship it possess an advantage in the form of factors favoring development of these forms of activity, i.e. the low level of threat to agricultural lands from wind erosion and the considerable underground water resources characterized by high quality parameters.

5. Conclusions

1. Processes occurring in ecosystems are directly or indirectly a factor influencing everyone's welfare. This means that the loss of ecosystem functions may considerably affect the chances for future development.
2. In view of the general availability of classical production factors resulting from progressive globalization processes, the quality of an environment is more often treated as a factor of social-economic development, and thus as a significant element of competitive advantage on a mesoeconomic level.
3. The environmental competitiveness of a region is a concept which perfectly fits in with the basic assumption of the sustainable development of regions. Proper use of environmental potential will firstly allow the generation of additional economic effects, and secondly will contribute to further improvement of the state of the environment and thus produce synergistic effects, and thirdly, will favor realization of social goals by a decrease in unemployment and a general improvement in quality of life.
4. It may be concluded, based on my results, that Lubelskie and Zachodniopomorskie voivodships are characterized by a relatively good environmental potential creating chances for specialization in a range of those forms of economic activity which are based on the use of environmental resources and values.

5. A significant issue is the formation of an external perception of the region as one which considers the realization of pro-ecological policy goals in its strategies, programs and practical activities. Local authorities should promote the ecological image of the region, and thus encourage potential investors to realize projects using the potential of the environment in a sustainable way.

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Analiza porównawcza środowiskowej konkurencyjności województwa lubelskiego i zachodniopomorskiego

Streszczenie

Wobec ogólnej dostępności klasycznych czynników produkcji, wynikającej z postępujących procesów globalizacji, jakość środowiska coraz częściej traktowana jest jako czynnik rozwoju społeczno-gospodarczego, w tym jako istotny element budowania przewagi konkurencyjnej na poziomie mezo-ekonomicznym.

Osiąganie przewagi konkurencyjnej nad innymi regionami w oparciu o istniejący potencjał środowiskowy, umiejętność jego wykorzystania w procesach wzrostu i rozwoju społeczno-gospodarczego oraz niski poziom antropopresji, określić można mianem środowiskowej konkurencyjności regionu.

Środowiskowa konkurencyjność regionów to koncepcja, która doskonale wpisuje się w podstawowe założenie zrównoważonego rozwoju. Właściwe wykorzystanie potencjału środowiskowego, po pierwsze, pozwala na wygenerowanie dodatkowych efektów ekonomicznych, po drugie, przyczynia się do dalszej poprawy stanu środowiska i uzyskaniu dzięki temu efektów synergii, po trzecie, sprzyja realizacji celów społecznych, poprzez spadek bezrobocia w regionie i ogólną poprawę jakości życia.

W artykule przedstawiono ocenę środowiskowej konkurencyjności województwa lubelskiego i zachodniopomorskiego. Przeprowadzono analizę wskaźników stanu, presji i ochrony środowiska, wykorzystując w tym celu metodę rangowania (punktową). W ramach poszczególnych wskaźników, województwom przypisano punkty od 1 do 16, w zależności od miejsca zajmowanego pod względem danego wskaźnika w kraju. Następnie, punkty te zsumowano, uzyskując łączny wynik dla badanych regionów.

Wyniki badań pokazały, że województwa: lubelskie i zachodniopomorskie, należą do regionów charakteryzujących się przeciętnym poziomem środowiskowej konkurencyjności w skali kraju. W 2010 r. zajmowały one odpowiednio 8 i 9 miejsce w rankingu polskich województw, przy czym w porównaniu z rokiem bazowym (2004), województwo lubelskie odnotowało spadek o 2 miejsca, natomiast Zachodniopomorskie poprawiło swoją pozycję o 4 miejsca.

W 2010 r. region lubelski uzyskał ponadprzeciętne wyniki w odniesieniu do 15 z 26 wskaźników (prawie 58%), natomiast województwo zachodniopomorskie w odniesieniu do 12 wskaźników (nieco ponad 46%).

Do mocnych stron województwa lubelskiego, w zakresie kształtowania się wskaźników środowiskowych, można zaliczyć: wysoki stopień redukcji emisji zanieczyszczeń gazowych wytworzonych w zakładach szczególnie uciążliwych dla środowiska, stosunkowo niski poziom zużycia wody w gospodarstwach do-

mowych w przeliczeniu na 1 mieszkańca miast oraz niski udział ścieków przemysłowych i komunalnych odprowadzonych do wód lub do ziemi.

Biorąc pod uwagę występowanie na terenie województwa obszarów cennych przyrodniczo dużą różnorodność biologiczną oraz zróżnicowany krajobraz, zasadnym wydaje się promowanie Lubelszczyzny jako regionu turystycznie i rekreacyjnie atrakcyjnego. Dodatkowym atutem w tym zakresie jest także wysoki udział parków i terenów zieleni osiedlowej.

Z kolei, województwo zachodniopomorskie charakteryzuje się stosunkowo dobrze rozwiniętym systemem ochrony przed emisją ścieków, wysokim udziałem gruntów pod wodami powierzchniowymi i gruntów leśnych oraz relatywnie wysokim udziałem upraw ekologicznych w powierzchni województwa.

Podobnie jak Lubelszczyzna, województwo zachodniopomorskie również powinno szukać szans rozwoju w obszarze produkcji żywności ekologicznej oraz w branży turystycznej. Warto przy tym nadmienić, że w odniesieniu do pierwszego obszaru działalności, województwo zachodniopomorskie dysponuje przewagą w postaci niskiego stopnia zagrożenia gruntów rolnych erozją wietrzną oraz znacznymi zasobami wód podziemnych, charakteryzującymi się wysokimi parametrami jakościowymi.

Wykorzystanie przewagi konkurencyjnej w oparciu o środowiskowe czynniki rozwoju będzie możliwe, przy założeniu, że podjęte zostaną odpowiednie działania marketingowe. Samorządy powinny promować ekologiczny wizerunek regionu, a tym samym zachęcać potencjalnych inwestorów do realizacji projektów, wykorzystujących w sposób zrównoważony potencjał środowiska.