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DEVELOPMENT OF THE TOURISM FUNCTION OF RURAL AREAS OF THE WARMIŃSKO- -MAZURSKIE VOIVODESHIP IN 2010 AND 2020

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ABSTRACT: Warmińsko-Mazurskie voivodeship is a characteristic region of Poland due to its natural conditions, which means that the economy is primarily agricultural and touristic. One of the main, innovative directions of non-agricultural activities supported in the rural areas of the region is rural tourism together, implemented as part of the smart specialisation "Water economy". Analysis of 19 selected indicators of tourism, tourism development and potential, as well as technical infrastructure and finances of communes, showed that in 2010 of the Warmińsko-Mazurskie voivodeship, the level of development of the tourism function of the rural areas was characterised by an average value of the synthetic Hellwig measure (0.13) and showed strong spatial heterogeneity. In 2020, under conditions of the COVID-19 pandemic, this measure decreased only slightly to a value of 0.11, primarily due to the continuation of the region's tourism development planned for the long term. The spatial arrangement of the development of the tourism function in the analysed years remained virtually unchanged. The highest values for the development of the tourism function, both in 2010 and in 2020, were recorded in municipalities located in the area of the Great Mazurian Lakes, Powiśle and the other lake districts of the region.

KEYWORDS: e-tourism function, tourism function development indicators, Hellwig's synthetic measure of development, COVID-19

Introduction

Warmińsko-Mazurskie Voivodeship is one of the least developed regions in Poland and faces numerous problems. In general, this region has been characterised by low relative competitiveness for many years, which is manifested, among others, in (Warmińsko-Mazurskie 2030, 2023; GUS, 2022):
- one of the lowest GDP per capita in the country,
- low productivity in industry and construction,
- insignificant share in domestic exports,
- low innovation (trace expenditures of enterprises on research and development, with a minimum share in the structure of sold production of high technology products and a low share of medium-high technology in total industrial sales).

On the other hand, Warmińsko-Mazurskie Voivodeship is characterised by attractive natural conditions, which play a dominant role in the region's tourist potential. Its tourist attractiveness is affected by the landscape: morainic plains and lacustrine hills, a considerable number of lakes, forest complexes and agricultural cultures. This applies mainly to the region's rural areas, with a considerable portion of nature sites under legal protection and the diversity of their forms, which provides the potential for ecotourism development, nature tourism and implementation of sustainable tourism. Apart from its natural values, the region has significant communication, residential and organisational potential, which means that tourism remains a key area of the current and future development of the Warmińsko-Mazurskie Voivodeship (Wasyluk et al., 2018).

In the implemented cohesion policy of the European Union, "Smarter Europe", emphasis is placed on increasing innovation through the development of smart specialisations (Ministerstwo Funduszy i Polityki Regionalnej, 2023). This means that the regions will have to continue the process of supporting smart specialisations and deepen the bottom-up process involving the private sector, science, non-governmental organisations, public administration and business environment institutions. This is the so-called "entrepreneurial process of discovery". This process enables entrepreneurial entities to identify the most promising areas for future regional development. This process can reveal what a country or region does best in terms of research, development and innovation because entrepreneurial actors know best or discover what they are good at. This usually happens through trial and error and experimentation with new activities. Therefore, regions must actively involve entrepreneurial actors in the development of strategies and provide more incentives to take risks (European Commission, 2012).

Smart specialisations implemented in the Warmińsko-Mazurskie Voivodeship include water economy, high-quality food, wood and furniture.

The water economy is a wide range of economic activities related to water. It includes the production of yachts and boats, the agro-food industry, accommodation and wellness, water sports, water transport, construction of environmental protection facilities, and the design and construction of water infrastructure (canals, flood barriers, etc.) (Uchwała, 2018).

Rural areas in the Warmińsko-Mazurskie Voivodeship are particularly predisposed to the development of tourism in the context of smart specialisation.

In particular, it focuses on:
- development of water, active and business tourism based on the existing values and potentials of the area, including sailing (Kowalczyk & Kulczyk, 2013; Kulczyk et al., 2016), canoeing (Batyk, 2012), bathing and sunbathing, diving, surfing, ice boats, angling (Czarkowski et al., 2012; Czarkowski et al., 2021; Kupren et al., 2018),
- marketing cooperation, which should result in the creation of a common tourist product using the potential of all communes (Pomianek, 2011; Kuźniar, 2013; Wilk-Grzywna, 2015),
- using water connections to create a common tourist offer, e.g. the Elbląg Canal and its branches, the Iława Canal, as well as local kayaking trails (Furgała-Selezniow et al., 2006; Liziński & Bukowski, 2008; Batyk, 2012; Batyk & Dąbrowska, 2015),
- shaping tourism development taking into account the conditions of the natural environment, in particular around lakes (Lossow, 1996; Hakuć-Błażowska et al., 2012; Turkowski, 2018; Parszuto et al., 2018),

- the use of fishing assets and the development of other forms of economic activity related to angling and fishery, such as fishing tourism, agritourism, fish gastronomy, local fish processing (Czarkowski et al., 2012; Czarkowski et al., 2021; Batyk et al., 2017; Batyk & Woźniak, 2017; Kupren et al., 2018),
- the use of some of the ponds in the tourist offer, including agritourism linked to angling, for the organisation of special fishing areas (Czarkowski, 2019),
- implementing leisure tourism in rural areas in attractive tourist regions (lake districts), with particular emphasis on summer houses located by lakes (Tschirschnitz, 2011; Hakuć-Błażowska et al., 2012),
- promoting not only environmental values and various forms of rest, recreation and tourism in rural areas but also artistic, cultural and sports events, also in the cities of the region (Szafranko, 2017),
- developing health and religious tourism services (Batyk & Dąbrowska, 2015),
- organisation of cognitive tourism with the use of tourist trails and routes as well as places and objects of various interest to tourists, which can be implemented both throughout the voivodeship and taking into account their location near canoeing, sailing, cycling and other routes (Batyk & Dąbrowska, 2015; Brodziński, 2017),

Considering the developed scope of support for tourism in the region, the aim of the research undertaken is to assess the development of the tourism function of rural areas of the Warmińsko-Mazurskie Voivodeship in 2010 and 2020 in the context of the existing tourism potential and the implementation of the region's "water economy" smart specialisation.

Material and methods

Study area

The research concerned rural areas of the Warmińsko-Mazurskie Voivodeship. Rural areas (66 rural communes and 34 urban-rural communes) cover 23,557 km^2, which constitutes 97.45% of the area of the voivodeship, which in total covers 7.73% of the country's area. The average area of rural areas in the commune of the region is 235.57 km^2, with a coefficient of variation of 38.38%, which proves that their size varies slightly on a regional scale. Forests constitute, on average 31.16% of the area. Surface waters occupy 5.7% of the total area of the voivodeship, which is the highest value in the country. The average share of surface water in rural areas is slightly lower, with a value of 5.6%. However, the presence of surface waters is concentrated in the rural areas of 36% of the communes of the voivodeship (GUS, 2023). A characteristic element of the region is lakes, numbering almost 1.5 thousand, with a total area of over 100 thousand ha. The average share of lakes in the voivodeship is 4.8% and is the highest in the country (Zdanowski et al., 2009). In the Warmińsko-Mazurskie Voivodeship, there is also a rich network of rivers, canals and other watercourses connecting lakes (GIOŚ, 2020).

Lakes, which are a specific element of the landscape but also a huge economic potential (Kowalczyk & Kulczyk, 2013; Kulczyk et al., 2016; Turkowski, 2016), are mainly concentrated in the Great Masurian Lake District, as well as in others lake districts: Iławskie, Olsztyńskie, Mrągowskie and Ełckie (WMBPP w Olsztynie, 2023).

Data collection

The research was conducted on the basis of secondary data obtained from public sources of information on rural areas and communes of the Warmińsko-Mazurskie Voivodeship for two years: 2010 and 2020. The main source of data was the Local Data Bank (GUS, 2023). The selection of variables for the study was guided by the literature on the subject (Szromek, 2013, Turkowski, 2017) as well as the availability and completeness of data.

Methods

The tourism function of a given area is generally defined as a broad range of socio-economic activities carried out by a given area and aimed at serving tourists. The value of the tourism function in the economic aspect is determined by means of indicators whose synthetic value makes it possible to specify the level of development of this function in the region under study in a given period (Pilichowska & Glądała, 2021). Determining the value of the tourism function allows, on the one hand, to classify areas in terms of their tourist importance and, on the other hand, to compare the level of development of this function in the same area over different periods, as is the case in this study. There are three main sets of indicators (Szromek, 2013):

a) tourism traffic intensity indicators (e.g. Schneider, Charvat, Defert),
b) indicators of tourism development (e.g. Baretje-Defert, density and development of accommodation),
c) other indicators of the tourism function or related functions.

While in the case of the first two groups, there is a clear definition of what is being measured by the indicators listed, there is no such precision in the third category. This group includes all the indicators used to measure, directly or indirectly, the development of the tourism function. It, therefore, includes indicators adapted to the needs of the phenomenon being analysed and its impact on the tourist function of the area (Szromek, 2013).

This study used 6 indicators from the first two sets. These were complemented by a set of 13 indicators characterising tourism businesses, tourist attractiveness, environmental protection, technical infrastructure and communal finances (Table 1). Based on the synthetic measure of development by Hellwig (1968), rural communes and urban-rural communes of the voivodeship were ranked according to the level of development of the tourism function and divided into four classes:

- I (high level of tourism potential) $\quad\quad S_i \geq \overline{S_i} + s_{S_i}$,

- II (average higher level of tourism potential) $\quad \overline{S_i} \leq S_i < \overline{S_i} + s_{S_i}$,

- III (average lower level of tourism potential) $\quad \overline{S_i} - s_{S_i} \leq S_i < \overline{S_i}$,

- IV (low level of tourism potential) $\quad\quad S_i < \overline{S_i} - s_{S_i}$.

The synthetic Hellwig S_i measure of development usually assumes values in the range (0,1), the closer the values are to 1, the higher the level of the examined phenomenon, i.e. the closer the commune is to the development model and the higher its level of tourism function.

Table 1. Indicators characterising the development of the tourism function of rural areas of the Warmińsko-Mazurskie Voivodeship

Type of indicators/group of variables	Variable code	Variable type	Indicator/variable description
Tourist traffic	x_1	S	Overnight stays for foreign tourists/number of inhabitants ×100 [Charvat index]
	x_2	S	Number of foreign tourists staying overnight/area in km² [Defert index]
	x_3	S	Number of foreign tourists/number of inhabitants ×100 [Schneider index]
Tourist development	x_4	S	Number of bed places/number of inhabitants ×100 [Baretje-Defert index]
	x_5	S	Number of beds/area of the commune
	x_6	S	Overnight stays provided to foreign tourists/number of bed places
Tourism enterprises	x_7	S	Share of entities in section I [%]
	x_8	S	Number of PKD entities in section I per 1000 inhabitants

| Type of indicators/group of variables	Variable code	Variable type	Indicator/variable description
Tourist attractions	x_9	S	Share of legally protected areas [%]
	x_{10}	S	Share of surface water [%]
	x_{11}	S	Share of forests [%]
	x_{12}	S	Bicycle paths per 100 km^2
Environmental protection	x_{13}	D	Mixed municipal waste collected during the year in t per km^2
	x_{14}	D	Industrial and municipal sewage in dam^3 per 1 km^2 of the area
Technical infrastructure	x_{15}	S	Water supply network per 100 km^2
	x_{16}	S	Sewage network per 100 km^2
	x_{17}	S	Gas network per 100 km^2
Finances of the commune	x_{18}	S	Share of expenditure on tourism in the total expenditure of the commune [%]
	x_{19}	S	Share of income in the tourism section in the total income of the commune [%]

S – stimulant; D – destimulant.

In addition, an analysis of the impact of individual factors on the level of development of the tourism function was carried out using the classic multiple regression method.

Results and discussion

In 2010, in the Warmińsko-Mazurskie Voivodeship, the average level of development of the tourism function in rural areas was at the average level of 0.13 of the Hellwig synthetic measure of development.

The high coefficient of variation of 50.25% of the measure indicates its high heterogeneity. Out of all 100 surveyed communes, the average level of the measure was recorded in 24 communes, and high level was only measured in 11 communes (Figure 1).
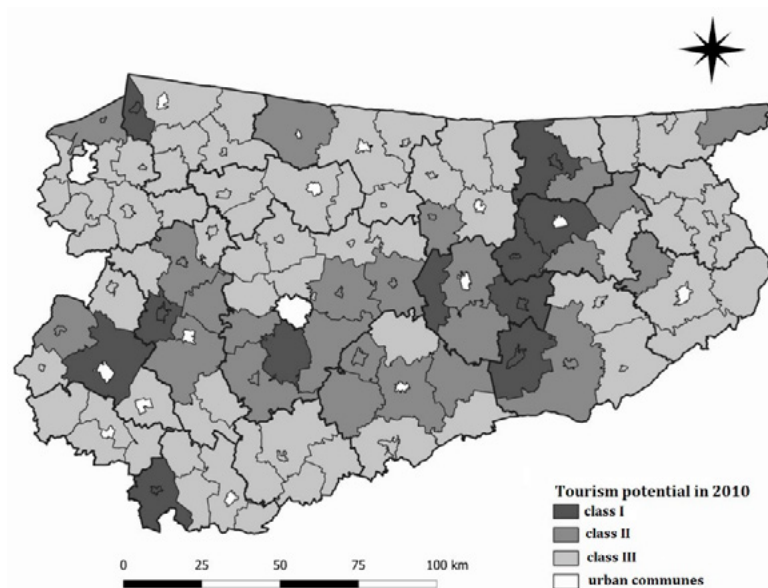
Figure 1. Spatial differentiation of communes of the Warmińsko-Mazurskie Voivodeship in terms of the development of the tourism function of rural areas in 2010

Rural communes with a high level of development of the tourism function included the communes of the Great Masurian Lake District: Mikołajki (0.51), Ryn (0.31), Węgorzewo (0.24), Giżycko (0.23), Ruciane Nida (0.21), Pozezdrze (0.19), Mrągowo (0.12), Piecki (0.18), Miłki (0.18), Pisz (0.13), as well as selected communes located in other Lake Districts: Mragowskie – commune of Sorkwity (0.22), Iławskie – Iława (0.20), Miłomłyn (0.25), Susz (0.13), Ostróda (0.17), Łukta (0.15) and Morąg (0.14), as well as Powiśle – Frombork (0.33) and Tolkmicko (0.18) (Figure 1).

A relatively high level of development of the tourism function was observed in the communes located around the city of Olsztyn: Stawiguda (0.20), Gietrzwałd (0.19), Purda (0.16), Olsztynek (0.14), Barczewo (0.13), and also the cities of Szczytno: Jedwabno (0.16), Pasym (0.15), Biskupiec (0.13) and Świątajno (0.13). In the south of the voivodeship, the urban-rural commune of Lidzbark (0.22) achieved a very high development of the tourism function, and in the north-east, the commune of Dubeninki stood out, but it was characterised by a lower measure of 0.14 (Figure 1).

The lowest value of the synthetic Hellwig measure (class III) was found in 65 communes, including: Pasłęk (0.07), Świątki (0.07), Gronowo Elbląskie (0.07), Barciany (0.07), Rychliki (0.07), Płoskinia (0.07), Wieliczki (0.07), Sępopol (0.08) and Lelkowo (0.08). In the mentioned communes, surface waters accounted for a small share of their area. In 2010, there were no communes belonging to class IV, which had the lowest level of development of the tourism function (Figure 1).

High results were recorded in regions with the largest share of surface waters, which may mean that this feature determines the tourism functions of communes in the region (Figure 2).
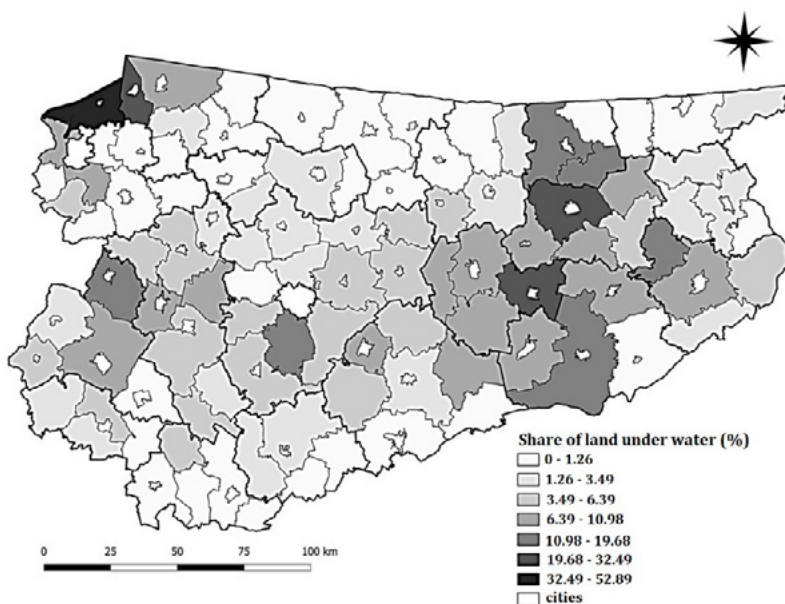

Figure 2. Share of land under water in total land in rural areas in communes of the Warmińsko-Mazurskie Voivodeship [%]

In addition to surface water (Figure 2), the spatial distribution of areas dominant in terms of the development of the tourism function is reinforced by the influence of road infrastructure, especially the course of National Road 16 (Figure 1).

The average synthetic measure of the development of the tourism function of rural areas in the Warmińsko-Mazurskie Voivodeship decreased from 0.13 in 2010 to 0.11 in 2020. Undoubtedly, the lockdown related to the COVID-19 pandemic, resulting in restrictions on the travel of tourists, had a big impact. On the other hand, the nature of the spatial differentiation remained almost identical – a strong differentiation with the same coefficient of variation of 50.25% as in 2010. The functional structure was basically the same – the highest values of the synthetic measure of the development of the tourism function were found in the communes of the Land of Great Masurian Lakes, Powiśle, part of the Iława Lake District, in communes located south of the city of Olsztyn. The impact of the national road No. 16 on the spatial location of areas with a dominant tourism function was also clearly marked.

The number of communes with a highly developed tourism function decreased from 11 in 2010 to 10 in 2020. On the other hand, the group of medium-level local government units increased by 1 commune and amounted to 25 communes. In 2020, as in 2010, none of the analysed communes were included in class IV, which had the lowest level of development of the tourist function (Figure 3).
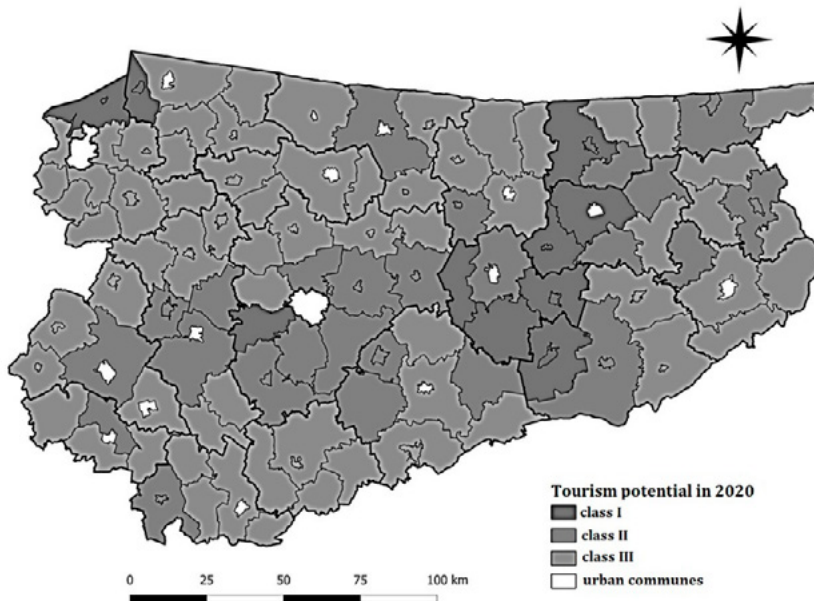

Figure 3. Spatial differentiation of communes in the Warmińsko-Mazurskie Voivodeship in terms of the development of the tourism function of rural areas in 2020

The analysis of the impact of indicators (Table 1) using the multiple regression method indicated that all indicators adopted for further analysis (after verification of the correlated indicators at the stage of analysis of the matrix of correlation coefficients) had a statistically significant impact on the development of the tourism function of rural areas of the Warmińsko-Mazurskie Voivodeship in 2020:

$$\text{Tourism function} = 0{,}040360 + 0{,}001384 \cdot x_3 + 0{,}009177 \cdot x_5 + 0{,}004004 \cdot x_6 +$$
$$+ 0{,}003417 {}^* x_7 + 0{,}000298 \cdot x_9 + 0{,}000876 \cdot x_{10} - 0{,}006536 \cdot x_{14} + 0{,}000202 \cdot x_{15} +$$
$$+ 0{,}000308 \cdot x_{16} + 0{,}000725 \cdot x_{17} + 0{,}009906 \cdot x_{18}$$

The obtained multiple regression model allows to explain more than 97% of the variability of the original dependent variable "tourism function". The value of the statistic $F_{(11.88)} = 254.74$ and the corresponding level of test probability p (below 0.05) confirm the statistically significant linear relationship of the above model. In addition, the values of the $t_{(88)}$ statistic indicate that the regression coefficients are also significantly different from zero.

The above regression model shows that the greatest impact on the increase in the tourism function of rural areas in 2020 had a unit change in tourism expenditure in total expenditure of communes (x_{18}), assuming no variability of other factors. A slightly smaller impact concerned the change in the number of bed places per commune area unit (x_5) and the indicator related to environmental protection – the amount of industrial and municipal sewage per commune area unit (x_{14}). The latter factor had a significant impact on the decline in the development of the tourism function. The positive impact of individual changes in other factors, including the share of surface waters (x_{10}), was significant but did not cause such a large increase in the tourism function measure.

It can be assumed that under normal conditions (without the COVID-19 pandemic), the impact of the Schneider index characterising tourist traffic (x_3) would be much greater. In this case, the lack of a drastic decrease in the development of the tourism function in 2020, compared to 2010, was determined by other factors, including, above all, indicators related to tourism development implemented "on the fly" as part of previously planned activities resulting from the adopted "Water economy"

smart specialisation. It corresponds to the OECD report (2023): "… while the short-term picture is one of uncertainty, over the long term tourism is likely to continue to grow and become an increasingly important element in all OECD economies. However, the tourism landscape will be impacted by large-scale social, economic, political, environmental and technological trends, bringing new and often unseen challenges, threats and opportunities. Exploring the multidimensional implications of these trends is important to inform policy and shape the future of tourism".

Conclusions

The last decades before the coronavirus pandemic in Poland were a period of high growth in both international and domestic tourism. Thanks to higher incomes, Poles spent significantly more on domestic travel, foreign travel, culture and leisure, and local gastronomy. The decline in tourism in the first year of the pandemic affected different voivodeships to varying degrees. This was most evident in August 2020, when the average number of tourists in accommodation establishments was 25.7% lower at the national level. While the number of tourists using accommodation facilities fell by less than 5% in the Zachodniopomorskie and Warmińsko-Mazurskie Voivodships, it fell by as much as 50% in the Mazowieckie Voivodship during this period (Jaszczak, 2020). This is probably one of the reasons why the synthetic indicator of the development of the tourism function in the Warmińsko-Mazurskie Voivodship will only slightly decrease from 0.13 in 2010 to 0.11 in 2020.

Another reason is that the synthetic indicator includes elements tracking tourist traffic, elements related to the tourism economy, environmental protection, technical infrastructure, and municipal finances. In this case, the continuation of the planned long-term development of tourism in the region, including the 'water economy' smart specialisation, can explain a slight decrease in this indicator.

The spatial layout of the development of the tourism function in the years covered by the analysis remained virtually unchanged. The highest values of the development of the tourism function were recorded in communes located in the area of the Great Masurian Lake District, Powiśle, part of the Iława Lake District and the southern part of the Olsztyńskie Lake District. Apart from surface waters, the spatial distribution of the dominant areas in terms of the development of the tourism function was affected by the impact of the development of road infrastructure, in particular, national road No. 16.

The presented analysis was based on official statistical data. There are indications that the actual data on the provision of tourist services could have been higher. In the Warmińsko-Mazurskie voivodeship, the accommodation base is characterised by a predominance of hotels and agritourism lodgings. According to the catalog of agritourism farms (Żakowska, 2020), there were 797 agritourism farms in the Warmińsko-Mazurskie Voivodeship. According to official data, agritourism lodgings accounted for 12.24% of accommodation establishments and had a share in the number of accommodation places of 2.53%. On this basis, it can be assumed that a significant number of tourists use unofficial accommodation facilities. It is difficult to estimate the number of private lodgings that operate in the grey economy (Żakowska, 2020). What's more, official statistics do not include thousands of tourists who stay and spend the night on yachts, in tents and in motorhomes.

Rural areas in the Warmińsko-Mazurskie Voivodeship are particularly predisposed to the development of tourism in the context of the region's smart specialisation "Water economy". However, it is necessary to create favourable conditions for the establishment of both non-agricultural entities and multifunctional farms with the possibility of conducting agritourism activities. Of course, development strategies and programs should pay special attention to problems related to the surplus of visitors who are not environmentally aware of tourists. Their large number contributes to the emergence of environmental problems. Therefore, further, rapid development of tourism in rural areas must take into account sustainable development related to the education of residents and tourists.

The contribution of the authors

Development of survey template, Z.B. and K.T.; data collection, Z.B.; data analysis, Z.B. and K.T.; literature review, K.T.; preparation of article content, Z.B. and K.T.

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ROZWÓJ FUNKCJI TURYSTYCZNEJ OBSZARÓW WIEJSKICH WOJEWÓDZTWA
WARMIŃSKO-MAZURSKIEGO W LATACH 2010 I 2020

STRESZCZENIE: Województwo warmińsko-mazurskie jest charakterystycznym regionem Polski, ze względu na warunki przyrodnicze, co powoduje, że gospodarka ma charakter przede wszystkim rolniczy i turystyczny. Jednym z głównych, innowacyjnych kierunków pozarolniczej działalności wspieranej na obszarach wiejskich regionu jest turystyka wiejska wraz z agroturystyką, realizowana w ramach inteligentnej specjalizacji "Ekonomia wody". Analiza dziewiętnastu wybranych wskaźników ruchu turystycznego, zagospodarowania i potencjału turystycznego oraz infrastruktury technicznej i finansów gmin badanych obszarów wykazała, że w 2010 roku rozwój funkcji turystycznej charakteryzował się przeciętną wartością syntetycznego miernika Hellwiga (0.13) i charakteryzował się silną heterogeniczność przestrzenną. W roku 2020, w warunkach pandemii COVID–19, miernik ten uległ jedynie niewielkiemu obniżeniu do wartości 0.11, przede wszystkim dzięki kontynuacji zaplanowanego w dłuższej perspektywie czasowej rozwoju zagospodarowania turystycznego regionu. Układ przestrzenny rozwoju funkcji turystycznej w analizowanych latach pozostawał praktycznie bez zmian. Najwyższe wartości rozwoju funkcji turystycznej, zarówno w 2010, jak i w 2020 roku, odnotowano w gminach zlokalizowanych na obszarze Wielkich Jezior Mazurskich, Powiśla i pozostałych pojezierzy regionu.

SŁOWA KLUCZOWE: funkcja turystyczna, wskaźniki rozwoju funkcji turystycznej, syntetyczny miernik rozwoju Hellwiga, COVID-19