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SPATIAL DIVERSITY OF COUNTIES OF THE WARSAW CAPITAL REGION IN TERMS OF THE DEVELOPMENT DEGREE OF THE TOURISM FUNCTION IN 2005-2017

Key words: regional development, tourism attractiveness, tourism function

ABSTRACT. The purpose of the article was an attempt to identify spatial diversity of counties in the Warsaw capital region in terms of the degree of development of the tourism function in the period of 2005-2017. Measuring the tourist function of a county requires the use of indicators that enable comparisons with other administration units. Therefore, some indicators based on the number of tourists accommodated, the number of overnight stays and the number of beds in relation to the number of inhabitants and the area of a county were applied. Although single indicators carry a certain load of information, a more comprehensive description of counties in relation to the degree of development of the tourism function was made possible by the construction of a synthetic measure. Using Hellwig's development measure, three rankings were constructed: using variables from 2005 and 2017 as well as using average values of variables of the whole analysed period. In the years 2005-2017, the capital city of Warsaw was a theoretical model for other counties and subregions in terms of the degree of tourism function development. An in-depth analysis of the value of indicators of each analysed year indicates that, while trends in each county were increasing in the analysed period, there were some minor fluctuations and decreases. The strongest position in the Warsaw capital region, apart from the capital city, was observed in the following counties: Pruszkowski, Legionowski and Otwocki. On the other hand, the most visible positive changes took place in West Warsaw and Grodziski counties.

INTRODUCTION

Tourism economy is developing most dynamically in regions where tourism performs a polarizing function, often also being a factor determining the economic activity of an area. However, in regions that are not clearly touristic, tourism has a stimulating function, i.e. it is an additional element stimulating economic development, while other branches of the economy develop there to a similar extent. Such regions often act as administrative, scientific, commercial, business or religious centres, in line with the attractiveness of these areas for specific segments of tourists. Neutral tourist regions with a small number of tourist attractions, can also be observed – where tourism plays a marginal role in the regional (local) economy [Grabowska 2003, p. 76].

Many groups of factors influence the scope and pace of tourism development of the region, not only including economic, technical, political, social and demographic factors, but also natural, cultural and historical conditions. These factors can have an endogenous or exogenous character, with endogenous factors making up the region's tourism potential, resulting in its tourism attractiveness [Witkowska-Dąbrowska 2007, p. 463]. Tourism affects the entire area, but can develop only in a certain part of it, in areas of tourism reception [Grabowska 2003, p. 76]. The region's attractiveness is closely related to its competitiveness, not only in socio-economic terms (in general), but also in terms of tourism and recreation [Cugno et al. 2012, Dębski, Niemczak 2015]. The importance of tourism in an area is associated with specific elements of its tourism potential, including structural resources, which include tourist attractions, tourism facilities or transport accessibility, and functional resources [Januszewska, Nawrocka 2015, p. 25]. Natural conditions (terrain, lakes and rivers, forest cover, air quality) are put first by tourists seeking opportunities for active recreation. Area accessibility is also important (travel time by car, proximity to the railway station). The specific architecture and occurrence of objects of historical significance determine the uniqueness of areas visited by tourists [Morozov, Morozov 2018].

However, the very occurrence of desirable natural conditions or buildings attractive in terms of architecture or history does not guarantee the development of a tourism economy of a region. It is important that local government authorities or local social groups take care of keeping areas visited by tourists clean and of an appropriate standard. The construction, modernization or expansion of an existing tourist (and tourist-related) infrastructure located in the vicinity of facilities visited by tourists (e.g. lodging houses, access roads, bicycle paths, parking lots, picnic areas, public toilets and cleanliness of the place) is not only an incentive attracting tourists, but also a factor conditioning the return of a satisfied tourist to the previously visited place or leaving a positive opinion on the internet, encouraging other tourists to arrive. A sense of safety as well as nice service and kindness of the locals are also significant [Blazeska et al. 2015, Calvo-Mora et al. 2011, Das et al. 2007, Gârbea 2014, Islam et al. 2017, Liu et al. 2016, Vengesai et al. 2009]. Care for material and non-material local resources is an investment focused both on the interests of visitors and the local population, as local government tourism policy serves both groups [Drażkiewicz 2009, p. 270].

According to Andrzej Kowalczyk [2000], socio-economic activity aimed at serving tourists, which a region or town fulfils in the system of the national economy, can be defined as the tourism function of an area. On the other hand, the development of the tourist function should be understood as the increasing intensity of such activities in relation to the area or number of population living there. Thus, according to Ewa Synówka-Bejenka [2017], the development of the tourist function is associated with the development of tourism in an area. The measurement of the tourism function of the area requires the use of indicators that allow for the comparison of a town, county or region with other areas, which enables to indicate which of the analysed territories is characterized by a higher sophistication of the tourism function, and thus, a higher degree of area competitiveness [Dupeyras, MacCallum 2013, Krešić, Prebežac 2011, Szromek 2012]. The classification of counties of the Warsaw capital region in terms of the degree of development of the tourist

function may be a guide for local authorities preparing strategies for the development of administrative units [Synówka-Bejenka 2017].

MATERIAL AND METHODS

As a consequence of the NUTS 2016 revision, the Mazowieckie region (NUTS 2) was recoded, and entered into force from 1 January 2018, as a NUTS 1 region (macroregion) and split into two new NUTS 2 regions: the Warsaw capital region and the Mazowieckie region (the rest of the macroregion) [Commission Regulation (EU) 2016/2066 of November 21, 2016]. Although the separation underlines the successes and leading position of the Warsaw capital region, in the future it could lead to its phasing-out from the EU's structural funds support [WWW]. The aim of the study is to identify the spatial diversity of counties (units of the LAU 1 level, also called counties) in the Warsaw capital region in terms of the degree of development of the tourist function. The years 2005-2017 were adopted as the research period, i.e. the period after Poland's accession to the European Union. Two groups of indicators were used to assess the tourism function of counties [Szromek 2013, Bąk, Szczecińska 2014, Bąk, Szczecińska 2015, Baran, Grzebyk 2010].

The first group includes tourism facility indicators:

- The tourist accommodation base density indicator, enabling the determination of the density of beds in the studied area:

$$I_{ABD} = \frac{\text{number of tourist bed places}}{\text{area in km}^2}$$

- The Baretje-Defert indicator [Baretje, Defert 1972], otherwise known as the tourism function indicator [GUS 2018, p. 71, Chudy-Hyski 2006, p. 132]:

$$I_{BD} = \frac{\text{number of tourist bed places}}{\text{number of population}} \times 100$$

The second group includes indicators of tourist traffic intensity:

- Defert's indicator, otherwise known as the tourist density indicator [GUS 2018, p. 71], enabling the assessment of tourist area congestion [Szromek 2013]:

$$I_D = \frac{\text{number of tourists acommodated}}{\text{area in km}^2} \times 100$$

- Schneider's indicator, informing about tourist density [Szromek 2013]:

$$I_S = \frac{\text{number of tourists acommodated}}{\text{number of population}} \times 100$$

- Charvat's indicator, also informing about tourist density [Szromek 2013]:

$$I_{Ch} = \frac{\text{number of nights spent}}{\text{number of population}} \times 100$$

- The indicator of the degree of bed occupancy (or: indicator of the use of accommodation capacity [GUS 2018, p. 71], in %), calculated by dividing the total number of overnight stays (nights spent) by the number of all beds (tourist bed places) offered on individual days of the month during which they were actually available [BDL GUS]:

$$I_{DOB} = \frac{\text{number of nights spent}}{\text{number of tourist bed places}} \times 100$$

- The accommodation development index [Szromek 2013]:

$$I_{AD} = \frac{\text{number of tourists accommodated}}{\text{number of tourist bed places}}$$

Next, based on the method of Hellwig's development measure [Hellwig 1968, Nowak 1990, p. 87], a synthetic measure was constructed enabling the ranking of counties according to the development degree of the tourism function. The above-mentioned indicators were used as variables to construct the measure. To find the variables that presented a large statistically significant correlation, Pearson's linear correlation coefficient was used. The Hellwig development measure (d_i) usually takes values in the range [0; 1]. The closer the object (a county) is to the pattern (the standard), the higher the measure value [Hellwig 1968, Pomianek 2010]. Two parameters of the taxonomic measure were used to classify counties according to the development degree of the tourist function, i.e. the arithmetic mean ($\bar{d}_i$) and standard deviation (S_{d_i}). The examined objects (counties) were divided into five groups differing in terms of the development degree of the tourism function. The following classes were distinguished:

- 1st class (very high degree of tourism function development) $d_i > \bar{d}_i + S_{d_i}$ (including counties for which the distance from the pattern exceeds the value $\bar{d}_i + S_{d_i}$),
- 2nd class (high degree of tourism function development) $\bar{d}_i + S_{d_i} \geq d_i > \bar{d}_i + \frac{1}{2}S_{d_i}$ (including counties for which the distance from the pattern ranged $(d_i + \frac{1}{2}S_{d_i}; d_i + S_{d_i})$),
- 3rd class (medium degree of tourism function development) $\bar{d}_i + \frac{1}{2}S_{d_i} \geq d_i > \bar{d}_i - \frac{1}{2}S_{d_i}$ (including counties for which the distance from the pattern ranged $(d_i + \frac{1}{2}S_{d_i}; d_i - \frac{1}{2}S_{d_i})$),
- 4th class (low degree of tourism function development) $\bar{d}_i - \frac{1}{2}S_{d_i} \geq d_i > \bar{d}_i - S_{d_i}$ (including counties for which the distance from the pattern ranged $(d_i - S_{d_i}; d_i - \frac{1}{2}S_{d_i})$),
- 5th class (very low degree of tourism function development) $d_i \leq \bar{d}_i - S_{d_i}$ (including counties for which the distance from the pattern is equal or lower than $d_i - S_{d_i}$).

where:

d_i – is the value of the synthetic measure calculated by Hellwig's method,

$\bar{d}_i$ – is the arithmetic mean of d_i ,

S_{d_i} – is the standard deviation of d_i .

The sources of data for 2005-2018 included the Local Data Bank of the Central Statistical Office (Statistics Poland, BDL GUS) and annual statistical reports by the Statistical Office in Warsaw. Calculations were made in the following programmes: PS Imago Pro 5.1 and MS Excel 2016.

RESULTS

The Warsaw capital region is divided into three sub-regions: the city of Warsaw, the East Warsaw subregion and the West Warsaw subregion. As results from Table 1, the highest values of the indicators: I_{ABD} , I_{BD} , I_D and I_S characterized the city of Warsaw. Comparing the other two subregions, it can be seen that the indicator values increased. In the case of the I_{ABD} and I_{BD} , the differences between these two subregions were not significant. In 2017, the highest values of I_{ABD} were observed in the Legionowski (9.8) and Pruszkowski (5.4) counties. The largest number of tourist beds per 100 inhabitants was observed in 2017, in the Legionowski county, which proves the county's considerable tourist attractiveness, especially in the area of the Zegrzyński Lake, where numerous hotels and guesthouses are located, being an attractive place for organizing scientific conferences, conventions

Table 1. Indicators of the tourist function in the Warsaw capital region in 2005 and 2017 by counties – part 1

Subregions and counties	Tourism function indicators (variable symbol)							
	$I_{ABD} (X_1)$		$I_{BD} (X_2)$		$I_D (X_3)$		$I_S (X_4)$	
	2005	2017	2005	2017	2005	2017	2005	2017
1. Warsaw city subregion, including county:	41.3	60.0	1.3	1.8	3,158.7	6,884.6	96.2	201.7
- Warsaw city	41.3	60.0	1.3	1.8	3,158.7	6,884.6	96.2	201.7
2. East Warsaw subregion, including counties:	0.8	2.1	0.4	1.0	44.2	153.3	24.9	75.5
- Legionowski	3.5	9.8	1.4	3.3	231.9	756.7	94.4	255.8
- Miński	0.4	0.5	0.3	0.4	14.1	23.1	11.7	17.6
- Otwocki	0.6	1.8	0.3	0.9	41.2	153.6	21.9	76.5
- Wołomiński	0.2	0.9	0.1	0.4	6.1	65.3	2.9	25.7
3. West Warsaw subregion, including counties:	0.7	2.2	0.3	0.8	33.3	168.1	15.1	65.5
- Grodziski	0.2	2.0	0.1	0.8	12.7	175.9	6.0	69.5
- Nowodworski	0.5	1.1	0.4	0.9	13.4	56.3	12.2	49.3
- Piaseczyński	1.2	2.0	0.5	0.7	25.0	140.7	10.8	48.0
- Pruszkowski	2.1	5.4	0.4	0.8	178.9	508.6	30.3	76.8
- West Warsaw	0.4	2.5	0.2	1.1	15.7	183.4	8.4	84.8
Total: the Warsaw capital region	4.2	7.0	0.9	1.4	303.7	729.4	66.3	146.9

Source: own calculation

and integration meetings. This county also stood out in terms of tourist density – in 2017 there were about 757 tourists per 100 km² of area. The second was Pruszkowski county, with 509 tourists per 100 km² of area. The West Warsaw subregion, in 2017, was visited by 168 tourists using accommodation of 100 km² in area, and this value was almost 10 percentage points higher than in the East Warsaw subregion. This subregion, was in a higher position in terms of the tourist traffic load (75 tourists using accommodation per 100 inhabitants of the area), mainly due to an excellent result in the Legionowski county (256 tourists per 100 inhabitants). In the Warsaw capital region, the values of the studied indicators increased, including the value of the I_D indicator by almost 60 percentage points, which indicates the growing tourist attractiveness of the area.

As results from Table 2, the Warsaw city subregion still dominated, but the differences were not as significant as in the case of the four indicators discussed earlier. In the case of the I_{Ch} indicator, the Legionowski county again stood out among the counties (with 390 nights spent per 100 inhabitants of the area), however the Pruszkowski county came first in terms of the degree of occupancy of beds and the number of tourists using accommodation per 100 beds of the area. Next came the Grodziski county, which determined a slight advantage of the West Warsaw subregion over the East Warsaw subregion.

Although individual indicators carry a certain load of information, the construction of a synthetic meter has enabled a more comprehensive description of counties in terms of the degree of the tourism function development. Based on the analysis of Pearson's

Table 2. Indicators of the tourist function in the Warsaw capital region in 2005 and 2017 by counties – part 2

Subregions and counties	Tourism function indicators (variable symbol)					
	I_{Ch} (X_5)		I_{DOB} (X_6)		I_{AD} (X_7)	
	2005	2017	2005	2017	2005	2017
1. Warsaw city subregion, including county:	183.0	349.1	14,560.3	19,858.2	76.5	114.7
- Warsaw city	183.0	349.1	14,560.3	19,858.2	76.5	114.7
2. East Warsaw subregion, including counties:	50.2	119.1	11,643.3	11,766.4	57.9	74.6
- Legionowski	163.8	390.1	11,651.7	11,754.1	67.2	77.1
- Miński	22.6	49.1	7,550.0	12,477.2	39.0	44.7
- Otwocki	48.1	106.6	14,066.6	12,144.2	64.1	87.1
- Wołomiński	16.6	40.6	15,025.2	10,889.7	26.4	69.0
3. West Warsaw subregion, including counties:	33.4	108.5	9,936.8	12,944.1	44.9	78.1
- Grodziski	7.4	109.9	7,138.3	14,205.7	57.6	89.9
- Nowodworski	39.0	70.3	9,387.6	7,545.1	29.4	52.9
- Piaseczyński	53.0	86.2	10,550.8	12,953.9	21.5	72.2
- Pruszkowski	40.2	123.5	11,363.6	15,273.4	85.6	95.0
- West Warsaw	11.5	147.6	5,935.1	12,947.5	43.2	74.4
Total: the Warsaw capital region	127.7	250.8	13,958.2	17,785.4	72.5	104.2

Source: own calculation

correlation, further analysis excluded the following variables: I_{BD} , I_D and I_S , showing a strong, statistically significant correlation with other variables. Therefore, the other 4 abovementioned variables were used in the construction of the Hellwig meter. Table 3 presents the ranking of counties in terms of the degree of the tourism function development in 2005. In the first place, with a value close to the value of the theoretical Hellwig pattern, the city of Warsaw was found. It was included in class 1 – with the highest (compared to the analysed counties) degree of development of the tourist function. The high value of the measure for the county caused a slight asymmetry, which is why the 5th class was not distinguished in the ranking (a very low degree of development of the tourist function). The Legionowski county was the only one classified into a high level of development, while the middle class (3rd) included 4 counties (Otwocki, Pruszkowski, Piaseczyński and Wołomiński). In the 4th class (a low level of development), were the other 4 units: Nowodworski, Grodziski, Miński and West Warsaw. The next ranking was constructed for data from 2017. As results from Tables 3 and 4, some changes occurred in the order of the analysed counties. The city of Warsaw remained in the first place, with a clearly higher value of the measure, and thus with even better matching with the theoretical pattern with which the counties were compared. The 2nd class was not distinguished. The next 3 counties obtained values representing less than half of the value got by the city of Warsaw. From 2nd place, Legionowski county moved to 3rd place, in favour of the Pruszkowski county. In addition to these two, 4 counties were included in the medium development class regarding the tourist function: Grodziski, West Warsaw, Otwocki and Piaseczyński. The 4th class included Wołomiński and Miński counties, while the ranking was closed by the Nowodworski county which, in 2005, was included in class 4. Four counties moved down the ranking and three were promoted.

The final ranking constructed for average values of the period 2005-2017 brings interesting findings. There was only 1 county (Warsaw City) in the 1st class and the value of the development measure was equal to the value of the theoretical pattern. In each case

Table 3. Ranking of counties in terms of the degree of tourism function development according to Hellwig's measure in 2005 and in 2017

Place	Counties	Value of d_i	Class	Place	Counties	Value of d_i	Class
2005				2017			
1.	Warsaw City	0.940	1.	1.	Warsaw city	0.958	1.
2.	Legionowski	0.547	2.	2.	Pruszkowski	0.484	3.
3.	Otwocki	0.449	3.	3.	Legionowski	0.472	3.
4.	Pruszkowski	0.446	3.	4.	Grodziski	0.435	3.
5.	Piaseczyński	0.315	3.	5.	West Warsaw	0.401	3.
6.	Wołomiński	0.313	3.	6.	Otwocki	0.391	3.
7.	Nowodworski	0.307	4.	7.	Piaseczyński	0.364	3.
8.	Grodziski	0.295	4.	8.	Wołomiński	0.290	4.
9.	Miński	0.284	4.	9.	Miński	0.247	4.
10.	West Warsaw	0.248	4.	10.	Nowodworski	0.186	5.

Source: own calculation

Table 4. Ranking of counties in terms of the degree of tourism function development according to Hellwig's measure in 2005-2017

Place (2005- 2017)	Counties	2005-2017		2005		2017		Change in the place 2017 in comparison to 2005*	Change in the class 2017 in comparison to 2005*
		d_i value	class	rank	class	rank	class		
1.	Warsaw City	1.000	1.	1.	1.	1.	1	0	0
2.	Pruszkowski	0.501	3.	4.	3.	2.	3.	+2	0
3.	Legionowski	0.492	3.	2.	2.	3.	3.	-1	-1
4.	Otwocki	0.433	3.	3.	3.	6.	3.	-3	0
5.	West Warsaw	0.386	3.	10.	4.	5.	3.	+5	+1
6.	Piaseczyński	0.378	3.	5.	3.	7.	3.	-2	0
7.	Wołomiński	0.344	3.	6.	3.	8.	4.	-2	-1
8.	Grodziski	0.340	3.	8.	4.	4.	3.	+4	+1
9.	Miński	0.264	4.	9.	4.	9.	4.	0	0
10.	Nowodworski	0.217	5.	7.	4.	10.	5.	-3	-1

* “+” shift up, “-“ shift down, 0 – no change

Source: own calculation

of the analysed variables, the most desirable values occurred in this county (the highest, since all the analysed indicators were stimulants).

As in 2017, the 2nd class was not distinguished. The most numerous class – with a medium degree of development of the tourist function – this time included 7 counties (Table 4). It can be seen that while, in 2005, the Warsaw West county was in the lowest position in the ranking, in 2017, it moved to 5th position and remained there in the final ranking, which indicates the gradual increase in the importance of this county in terms of the tourism function in the Warsaw capital region. Miński county was qualified in 4th class, whereas Nowodworski was on the very edge of the two weakest classes, but ten-thousandths of a fraction of the measure value placed it in 5th class.

The abovementioned results are coherent with the results of studies in which other types of statistical methods were applied, e.g. in the analysis of Polish counties conducted by Ewa Synówka-Bejenka [2017], using the TOPSIS method, the city of Warsaw was found in a group with a high degree of tourism function development. Moreover, analyses carried out by the Central Statistical Office [GUS 2005-2018] prove that none of the Polish regions is a typical tourist area (NUTS 2), so despite a stronger or less outlined tourist function – especially in some municipalities (LAU 2) – other functions are also developing in regions. Tourism can perform a stimulating function there, and thus constitute an additional element stimulating economic development. The Warsaw Capital region does not have numerous and unique (at least on a national scale) natural values (such as an interesting landform), and seasonal problems with air quality are a barrier, too. Indeed, the city of Warsaw, located in the centre of the region, functioning as a large administrative, scientific and business core, with numerous facilities of historical and cultural significance, is an area frequently visited by tourists, including arrivals in business matters. The city's accessibility, comfortable public transport network, enabling access to the centre

from every corner of the city means that tourists (especially business ones) frequently choose accommodation in the city itself, without looking for other offers in the capital's surroundings (although they are usually cheaper).

CONCLUSIONS

As results from the conducted analysis, in the period of 2005-2017, the city of Warsaw was a theoretical pattern (model) for other counties in terms of the degree of the tourist function development. An in-depth analysis of the values of indicators for each year in the period indicates that though trends in each county were increasing (in relation to each previous year), there occurred some several percent decreases. Therefore, some fluctuations in the places occupied by counties can be noticed in the constructed rankings. In the Warsaw capital region, the strongest positions, apart from the city of Warsaw, were recorded for the following counties: Pruszkowski, Legionowski and Otwocki. However, the largest change in 2017 compared to 2005 was recorded in the West Warsaw county, which moved from the weakest position to 5th place. In turn, the Grodziski county from 8th place in 2005, twelve years later moved to 4th place. In these counties, the tourist function is more visible than in the rest of the Warsaw capital region, though it is not the dominant function in this area. The second to last in the rankings, Miński county was located some distance from Warsaw, with a relatively long travel time to the Centre. Similarly, Nowodworski county, the weakest in 2017 and in the final ranking covering the years 2005-2017, despite having an extensive infrastructure (Warsaw Modlin Airport), was not an attractive tourist location.

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ZRÓŻNICOWANIE PRZESTRZENNE POWIATÓW REGIONU STOLECZNEGO WARSZAWSKIEGO POD WZGLĘDEM STOPNIA ROZWOJU FUNKCJI TURYSTYCZNEJ W LATACH 2005-2017

Słowa kluczowe: rozwój regionalny, atrakcyjność turystyczna, funkcja turystyczna

ABSTRAKT

Celem artykułu jest identyfikacja zróżnicowania przestrzennego powiatów w regionie warszawskim stołecznym pod względem stopnia rozwoju funkcji turystycznej, w latach 2005-2017. Pomiar funkcji turystycznej powiatu wymaga zastosowania wskaźników, umożliwiających porównanie z innymi jednostkami. W tym celu wykorzystano wskaźniki uwzględniające liczbę turystów korzystających z noclegów, liczbę udzielonych noclegów oraz liczbę miejsc noclegowych w odniesieniu do liczby mieszkańców oraz powierzchni obszaru. Pojedyncze wskaźniki niosą pewny ładunek informacji, jednak bardziej kompleksową charakterystykę powiatów od względem stopnia rozwoju funkcji turystycznej umożliwiła konstrukcja miernika syntetycznego. Przy zastosowaniu miary rozwoju Hellwiga, skonstruowano trzy rankingi: dla zmiennych z lat 2005 i 2017, a także dla średnich wartości zmiennych z okresu 2005-2017. W latach 2005-2017 miasto Warszawa stanowiło teoretyczny wzorzec dla pozostałych powiatów i podregionów pod względem stopnia rozwoju funkcji turystycznej. Poglębiona analiza wartości wskaźników dla każdego roku w badanym okresie wskazuje, że chociaż w badanym okresie tendencje w każdym z powiatów były rosnące, to w relacji z roku na rok zdarzały się kilkuprocentowe wahania i spadki. W regionie warszawskim stołecznym najsilniejszą pozycją, oprócz miasta Warszawa, charakteryzowały się powiaty: pruszkowski, legionowski i otwocki. Natomiast najbardziej widoczne pozytywne zmiany nastąpiły w powiatach: warszawskim zachodnim i grodziskim.

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