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**MULTI-DIMENSIONAL ASSESSMENT OF HOUSING  
CONDITIONS OF THE POPULATION IN RURAL AND  
URBAN AREAS OF THE WIELKOPOLSKIE VOIVODESHIP**

Key words: housing conditions, rural areas, urban areas, Wielkopolska province, TOPSIS method

**ABSTRACT.** The aim of the study was to compare the housing conditions of the population living in rural and urban areas of Wielkopolska province communes. The multidimensional assessment of housing conditions was carried out using the TOPSIS method. The research drew on 2016 data published by the Central Statistical Office in the Local Data Bank. The housing conditions in rural areas of the Wielkopolska province were found to be significantly worse than in urban areas. Over 38% of all examined urban areas and only 5% of rural areas (mainly located in the Poznań Metropolitan Area) were classified as Class I with the highest level of housing conditions. Class IV – with the lowest level of housing conditions – included as many as 25% of rural areas and only one urban area located in a mixed, urban-rural commune. In many of the studies, dynamic, beneficial changes in housing conditions in rural areas are emphasized despite the continuous worse situation of rural areas compared to cities. However, due to the observed suburbanisation processes in rural areas in the vicinity of large urban agglomerations, it would be necessary to distinguish living transformations in these rural areas, from changes in housing conditions in rural areas that perform typical agricultural functions.

## INTRODUCTION

Quality of life is the subject of interest in many sciences, it is an interdisciplinary problem analyzed taking various aspects into account. An objective quality of life can be studied taking various criteria and areas into account. One of the important indicators of people's quality of life are housing conditions [Siedlecka, Smarzewska 2013].

The need for shelter and independence from external atmospheric conditions has accompanied people since the dawn of time. The manner of its satisfaction changed along with the development of civilization, starting from the use of existing natural conditions (caves) to buildings erected especially for this purpose [Pisz 2002]. Habitation is a good considered to be a primary necessity, it is the foundation of a dignified life for every human being. It determines functioning in society, as well as fulfilling the obligations imposed on the individual and benefitting from the rights guaranteed to all. It permeates every

area of socio-economic life. Housing conditions are, therefore, one of the basic factors determining the level and quality of life of people creating households [Oleńczuk-Paszela, Sompolska-Rzechuła 2017, Głowicka-Wołoszyn i in. 2018].

Surveys of the housing situation, conducted in Poland, indicate a significant diversification between city and village, both in terms of housing availability [Prokopowicz, Wereda 2017], as well as living conditions such as equipping apartments with basic technical infrastructure [Ciura 2010]. Although the authors point to dynamic changes in the equalization of disproportions between the city and the countryside, the living conditions of rural households are still described as inferior.

The aim of the research was a synthetic assessment of the level of housing conditions of the population living in the communes (municipalities) of the Wielkopolskie Voivodship with the distinction of rural areas and cities in 2016. It allowed to assess the range of disproportions between rural and urban areas of the Wielkopolskie Voivodship in terms of the studied phenomenon. The TOPSIS method was used to create a synthetic meter and research was based on data from the Central Statistical Office (Local Data Bank).

## MATERIAL AND METHODS OF RESEARCH

In 2016, there were 226 communes in the Wielkopolskie Voivodship, of which over 50% were rural communes, only 8% were urban communes, and the remaining 41% were urban-rural communes (Table 1). According to the definition of the Central Statistical Office in Warsaw, rural areas and areas located outside the administrative boundaries of cities in rural-urban communes were classified as rural areas.

In view of the purpose of the research, which was a comparison of housing conditions in rural and urban areas of the Wielkopolskie Voivodship, a total of 319 units were analyzed (Table 1), of which 207 were rural areas (114 rural communes and 93 rural areas separated from urban-rural communes), and 112 units were urban areas (19 urban municipalities including cities with county rights and 93 urban areas separated from urban-rural municipalities). In 2016, the Wielkopolskie Voivodeship was inhabited by about 3.5 million people, of which about 1.6 million in rural areas, which accounted for over 45% of the province's population.

The research was based on data from 2016 published by the Central Statistical Office in the Local Data Bank. To construct the synthetic measure of housing conditions of the population, simple features (indicators) characterizing housing resources and housing equipment in the technical and sanitary installations were selected:

- $X_1$  – average usable floor area of a flat in  $m^2$  per 1 person,
- $X_2$  – dwellings per 1000 inhabitants,
- $X_3$  – average number of people per 1 room,
- $X_4$  – percentage of flats with access to water supply,
- $X_5$  – percentage of flats equipped with a rinsed toilet,
- $X_6$  – percentage of apartments equipped with central heating,
- $X_7$  – percentage of flats equipped with a bathroom.

Table 1. Number of units (communes and rural areas and cities separated in urban-rural communes) considered in the study

Type of area	Location within the administrative types of communes	Communes		Rural/urban areas within administrative types of communes		Rural / urban areas	
		number of communes	percentage of communes	number of units within communes	percentage of all units	number of units	percentage of units
Rural areas	rural	114	50.4	114	35.7	207	64.9
	urban-rural	93	41.2	93	29.2		
Urban areas	urban	19	8.4	19	5.9	112	35.1
Total		226	100.0	319	100.0	319	100

Source: own calculation based on Local Data Bank, Central Statistical Office [GUS]

On the basis of statistical verification, due to a very strong correlation with other features, the  $X_7$  indicator (passive feature) was omitted when constructing the synthetic measure. Among other indicators, only the  $X_3$  trait was considered a destimulant of the analyzed phenomenon, and the remaining features were taken as stimulants.

In the further steps of constructing the synthetic measure with the TOPSIS method [Hwang, Yoon 1981, Wysocki 2010]:

- the standardization of simple features was made using the zero unitarization method [Kukula 2000],
- for each simple feature, model values were determined, i.e. the positive and negative level of housing conditions, assuming maximum and minimum values in the set of values of features, respectively,
- the distances of individual values of simple features were calculated from the standard ( $d_i^+$ ) and the anti-standard ( $d_i^-$ ) using the Euclidean distance and, on their basis, the values of the synthetic measure were determined for each  $i$ -th unit tested:

$$q_i = \frac{d_i^-}{d_i^- + d_i^+}$$

Based on the value of the synthetic measure, typological classes of housing conditions of the population were determined using a statistical criterion based on the average ( $q_{sr}$ ) and standard deviation ( $s_q$ ) from the value of the synthetic meter ( $q_i$ ):

- Class IV (low level of housing):  $q_i < q_{sr} - s_q$ ,
- Class III (average lower):  $q_{sr} > q_i \geq q_{sr} - s_q$ ,
- Class II (average higher):  $q_{sr} + s_q > q_i \geq q_{sr}$ ,
- Class I (high):  $q_i \geq q_{sr} + s_q$ .

The characteristics of individual classes were made on the basis of average harmonic values determined for diagnostic variables as well as the passive variable. In addition, average harmonic values were determined for additional features that describe the housing situation of the population in urban and rural areas, but due to demographic or economic conditions, it is not possible to unambiguously assess whether this situation is better or worse. An example of such a variable is the average number of people per one dwelling. This variable, without being linked to others, such as the size of the flat or the number of rooms in the apartment, is not the basis for the assessment of housing conditions, but may contribute to their in-depth analysis and characterization.

## RESEARCH RESULTS

In 2016, 16.6% of the surveyed areas (urban and rural combined) were characterized by a high level of housing conditions (Class I). This class qualified as many as 42 cities (which were as much as 37.5% out of 112 examined urban areas) and only 11 rural areas (which were only 5.3% out of 207 units of this type). Among 11 rural areas with a high level of housing conditions, 7 were rural communes, and 4 were rural areas in urban-rural communes.

Rural communes with a high level of housing conditions are mainly (6 communes: Dopiewo, Kleszczewo, Komorniki, Rokietnica, Suchy Las, Tarnowo Podgórne) communes belonging to the Poznań Metropolitan Area (POM) and located in the area of direct impact of the city of Poznań. Only one rural commune was outside POM – it was the commune of Powidz with a highly developed tourist function and favorable financial situation due to the location of aerial military bases on its area [Głowicka-Wołoszyn, Wysocki 2016]. The remaining 4 rural areas with a high level of housing conditions were noted in urban-rural communes (Kórnik, Mosina, Pobiedziska and Swarzędz), which were also areas belonging to POM. As shown by the studies of Joanna Stanisławska and Romana Głowicka-Wołoszyn [2017], the most favorable and dynamic changes in the demographic situation took place in POM rural areas, which should be directly related to the phenomenon of suburbanisation and change of the functional type of these communes [cf. Wołoszyn et al. 2016, Kozera, Głowicka-Wołoszyn 2018]. Functional changes of rural communes in the vicinity of Poznań, from agricultural areas to residential areas, are the result of migration to these areas, mainly of the professionally active urban population, relatively wealthy, often young families. The natural consequence of these demographic changes will, therefore, be an improvement of the housing situation in suburban areas, since new residents usually move to new, detached and multi-family houses or already-standing, modernized and/or redecorated apartments. An improvement of housing equipment with technical or sanitary facilities is also expected, which results from the transfer of housing and living urban standards to suburban areas.

In areas (urban and rural) in Class I, there were, on average, 400 dwellings per 1,000 inhabitants and this was a value of more than 130 dwellings higher than in the class with the lowest level of housing (Class IV). The class of areas with the highest level of housing conditions was also characterized by the largest area of single dwelling per one inhabitant amounting to 29.3 sq.m. (higher by 4.6 sq.m. than in Class IV). Almost all dwellings

Table 2. Identification of housing conditions of the population in the Wielkopolskie Voivodship with a distinction of rural areas and cities - average values of indicators of these conditions in typological classes, the Wielkopolskie Voivodship and in Poland in 2016

Specification	Classes								Total	
	I high		II average		III higher		IV lower			
Level of housing conditions	<0.656; 0.824>	<0.552; 0.656)	<0.447; 0.552)	<0.220; 0.447)	<0.220; 0.447)	<0.220; 0.824>				
Values of the synthetic index										
Spatial units, including:										
Rural areas total, including:	11	5.3	40	19.3	105	50.7	51	24.6	207	100.0
– in rural communes	7	6.1	25	21.9	62	54.4	20	17.5	114	100.0
– in urban-rural communes	4	4.3	15	16.1	43	46.2	31	33.4	93	100.0
Urban areas – total:	42	37.5	63	56.3	6	5.4	1	0.9	112	100.0
– in urban communes	15	78.9	3	15.8	1	5.3	0	0.0	19	100.0
– in urban-rural communes	27	29.0	60	64.5	5	5.4	1	1.1	93	100.0

Table 2. Cont.

Specification	Classes				Total	
	I high <0.656; 0.824>	II average <0.552; 0.656>	III higher <0.447; 0.552>	IV low <0.220; 0.447>		
Values of the synthetic index						
Features:			Average values (average harmonics)			
			typological classes			
			Wielkopolskie voivodship	Poland		
Diagnostic	average usable floor area of a flat in sq.m per 1 person	29.3	27.2	26.4	24.7	
	dwellings per 1,000 inhabitants	401.1	313.1	271.0	269.4	
	average number of people per 1 room,	0.7	0.8	0.8	0.9	
	percentage of flats with access to a water supply	99.6	98.6	96.7	93.0	
	percentage of flats equipped with a rinsed toilet	98.6	96.2	91.8	85.0	
	percentage of flats equipped with central heating	87.9	82.2	75.7	67.0	
	percentage of flats equipped with a bathroom	97.2	93.5	88.2	80.6	
Passive						
	average usable floor area of a flat in sq. m	73.0	86.9	97.5	91.6	
	average number of rooms in one flat	3.8	4.2	4.6	4.3	
	average number of persons per 1 dwelling	2.5	3.2	3.7	3.7	
	percentage of flats with access to network gas	71.6	43.1	12.5	3.9	
Additional						

Source: own calculation based on Local Data Bank, Central Statistical Office [GUS]

(99.6%) in Class I had access to a water supply, were equipped with a flush toilet (98.6%) and with a bathroom (97.2%). The values of these partial indicators were higher than in Class IV by 7, 14 and 17 percentage points (p.p.) and by about 5-6 p.p. higher than for Poland. Less than 90% of the apartments in Class I had central heating, but it was up to 21 p.p. more than in Class IV and almost 6 p.p. more than in Poland, in general.

It is noteworthy, however, that the differences between the average values characterizing the class of areas with the highest level of housing conditions were slightly higher than the national average, and in the case of Class II (with an average higher level of housing conditions), the value of the housing availability index (dwellings per 1,000 inhabitants) was significantly lower compared to the national average. The comparison of the value of the housing affordability indicator for the class of urban and rural areas of the Wielkopolskie Voivodship with the highest and average higher level of housing conditions, compared to the national average, indicates a clear problem of housing availability in the Wielkopolskie Voivodship.

The lowest level of housing (Class IV) characterized 16.3% of the surveyed areas, however, this group consisted almost entirely of rural areas, of which there were 51, meaning that every fourth rural area out of 207 analyzed and only one city, which accounted for 0.9% of 112 analyzed areas.

Rural areas in this class were characterized primarily by very low availability of apartments – about 270 apartments per 1000 inhabitants, so it was over 100 apartments less compared to the value of the indicator for Poland. Only 85% of households in this class were equipped with a flush toilet (9 p.p. less than the total in Poland), and only 80% had a bathroom (11 p.p. less than in Poland). The largest inequality of households in this class compared to the national average (15 p.p.) concerned the percentage of flats equipped with central heating – only 67% of flats in Class IV had this facility.

## CONCLUSIONS

As a result of the conducted research, it was found that housing conditions in rural areas in the Wielkopolskie voivodship are clearly worse than in cities. In 2016, over 38% of all surveyed urban areas and only 5% of rural areas (mainly located in the Poznań Metropolitan Area) were classified as Class I with the highest level of housing conditions, while in Class IV, with the lowest level of housing conditions, there were as many as 25% of the surveyed rural areas and only one urban area located in the urban-rural commune.

In many conducted studies, dynamic, beneficial changes in housing conditions in rural areas are emphasized despite the ongoing worse situation of rural areas compared to cities. However, due to the observed suburbanisation processes in rural areas in the vicinity of large urban agglomerations, it would be necessary to distinguish living transformations in these rural areas, from changes in housing conditions in rural areas performing typically agricultural functions. Changes in housing conditions in rural areas in metropolitan areas of large cities are so dynamic that they can distort the picture of changes in rural areas in general. As the research has shown, the housing conditions in rural areas in close vicinity of Poznań allowed to classify these areas to the two highest classes.

The research into changes in housing conditions that take place in rural areas, especially in metropolitan areas, can contribute to the understanding of this process and help develop solutions that can contribute to improving the quality of life of residents in rural areas.

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## WIELOWYMIAROWA OCENA WARUNKÓW MIESZKANIOWYCH LUDNOŚCI NA OBSZARACH WIEJSKICH I MIEJSKICH WOJEWÓDZTWA WIELKOPOLSKIEGO

Słowa kluczowe: jakość życia, warunki mieszkaniowe, obszary wiejskie, Wielkopolska, metoda TOPSiS

### ABSTRAKT

Celem badań była syntetyczna ocena poziomu warunków mieszkaniowych ludności zamieszkującej gminy województwa wielkopolskiego z wyróżnieniem obszarów wiejskich i miast w 2016 roku. Pozwoliło to na ocenę skali dysproporcji pomiędzy wiejskimi i miejskimi obszarami województwa wielkopolskiego pod względem badanego zjawiska. Do konstrukcji miernika syntetycznego zastosowano metodę TOPSiS, a badania przeprowadzono na podstawie danych pochodzących z GUS. W wyniku przeprowadzonych badań stwierdzono, że warunki mieszkaniowe na obszarach wiejskich w województwie wielkopolskim są wyraźnie gorsze niż w miastach. W 2016 roku do klasy I o najwyższym poziomie warunków mieszkaniowych zakwalifikowano ponad 38% wszystkich badanych obszarów miast i tylko 5% obszarów wiejskich (głównie położonych w Poznańskim Obszarze Metropolitalnym). Natomiast w klasie IV o najniższym poziomie warunków mieszkaniowych znalazło się aż 25% badanych obszarów wiejskich i tylko jeden obszar miejski położony w gminie miejsko-wiejskiej. W wielu prowadzonych badaniach podkreśla się dynamiczne, korzystne zmiany w zakresie warunków mieszkaniowych na obszarach wiejskich mimo nadal gorszej sytuacji na wsi w porównaniu do miast. Jednak w związku z obserwowanymi procesami suburbanizacji na obszarach wiejskich w otoczeniu dużych aglomeracji miejskich należałoby odróżnić przemiany bytowe na tych obszarach wiejskich od przemian warunków mieszkaniowych na obszarach wiejskich, pełniących typowo rolnicze funkcje. Zmiany warunków mieszkaniowych na wsiach w obszarach metropolitalnych dużych miast są na tyle dynamiczne, że mogą zniekształcać obraz przemian na obszarach wiejskich ogółem. Jak wykazały bowiem badania, warunki mieszkaniowe na obszarach wiejskich w bezpośrednim sąsiedztwie Poznania pozwolily zaklasyfikować te obszary do dwóch najwyższych klas.

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