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## Historical and contemporary factors shaping the layout of rural buildings

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**Abstract:** The layout of rural buildings has been shaped over centuries as most existing towns were founded several hundred years ago with the main reason for establishing a village in a given place being natural factors such as access to resources. Over the centuries, some characteristic building layouts have emerged. The aim of the research presented in the article was to determine the degree of impact of natural factors on the process of establishing a village and to identify contemporary factors influencing the development of the historical layout of rural buildings. The research was carried out using the example of a rural commune neighboring Czestochowa. All the towns in the exemplary rural commune were analysed historically. The results are presented in the form of numerical indicators showing the influence of individual factors on the settlement of the village. Then, using the example of four representative settlements for different types of buildings, the historical and current layout was compared. It was found that the original layout of buildings has been preserved as a general outline, and current development depends mainly on economic factors and the attractiveness of the area, illustrated with appropriate examples.

**Keywords:** rural construction, natural factors, spatial development

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### Introduction

By definition, a village is a settlement unit with a compact or dispersed development and existing agricultural or related service or tourist functions, without municipal rights or the status of a city (Journal of Laws of 2003, item 1612). The factors determining its formation and development are foremost natural factors, which include topography, access to water, soil quality, land cover and climate, however, historical and cultural factors (Shcherbina & Gorbenkova, 2019)

as well as socio-demographic factors (Wang & Yuan, 2019) are equally important. Over hundreds of years, these factors have shaped the modern image of the village, which often differs from its original appearance. At this point, it is worth emphasizing that not all villages are characterized by a uniform spatial arrangement. This term is understood as the layout of housing estates, farms, fields and roads. Diverse layouts have resulted in the creation of several basic types of villages. The oldest are oval village (pol. *owalnica*), encircling village (pol. *okolnica*) and linear village (pol. *ulicówka*) (Burszta, 1958). Most original rural forms have changed over the years, into more complex forms, for example, a linear village changes into a multi-street village (pol. *wielodroźnica*). However, traces of some original variants have survived to this day (Szulc, 1995). Numerous studies have addressed the following issues: the state of preservation of spatial systems and the identification of those that require special protection (Szczepańska & Wilkaniec, 2016), valorization of spatial systems (Figlus, 2018), the degree of concentration of rural buildings (Gibas & Heffner, 2018), and the problem of fragmentation of cadastral plots and its negative impact on the spatial structure of rural areas (Leń & Mika, 2016; Dudzińska, 2012). The problem of so-called patchiness of rural communes, created mainly as a result of the law of inheritance (Niroula & Thapa, 2005), prompted the development of certain mathematical foundations that may significantly facilitate the liquidation of land dispersion (Leń, 2018).

Research on the changes of rural spatial systems was carried out for various regions of Poland, including Eastern Mazovia (Bierkat & Długozima, 2017), the suburbs of Olsztyn (Sobotka, 2014), as well as in other countries. The studies concerned the analysis of changes in the use of rural land in southern Italy (Tortora et al., 2015), the use of a simulation method to illustrate land use changes in cities and villages (Sang et al., 2011) and the spatial evolution of rural settlement in China (Li & Song, 2020).

The aim of the research presented in the article was to determine the degree of the impact of natural factors on the process of establishing a village and to identify contemporary factors influencing the development of the historical layout of rural buildings. The research was carried out using the example of a rural commune adjacent to Częstochowa.

## 1. Methodology of research

The research was carried out in two stages. The first stage was based on available source documents (method of examining documents) related to local history and the oldest available cartographic materials (Kała et al., 2007; Mapster, 2020). The analysis determined the influence of factors that prompted the establishment of a village and the age of each of the 28 localities belonging to the commune. Natural factors determining the emergence of villages were identified, including: access to water, afforestation, soil quality and access to fossil resources. These were then subjected to an impact assessment.

The second stage of the research determined the contemporary factors influencing current trends in rural spatial development. Four localities, representative of different historical building layouts, were selected for a detailed analysis. Using the oldest available cartographic materials in digital form (Mapster, 2020), contemporary satellite images (Geoportal, 2020) and the author's own observations, the current layout of the village was compared with data from 1893. During the research, particular attention was paid to such elements of spatial layout such as: the layout of the buildings, the layout of the land and finally the transport communication system. With regard to the layout of the buildings, both the layout of the existing structures as well as the construction and distribution of new buildings were analysed. The analysis of the land layout concerned the shape and size of plots, as well as the method of their distribution and division. However, the analysis of the transport communication system was carried out in the context of historical and modern road connections.

## 2. Analysis of the results

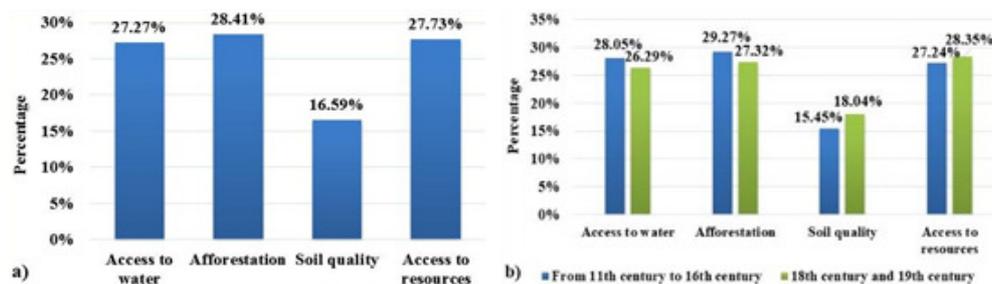
Table 1 shows the point assessments for the impact of natural factors identified in the first stage of the research. Each of the factors was assessed by assigning a score according to the selected scale from 1 to 5, where the lowest score "1" denoted no significant impact on the development of the village, and the highest score "5" a very large impact. The value of the ratings was influenced, among others, by the availability of individual resources in a given area. The table also shows the age at which the village was established according to the sources.

Figure 1a shows the percentage share of selected natural factors in the process of village formation. As shown in the figure, the following three dominant factors stand out with a comparable index value amounting to approx. 28%: access to water, resources and afforestation. It is known from literature that in the early Middle Ages, the areas of the analysed commune were mostly covered with forest (Kala et al., 2007). It was also established that in the analysed area there was a large network of surface and underground water, which, combined with the wealth of mineral resources (sand, gravel, ore-bearing clays, limestone and iron ore deposits) resulted in favorable settlement conditions. The analysed area is characterized by the presence of medium and poor quality soils, which translates into a low impact value for this factor of approx. 17%.

Figure 1b shows that, both in the period from the 11th to the 16th century and from the 18th to the 19th century, the main factors of rural development were the access to water, resources and afforestation mentioned earlier. It is also worth noting, however, that in the second analysed period, access to resources has the highest percentage, which amounts to approx. 28%. Soil quality has also increased in importance. The percentage of this factor increased by approx. 3%.

**Table 1.** Assessment of the impact of individual factors on the rural development and the age of its establishment (*own research*)

Village	Access to water	Afforestation	Soil quality	Access to resources	Age of village foundation	Village	Access to water	Afforestation	Soil quality	Access to resources	Age of village foundation
No 1	3	5	3	3	18th century	No 15	5	5	3	4	14th century
No 2	4	1	3	3	19th century	No 16	3	5	3	4	16th century
No 3	3	5	3	4	18th century	No 17	5	5	2	5	16th century
No 4	4	4	2	3	15th century	No 18	5	4	2	5	16th century
No 5	3	1	2	4	19th century	No 19	3	5	3	5	18th century
No 6	5	5	3	3	18th century	No 20	5	4	3	4	14th century
No 7	3	5	2	5	19th century	No 21	4	5	2	5	15th century
No 8	5	5	3	5	11th century	No 22	4	5	2	5	15th century
No 9	5	5	2	4	16th century	No 23	3	4	2	5	18th century
No 10	5	3	2	4	18th century	No 24	5	5	3	5	14th century
No 11	4	5	2	5	15th century	No 25	5	5	3	5	14th century
No 12	5	5	3	5	19th century	No 26	5	5	3	5	14th century
No 13	5	5	3	5	18th century	No 27	5	5	3	4	19th century
No 14	4	4	3	5	18th century	No 28	5	5	3	3	15th century
SUM OF ASSESSMENTS							120	125	73	122	–

**Fig. 1.** Percentage share of the impact of natural factors on establishing a village: a) over the full period, b) divided into two time periods (*own research*)

### 3. Transformations of rural spatial systems

As already mentioned, the second stage of the research concerned a detailed analysis of 4 localities with different spatial arrangements.

Figure 2a shows a spatial arrangement with features characteristic of the row village (Szulc, 1995), such as a loose arrangement of buildings on both sides of the

road and strips of arable fields perpendicular to the road. Agricultural land is located behind residential and farm buildings, mainly due to easy access to the river flowing along the border of the farms. The transport communication system of the village was a built-up main road and several undeveloped forest roads leading perpendicularly from it. The abundance of raw materials in these areas (ore-bearing loams) resulted in the production of ceramic materials in a brickyard that has operated since the 19th century. The development of the countryside prompted an influx of people, which was associated with the need to build new housing facilities. For this purpose, forests were cleared and buildings were erected along both sides of tributary roads. In the interwar period, land estates were parceled out, which resulted in the creation of many smaller plots. The division of land formerly owned by one landlord could also be related to inheritance. Both these processes contributed to the creation of a so-called patchiness of village layout. Currently, plots are situated perpendicular to the road, and their shape is usually an elongated rectangle. The system also shows features characteristic of a series system (Fig. 2b).



Fig. 2. Village layout: a) in 1893 (Mapster, 2020), b) currently (own research based on Geoportal)

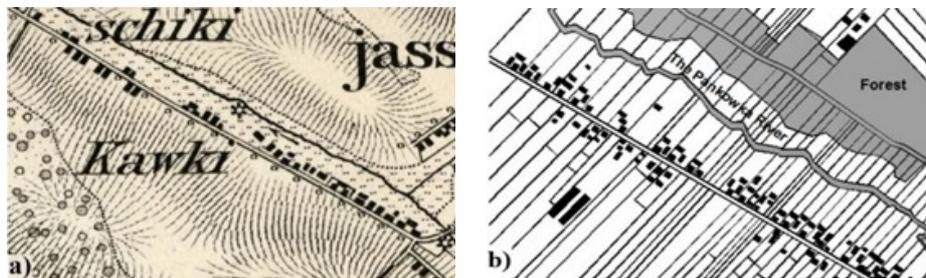
Figure 3a shows a multi-street system, characterized by buildings on both sides of several roads intersecting each other. Agricultural land was located behind residential buildings, and the complex transport communication system facilitated access to the village. It consisted of narrow roads, mostly routed through meadows and forest areas. The exploitation of iron ore deposits and the establishment of the mine after 1945 had a great influence on the development of the village in the 19th century. It was connected with the need to find places to live for the workers. A small estate of multi-family houses was built (arrow in the picture).



Fig. 3. Village layout: a) in 1893 (Mapster, 2020), b) currently (own research based on Geoportal)

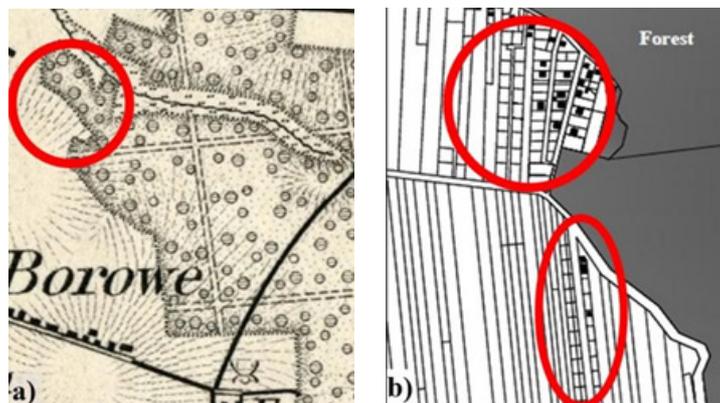
Figure 3b shows a clear example of the aforementioned patchiness, i.e. a series of long, narrow plots, resulting from inheritance (in circles). As a result of the changes, the nineteenth century layout was not transformed into a different form, but it was significantly expanded by widening the transport communication routes, marking out its new sections and building a new housing development.

Another type of village analysed is the linear village, characterized by a one-way layout with compact buildings on both sides of the road (Fig. 4a). As in the first example, the plots are perpendicular to the road and continue all the way to the river behind the pastures. Today, this system looks almost the same. However, there have been some changes, such as, an increased number of buildings and more separate farmland. The plots have the shape of an elongated rectangle.



**Fig. 4.** Village layout: a) in 1893 (*Mapster, 2020*), b) currently (*own research based on Geoportal*)

The last example of spatial transformation is the formation of a system with urban features. The areas marked in circles in Fig. 5a are partially occupied by meadows and forests. Currently, these areas have been divided into plots for sale for single-family housing (Fig. 5b).



**Fig. 5.** Village layout: a) in 1893 (*Mapster, 2020*), b) currently (*own research based on Geoportal*)

Part of the area has been cleared and access roads have been marked out. It is also common to separate individual smaller plots from former agricultural land, as shown in Figure 5b. An access road has been marked out, along which residential buildings are erected on one side. Due to the change in the occupational structure of rural residents and the lack of necessity to have large areas for farming, these plots are small.

## Conclusions

The conducted research shows that natural factors had a decisive influence on the formation and development of villages, and thus on the historical layout of rural buildings. It was found that the most important were: access to water, access to fossil resources and afforestation. These factors obtained a comparable value of the indicators amounting to approx. 28%. The quality of the soil was a less important factor, however, with the passage of time, soil quality became more important.

The analysis also showed that the layouts of buildings undergo transformation involving the expansion of the historical layout. These changes concern the demarcation of new roads along which new buildings are erected, as well as the shape and size of plots. The current plots are of small size, which is justified by the changes in the occupational structure of the inhabitants. An increasingly frequent phenomenon in the countryside is the formation of systems with urban features. Part of the forest area and the land that used to function as arable land are now divided into smaller plots and sold for development purposes. These activities are preceded by changes to the commune's spatial development plan.

It also happens that the existing structures are quite problematic in current realities. For example, most of the existing roads follow the old unpaved roads. These roads were planted with trees, often too close to the edge, which in the current conditions poses a great danger to road users. Another example relates to the historical layout of the land. As a result of inheritance, narrow plots were created adjacent to each other. The houses erected on them created dense single-family housing. On agricultural land, a checker pattern of land was often formed.

The natural factors identified in the course of the research, which were previously necessary for the establishment and development of the village, have now lost their importance. Today, they constitute the most important conditions for the development of recreational areas or rural-type settlements. This is related to changes in the social structure of rural residents in terms of infrastructure, motorization and profession. Most inhabitants conduct non-agricultural activities or find employment in the city, meaning that conditions such as soil quality or access to water are not the main determiner of settlement. Currently, the development of the construction industry has also allowed for greater freedom in choosing areas for development. Also, access to the workplace is not a major problem, due to the well-developed network of transport communication routes and the fact that most residents have a vehicle independent of public transport. It can be concluded that

the main factors influencing the development of rural areas and the expansion of historical spatial systems today are: economic factors (e.g. the price of plots), the attractiveness of the area (e.g. attractive landscape with good access to the city) and planned activities of the local government (local commune land development plans).

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