

Prognosis of the Natural Environment Transformations Resulting from Spatial Planning Solutions

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Abstract

This article attempts to forecast the influence of local planning decisions on the natural environment and landscape of a chosen tourist destination. In Poland, placement of a new development takes place on the basis of a local plan or, in its absence, on decisions concerning location of the said development. The plan document plays a deciding role in the development of a place, shaping architecture, protecting the natural values of landscape and nature, and as a tool, for shaping the spatial order. Drafting the local plan is not enough to provide guarantees that the adopted solutions will minimize changes to the environment. It often happens under pressure from the society exerting favourable provisions enabling completion of a development.

Keywords: forecasting environmental changes, transformation of the natural environment, local spatial plans

Introduction

When quoting the basic definition of sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” [1, 2], the role of planning documents in creating sustainable development of a commune seems unquestionable. Planning is location tools determining the shape of space filled with anthropogenic elements. The role of these tools is also planning and completion of locations of certain structures and complexes placed in a geographic space which, in a minimal way, collides with structures and processes taking place in the natural environment, and also creating favourable conditions for sustainable social development [3]. Urban plan-

ners seek, in activities in the area of spatial planning the main tool for creating the spatial sphere, to significantly influence the remaining spheres of sustainable development.

Sustainable development policies typically encompass three main themes: economic, environmental, and social. But according to the European Landscape Convention (Council of Europe, 2000) and UNESCO’s Universal Declaration on Cultural Diversity (UNESCO, 2002), there is a fourth cultural element to sustainability. Prieur [4], discussing the preamble to the European Landscape Convention, refers to its promotion of: “all four ingredients of sustainable development (social, ecological, economic, and cultural improvement)” [5].

The role of the Environmental Impact Assessment in the development process is recognized as an integral part of the planning and decision-making process. Its strength lies in its potential for analyzing the associated environmental

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issues and for improving the siting, layout, and design of a particular scheme. The assessment of landscape and visual effects are an essential part of this process [6].

In Poland, the spatial development of a commune takes place on the basis of the spatial policy determined in the study of conditioning and directions of spatial development. The main tasks of the spatial planning policy are the determination of its goals as well as means of realization activities that serve the purpose of achieving the indicated goals. Conclusively, the tool for realization of spatial planning policy included in the study of conditioning and directions of spatial development of a commune is its local spatial development plan.

The aim of this article is to determine the influence of the local law, determined in a local spatial development plan, on the landscape of Czarna Góra village. These deliberations are important in the light of landscape transformations that often take place under pressure from investors who sometimes force favourable regulations in order to complete a building development. The research involves a Spiska village Czarna Góra located in the Bukowina Tatrzańska commune, in the proximity of the Polish-Slovakian border, at an altitude of 740-860 m above sea level, at the tributaries of the Białka River. During research, which was carried out in 2008-09, a field inventory of village buildings was compiled, including photographic documentation and a map. Numerous meetings with local authorities took place in order to obtain information about planned spatial development and conditions of development for new investment areas.

Local Planning in a Commune

The basic planning document and, at the same time, an act of local law, whose provisions are binding for local authorities, public institutions, and citizens, is the local spatial development plan. This local spatial development plan determines: purpose of the land, location of public purpose investments, and the method of development and conditions of land development. The local plan is compiled optionally for the area of the whole commune or its part. Nevertheless, in special cases, the commune has a duty to compile a plan for a designated area. On account of the importance of the plan as a document on the basis of which planning permission is issued, it has to be specified in a clear and detailed way.

The borders of the area covered by the plan are determined by the commune council by a resolution. The procedure of compiling a plan is subject to public viewing by making the plan available to the public. The Current Planning and Spatial Development Act introduced the principle of openness in spatial planning in a commune, not only by the right of obtaining information about local authorities activities in the process of creating planning documents, but also by the right to inspect the document study and the local development plan.

Compilation of a local spatial development plan by the commune carries numerous consequences, not only finan-

cial but also social, environmental, and spatial. The social, environmental and spatial consequences are difficult to measure and they are usually visible in either social satisfaction or opposition to its assumptions or protests of environmental organizations. However, the financial consequences of compiling a local spatial development plan take the form of notable benefits or costs for both the commune and its citizens. A commune, when compiling a local plan, realistically influences the changes in the value of property placed in the area covered by the plan. The cost of compiling such a plan is incurred by the commune's budget; therefore, the commune has the right to participate in the benefits which the owners of the property achieve as a result of the change of purpose of their property. Stipulations of the local plan may also influence a decrease in property value. Then the owner of the property or perpetual user may demand from the commune compensation for damages incurred or property buy-back.

When formulating spatial policy and during work on a local spatial plan, visualization of the designed investment can be used. A debate on spatial development, supported by a spatial design model of proposed planning solutions, may enable achievement one of the main goals of spatial planning, which is landscape protection. It is also included in the European Landscape Convention.

Research in landscape visualization has, to date, focused on technological issues and incredible advances have been made. It may not be long before we see photorealistic interactive virtual worlds where avatars (virtual humans) interact with each other and the environment in natural ways. However, in contrast to the technological challenges, perceptual and societal issues of visualization have hardly been touched [7, 8] in landscape visualization research [9].

Nature and Landscape Values of the Village

In the area covered by the local spatial development plan of Czarna Góra village, valuable elements of the natural environment can be found. There are also natural and environmental values of high significance to the quality of life of local inhabitants. The most valuable resources and natural values are considered the following:

1. Landscape and scenic values resulting from diverse land morphology that enable viewing of wide panoramas in multi-layered plans. Altitude ordinates fluctuate from 674 m above sea level in the northwestern part (Białka channel) to 970 m above sea level in the eastern part (Wierchowina Ridge). Then, topographic prominence exceeds 300 m. The dominating element in land morphology is Litwinka Hill (Czarna Góra) of 901.5 m above sea level with a cross placed at its summit [10].
2. Significant resources of surface water result from a high amount of rainfall and specific geomorphological structure. The presence of the typically mountainous river Białka Tatrzańska and its smaller tributaries considerably strengthen hydrological resources. The elements of a surface hydrological network serve not only the

drainage function, but also ecological functions as natural migration routes and, thanks to its biological structure, they increase regional diversity.

3. Farms and tree-covered areas due to diversification of habitats and high diversity play important environmental functions: water and soil protection and landscaping.
4. Valuable non-woodland communities due to the presence of numerous rare or endangered plant species enrich the region's biodiversity through the functionality of habitats of diverse soil and moist conditions; the presence of numerous species of amphibians, reptiles, insects, rodents, and birds. Permanently marshy areas are also important for shaping local hydrological conditions, including water retention.
5. The richness and diversity of plant and animal species due to the presence of plants typical of and characteristic for the lower mountain level, the presence of rare plants, endangered plants, and the presence of forest animals, including rare, protected, and endangered ones.
6. Ecologic structures including the world-renowned ecological corridor marked by the ECONET net covering the whole area of Czarna Góra village covered by the local plan. Moreover, the area of Białka River at the mouth of Leśnicki stream to the mouth of Czorszyński reservoir covered by the net of Natura 2000 programme as part of the Special Protection Area (SOO) – “Dolina Białka” PLH120024, refugium type B, area of 716.3 ha. A wide migration corridor of longitudinal route runs through the farm-woodland-tree-covered area. It joins the structures of the Tatra Mountains, Magura Spiska, the Pieniny Mountains, Orawsko-Nowotarska Valley, and the Gorce Mountains. In the village there are also local migration routes connected with streams and local interchange area in the Eastern part of the village.

The above-mentioned values are characteristic of the high environmental standards that concern air, soil, and surface waters.

The area of Czarna Góra village, due to its characteristic location on the border of Jaworzyńska Valley and the Spisko-Gubałowskie Foothills and in the valley of River Białka Tatrzańska, possesses high scenic values. Among the factors influencing the scenic attractiveness are large eleva-



Fig. 1. Panorama from Litwinka Mountain. (Phot. M. Hełdak).

tions of mountain parts which enable observation of the vast scenic panorama of the Tatra, Spiska, Gorce, and Pieniny mountains. Also, the presence of extensive woodland and farm tree covered areas creates an amazing mosaic of field distribution. All grounds located in the upper parts of slopes, on the mountain ridges, and on the peaks (among others Umarla Droga) and also on upper culminations (among others Litwinka) should be classed as areas of high scenic value (Fig. 1). They are clearly visible from long distances, from the main transport routes, and from scenic points and routes. Also, the valley of the Białka River possesses high scenic values with its beautiful rock formations, brooks, and water plants. In the village an old settlement complex has been preserved together with some examples of regional building styles and characteristic cultural elements of Spiska village, which are accompanied by valuable tree specimens and roadside shrines.

The preservation of unique natural and scenic values should take priority in the spatial planning process.

Risks Resulting from the Planned Building Development of Czarna Góra Spiska Village

Development and Current Level of Investment in the Village

The area of Bukowina Tatrzańska commune, ethnically divided by the Białka River into Podhale and Spisz, is currently dominated by Podhale region influences. In the villages of Jurgów, Czarna Góra, and Brzegi the influences of the Spiska style are very strong and a disparate Spisz character [11]. Currently we can see a progressive diffusion of Podhale and Spisz culture. The dissimilarity of buildings in Czarna Góra lies in the appearance of numerous plastered and brick houses from the end of the 19th century (due to Hungarian fire regulations) and also in the usage of gable roofs with balconies at the top. There is a difference in wood panelling of walls and gables – different types of wooden boards and balcony ornaments – fine-components and open-patterned cut-outs in railings.

In the village individual buildings, the remains of Spisz architecture, have been preserved. The Korkosz Croft in Czarna Góra is a branch of the Museum of Folk Culture of the Spisz Region. “It is one of the forms for popularization and preservation of values of the cultural environment through organization of a museum in a building located in its natural environment and scenery, understood as the form of conservation *in situ* (in a place)” [12].

The northern part of the village is a development where homesteads are placed along the road, usually in the bottom of a valley, and the remaining part – ribbon development. In the old part of the village are the remains of the old spatial layout and historical buildings that are mixed with dominating modern elements of development, but they still possess high cultural values.

Currently the village building development is diverse – partly in Podhale region style. Cottages usually include two outbuildings in a circular formation (fence or a building).

In the village scenery modern buildings can be seen, especially the typical “quarter,” often with white walls, pebble underpinning and roof covered with metal sheeting. Most of the residential buildings have been renovated or extended incorrectly. There is also a tendency to replace the wooden materials with bricks. Areas of residential and service developments have been presented in Fig. 2. The buildings are concentrated around the main road running through the village which, to a certain extent, are the result of natural restrictions for development. Recently, rapid development has been noticed only in the area near the buildings of the village leader, on the slope from which there is a beautiful view over the Tatra Mountains and Spiska Magura. In the remaining parts of the village the development is not spreading so rapidly.

Planned Development and Environmental Transformations

The location of the village in the mountainous area, near the Tatra and Pieniny Mountains, 20 km from Zakopane, increases development opportunities for Czarna Góra as an attractive touristic place. Landscape factors and the developing winter sports infrastructure have the greatest influence on possible development. In the area of the neighbouring village Białka Tatrzańska, in the last few years, there has been a dynamic growth of sports and recreational areas, including ski lifts and cable cars, transforming the village into an attractive winter sports centre. Similar conditions are also present in Czarna Góra, creating big possibilities for development. Currently there is one ski station



Fig. 2. Czarna Góra village – the location of the existing building development.

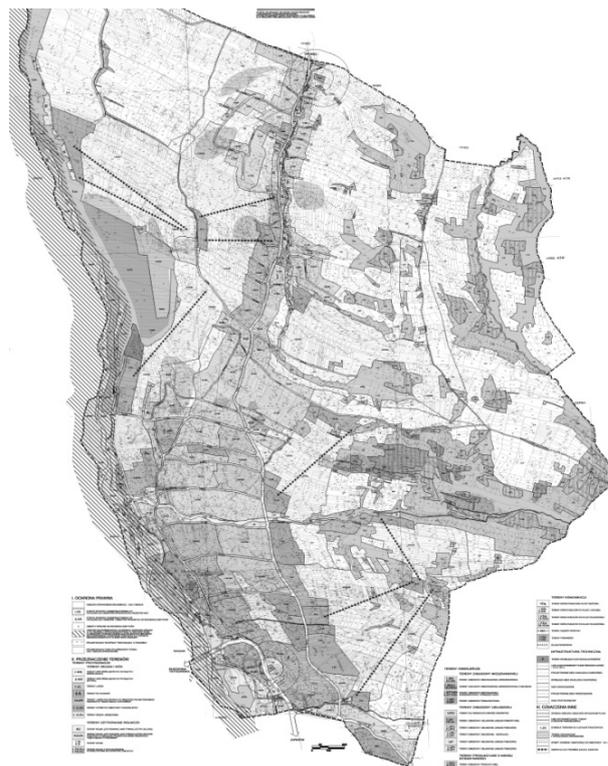


Fig. 3. Czarna Góra – Designed spatial development on the basis of the local spatial management plan.

(chairlift) and a lift on the hillside of Litwinka mountain (not used in the last ski season).

In addition to winter sports facilities, the area of Czarna Góra possesses wonderful conditions for summer leisure activities. The village is a great alternative for the often crowded and more expensive Zakopane, offering fantastic areas for trekking and mountain-biking thanks to its landscape qualities and the character of the village.

On the other hand, the natural environment, i.e. the layout of the land, short vegetation period and poor quality of soil cause the gradual decrease of farming acreage and transformation of farmlands into green areas. Therefore, there is an expectation that the village’s character will change into a tourist centre.

The local spatial plan in place for Czarna Góra provides for significant development of areas meant for investment. New areas of housing developments are presented in Fig. 3 [13]. In the local plan new investment areas located quite far from the main road, which runs through the village, have been indicated. This requires a significant development of the technical infrastructure, including transportation. The spatial development of the designed housing developments is disconcerting when taking into account plans for creating the Spisz National Park, which will, among other things, be responsible for:

- preservation of unique natural qualities
- provision of ecosystem for self-regulation and self-regeneration
- introduction of order to tourist and leisure activities
- protection of unique scenic qualities

Having analyzed the area for investment and the space for the new residential and guest houses, and a service area, it was decided that it would be increased by about 210 ha. Altogether, for various investments 110 ha of new land was designated in the local plan to build new ski routes or to widen the existing ones, therefore 100 ha of land was allotted. The scope of changes which the investments might bring is significant. The completion of investments in the new areas earmarked for development will cause irreversible changes in the environment, including:

- damage to surface geological structures as a result of earth work
- changes in the local distribution of water as a result of partial surface insulation and drainage of shallow groundwater
- changes in the landscape
- damage to soil and vegetation

Also, during operation the buildings can become a source of air, noise, water, and soil pollution.

Resulting from the location on slopes of 5-45% incline of some of the areas covered by the local plan, erosive processes constitute a significant risk to the land. Landslides arise as a result of cutting into a significantly inclined slope, due to the fact that the surface is predisposed to sliding on non-strengthened banks and also as a result of changes to groundwater conditions. Threats to the environment can also come from incorrect water-sewage and waste management. Part of the village located in a valley is equipped with an organized sewage system connected to a sewage treatment plant. However, there also exists a certain danger of ground and underground water if continuous development of sewage system, due to the increased investment and the numbers of tourists, is not carried out.

In the area of planned development, when completed, there will be a significant decrease in water filtering due to insulation of surface soil. Also, the water balance on the ski-lift areas will be affected as a result of using artificial snow on ski slopes.

The completion of the plan by the realization of new investments will cause a partial elimination of vegetation. It mainly concerns valuable groups of plants located on the edge of developed areas. It results in gradual displacement of different, very often rare and endangered species of plants and animals.

Moreover, realization of the local plan will cause irreversible changes to the landscape following the appearance of buildings, local roads and other elements of technical infrastructure. Building developments will significantly affect scenery in the village. The plan sets conditions and rules for the development of infrastructure; however, the scale of acceptable new investment is great in comparison to the present investment in Czarna Góra.

Conclusions

1. Taking into account morphological and natural conditions, the location of new areas meant for village development had to consider the presence of landslide

areas, marshlands, and stream channels. Potentially significant development of infrastructure in the southern part of Czarna Góra (development in the Białka River Valley) to the west is restricted by the necessity to protect natural resources of the ecological system of the Białka River and the danger of flooding in this area.

2. Despite the presence of natural barriers for the spatial development of the village (the Białka River, protected ecological structures, significant terrain gradient), a significant area of land of over 100 ha has been allocated for investment. Another 100 ha has been allocated for completion of ski-lifts and cable-cars.
3. Realization of the plan's provisions will cause irreversible changes to the natural environment, mainly to the soil and water by pollution of the soil covering and elimination of vegetation. It will cause changes to local water circulation. The decrease of the farmlands will result in elimination of habitats of local vegetation and will drive small game away to the non-developed areas.
4. Utilization of the whole potential development area will influence the spread of development into areas free of construction which will worsen local scenic qualities.
5. Being able to visually represent the existing real world as well as potential alterations is essential for landscape designers and planners to express and communicate their thoughts. In the past, maps, plans, and sections have been predominately used. These representations are at a high level of abstraction. For the understanding of both the general public and the experts, it is important to communicate a proposal in perspective view, providing a more natural and direct approach to Communications [9].

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