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Studies of Natural Environmental Conditions for the Needs of Local Spatial Management Plans in Poland

1. Introduction

Natural conditions in Poland serve as a basis for all types of activities regarding spatial planning. Physiographic studies (developed until 1984) and currently ecophysiographic studies are based on urban physiography defined as a field which engages in the study and comprehensive evaluation of the natural environment for the needs of spatial management [1, 5].

According to the Spatial Planning Act of 1961 [6], physiographic studies were supposed to create a natural foundation for the spatial plan, making it possible to:

- achieve ecological conditions optimal for human beings,
- create conditions which would guarantee good management of natural resources,
- safeguard economic effects of planned investments in management plans through comprehensive exploitation of natural qualities of the area and avoidance of possible clashes between the management plan and natural conditions.

With the new political situation in Poland, the obligation to develop ecophysiographic studies was introduced by the Act on Access to Information on the Environment [9] and confirmed by the Environmental Protection Law [10] in order to provide the conditions for maintaining the natural balance and rational management of environmental resources; in accordance with the principles of sustainable development, for the purposes of municipal studies of conditions and directions of spatial management and local plans.

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This article offers an overall analysis of documents on natural environmental conditions for the needs of local planning, which were in force in Poland after the Second World War.

2. Physiographic studies

Until the mid 1980s , two basic types of studies on natural environmental conditions for the purposes of local management plans were drawn up: physiographic studies and physiographic comments as well as problem-based studies [12].

Physiographic studies, depending on their accuracy level (map scale), could be divided into: preliminary, general and detailed. They dealt with the existing conditions of the natural environment and change tendencies under the influence of management and investment measures.

Preliminary physiographic studies served as one of the substantive fundaments for developing municipal general plans They were developed, among other things, when there was a need to define the directions of agricultural economy, conduct changes of land use, indicate areas where hydrographic conditions had to be regulated, protect forests or woodlots, indicate areas conducive or unconducive to spatial development (settlement), delineate recreation areas, define areas where building resources could be exploited or areas which should be set aside for special protection.

General physiographic studies were usually drawn up for the needs of city general plans, less frequently village general plans They defined possibilities and directions of spatial development regarding: settlement, recreation, industry, delineation of protected or green areas, localization of communal infrastructure facilities, etc.

Detailed physiographic studies served as a significant basis for developing concepts of city or district plans Evaluations included in these studies were used to define areas set out for building development, green areas, protection zones for the industry, water intakes, or areas which require further problem-based studies.

Compared to other studies, **physiographic comments**, were distinctive for the fact that judgments and land evaluation (valorization) included in them, did not need to consist of full documentation based on field studies They were characterized by smaller accuracy and narrower thematic scope. They acted as a reference base for decisions, which are partly brought about by preliminary and general physiographic studies, especially when it comes to pointing out possibilities and directions of development for particular villages.

Problem-based studies were carried out, depending on needs, for all types of projects of local plans, particularly if it was necessary to extend the results of physiographic studies with respect to a particular element of the natural environment; or if there was a need to define the future state of a given area, after finalizing investment projects Problem-based studies, then, aimed at specifying the influence of physiographic elements on the way space is used and determining the results of plan implementation in terms of the following: relief, water regimes, hydrogeological conditions, local climatic conditions, and existing biocenoses.

The scope of physiographic studies and problem-based studies did not have to coincide with the borders of the spatial plan provided it guaranteed achieving appropriate conclusions Assessments of water, ground, and climate conditions usually required conducting research on a larger area than the one covered by the spatial plan.

The process of physiographic study development consisted of a preparatory stage (preliminary information search), fieldwork, and cameral work which concerned compiling collected materials and analyzing elements of the natural environment, paying special attention to the needs of the spatial plan. For example, the method of land evaluation and classification developed in the 1960s [3] is still used in spatial and planning practices.

The Act on Spatial Planning [7] abolished the obligation to prepare studies of natural environmental conditions It defined the aim and procedures of spatial management planning by declaring the need to preserve natural balance but without regulating the scope of technical planning activities.

The subsequent Act on Spatial Management of 1994 [8] did not introduce new tools which would aid in implementing the principles of sustainable development, while it strengthened certain unfavourable trends in spatial planning.

3. Ecophysiographic Studies

In 2000, studies of natural conditions were again established according to the law. Article 6 of the Act on Access to Information on the Environment [9] declares the obligation to produce municipal studies of conditions and directions of spatial management and local spatial management plans "on the basis of ecophysiographic studies, depending on the type of plan, the features of the individual natural elements of the environment and their interactions."

Based on the Environmental Protection Law [10] which defines, among other things, the principles of protection and exploitation of natural resources, taking into consideration the principles of sustainable development, in 2002, the Ministry of Environment issued an Ordinance on Ecophysiographic Studies.

According to the Ordinance, these studies serve as a basis for:
- suggesting spatial solutions and formulating decisions in (local and voivodship) spatial management plans,
- creating environmental impact prognoses for spatial management projects and prognoses for other planning documents.

Apart from the study of conditions and directions of spatial management, the process of creating a municipal spatial management plan consists of developing ecophysiographic documentation, project of the local plan, and environmental impact prognosis for this project [11].

Ecophysiographic study (the name itself emphasises the aspect of ecological and biotic development premises in spatial management) is, to a certain extent, a collection of information about the environment treated as a system. It is a study which illustrates the way this environment functions and is supposed to aid in managing natural environmental conditions appropriately in the process of implementing the stages of spatial planning.

The basic aims of ecophysiographic studies include:
- ecological aims,
- spatial sustainable development aims (eco-development).

The implementation of these aims is possible thanks to a detailed identification of the principles which influence the way ecosystems and their components – biotopes and biocenoses (physiocenoses) – function.

According to the already cited Ordinance issued by the Ministry of Environment, ecophysiographic studies are created with the following issues taken into consideration:
- adjusting the function, structure and intensity of spatial management to natural conditions,
- ensuring the sustainability of fundamental natural processes within the area covered by the planning document,
- assuring conditions for the renewability of natural resources,
- eliminating or limiting threats or adverse impacts on the environment or people's health,
- determining the directions of degraded area recultivation.

The Ordinance distinguishes between two types of studies:

1) **basic studies** – created for the needs of the project of the local spatial management plan and for the needs of the project of the voivodship spatial management plan,
2) **problem-based studies** – created in the case when it is necessary to identify the features of selected natural elements in a more detailed way or if there is a need to determine the size and scope of tangible threats to environment or health.

Basic ecophysiographic studies are created before the project of the local spatial management plan, whilst problem-based ecophysiographic studies are developed before or at the same time as the project of the local plan is created. Both basic and problem-based studies are composed of a cartographic and descriptive part. These documents serve as a basis for suggesting spatial solutions and formulating decisions of local spatial management plans, while their scope results from the above-mentioned aims.

A basic ecophysiographic study should include:

- identification and description of environment state and functioning,
- diagnosis of the environment state and functioning,
- preliminary prognosis of environment changes,
- definition of ecophysiographic conditions.

The detailed thematic scope of the study should be adjusted to the aim and subject of the created planning document and characteristic features of the analysed area.

Identification and description of the environment state and functioning involves particular elements of the environment and their mutual interrelations as well as processes taking place within the environment, former environment changes, natural structure of the area and its relations with surrounding areas, natural resources and landscape qualities as well as the status of their legal protection, quality and threats, including the identification of their sources.

Diagnosis of the environment state and functioning involves the assessment of environment resistance to degradation and regeneration capability, the state of protection and exploitation of natural resources and landscape qualities as well as the possibilities of their development, harmony between the way the land is currently used with its natural conditions, environment changes, threats and possibilities of their minimisation.

Preliminary prognosis of environment changes, which involves determining the directions of unfavourable transformations and environment degradation, mainly aims at identifying areas which should primarily play natural functions and evaluating environment utility (development possibilities and restrictions) for particular types of land use and management forms.

Ecophysiographic conditions are formulated in the form of conclusions from the analyses and assessments enumerated above, according to the aim, subject and scale of the planning document. In particular, one should determine the utility of particular areas for developing practical functions, indicate areas, which should be subjugated to the need for stable environment functioning and preserving biological diversity, and finally formulate restrictions within indicated areas regarding the protection of natural resources, existing problems, and environmental threats.

The detailed scope of the problem-based study of an area embraced by a local plan is adjusted to the character of issues that need to be investigated. This may concern, for example, the existence of difficult geotechnical conditions for building foundation, acoustic, electromagnetic, or radon threats, etc [2].

4. Conclusion

Studies of natural environmental conditions are usually composed of a descriptive and cartographic part. The descriptive part includes a description of physiographic elements and physiographer's comments regarding the cartographic material.

Classification maps constitute an important element of the physiographic study as they enable the planner to figure out instantly:

- where the natural conditions are conducive towards the realisation of the spatial concept;
- which areas require deeper analyses;
- which physiographic elements facilitate investment realisation (buildings, roads, etc.) and which make them more difficult.

Ecophysiographic studies developed currently play a very significant role when it comes to the realisation of principles of eco-development. They activate the development of new research methods or improvement of the existing but less popular methods They should emerge as a result of cooperation, apart from planners, between various experts in physiography and ecology, such as geographers, geologists, hydrologists, pedologists, biologists, farmers, foresters, etc.

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