

CHAPTER 2

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PLANNING SUSTAINABLE DEVELOPMENT

The living environment

The environment which supplies man with natural resources for processing and production is a system characterized by powerful mechanisms that support the attainment of an equilibrium between its constituent elements. Those elements are not infinite. Our approach to exploiting natural resources is shaped by the awareness held by the users of space and the resulting legal regulations that restrict certain types of activities and impose various measures supporting the reinstatement of the natural environment. Even when deprived of the exploitative and regulatory effects of human activity, the natural environment is subjected to constant fluctuations due to fierce competition between various plant and animal species. The above contributes to the formation of areas marked by great ecological diversity.

The natural environment comprises biotic factors and elements introduced by human activity (anthropogenic factors). Therefore, the environment constitutes a set of external factors that form identifiable relationships with the described or analyzed object. A common scale may not be applied to measure the consequences of those relationships.

In the contemporary world, environmental protection should be taken into account in urban planning – even the creation of nature reserves is a planning activity. No protection procedure will be effective without an implementation plan. When deprived of a conscious planning effort, every spatial system, represented by the opposition of two primary values – ecology and economy, will be based on one of the following „natural” relationships: predator–prey, competition, parasitism. Those relationships are well known in ecology, yet none of them benefit the natural environment.

The only seemingly beneficial relationship is one of symbiosis, but in the contemporary world, a symbiotic relationship requires planned action. Symbiosis is largely synonymous with sustainable development, i.e. the attainment of a situation that benefits all users of space.

Environmental protection instruments vary as regards their range of influence and character. They involve technical, organizational, economic and legal measures. Spatial planning also plays an important

role in environmental protection. Combined with traditional planning measures, the advances in planning legislation deliver increasingly effective instruments for the rational use and protection of the natural environment. The new Act on spatial planning and management may serve as an example. It should be noted, however, that only space and its constituent elements can be directly influenced by human activity. In physical terms, space is a tangible object that can be experienced and transformed. The word „space” is used in various contexts (spatial framework, spatial effect, spatial shape, spatial design, spatial order, filling space), implying that this term hides a material object.

Today, space comprises mostly anthropogenic components. Inanimate features of space are more dependent on man than man is dependent on them, as they have been shaped through man's will and conscious effort. Human efforts to modify the environment sum up all transformative material activities in space that affect the physical form and the biotic content of man's chosen living environment.

Concept of sustainable development

The concept of sustainable development originated in forestry, and it was coined by Hans Carl von Carlowitz. Initially, it denoted a method of forest management in line with which trees should not be removed from the forest at a faster rate than they could be regrown. This way, forest resources would never be depleted.

In the early 19th century, the sustainable development concept was promoted by all forestry universities in Germany. At the time, German forestry was widely acclaimed throughout the world, and the concept was readily picked up by scientists throughout Europe. It was translated into English as Sustained Yield Forestry. The term „sustainable” was then adopted by green movements, and it was reintroduced to public debate in the 1980s. Today, the concept of sustainable development is no longer restricted to the realm of forestry (www.wikipedia.pl).

Two concepts are of paramount importance to understanding the true meaning of sustainable development (KOZŁOWSKI 2005). They are the concept of basic needs and the principle of limited possibilities, especially the limitedness of natural resources. Sustainable development is defined as follows:

„Sustainable development is development that meets the needs of the present without compromising the ability of future generations to satisfy their own needs. It is based on two principal concepts:

- needs – in particular basic needs of the world's most impoverished populations which should receive the highest priority,
- limitations – limitations imposed by the present state of technology and social organization on environmental resources.”

Concept of sustainable development

The concept of sustainable development, stated in the Constitution of the Republic of Poland, features two principal elements supporting the construction of a mathematical model. Development implies that the value (in the broad sense) of the modeled phenomenon has to increase – the preservation of the existing, input state does not constitute development.

Sustainment means that the factors conditioning development have to be bound by mutual relations (functional dependency) leading to their stabilization – sustainment.

The key determinants of spatial planning are natural factors – environmental (ecological) and anthropogenic (mostly economic). Environmental factors create ecological value, while anthropogenic factors contribute to the economic value of planning space. To date, the two types of factors remain in mutual opposition: by increasing the ecological value of space, we usually agree to a drop in its economic value, and – much more frequently – by increasing the economic value of space, we reduce its ecological worth. However, it should be noted that both of them are applied to describe the relationship between man (and human activities) and the natural environment. Nature itself is not “aware” of its ecological value.

Unplanned (or inadequately planned) relationships between man and the environment usually follow the predator–prey pattern, and, at the current level of technological advancement, the role of predator is undoubtedly assigned to man. In classical ecology, the predator–prey pattern has a cyclic nature. The number of predators and prey approximates an average value, subject to the predominance of the respective population in a given area. The amplitude of prey is greater than the amplitude of predators (Fig. 1), and the two are mutually displaced. A given area has to be characterized by higher ecological than economic value. An increase in the predator population leads to a delayed drop in the number of prey. For example, a decrease in the rabbit population leads to an extinction of wolves, thus restoring the population of rabbits and, consequently, the population of wolves.

In the most general terms, population size may be interpreted as a symbolic value (both are quantitative categories). If this is the case, the relationship between a given area's ecological and economic value fulfils the requirements of a system where economic value is represented by predators and ecologic value – by prey (Fig. 1).

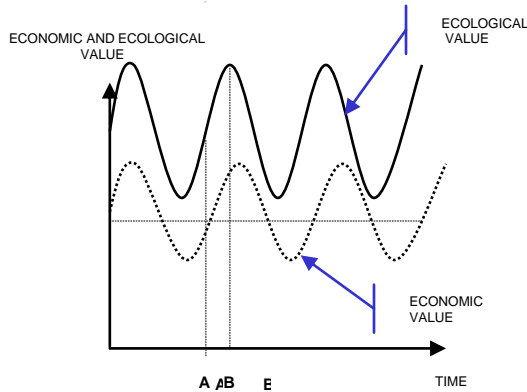


Fig. 1. Changes in value over time in the predator–prey system

In this system, the ecological and economic value of a given system increases only along a short section A and B. The growth of economic value begins once ecological value has reached its maximum. The above situation does not fit the definition of sustainable development which is our goal.

Sustainment is achieved by dampening the fluctuations of both values (by eliminating their cycles) (Fig. 2), but in this case, the level of

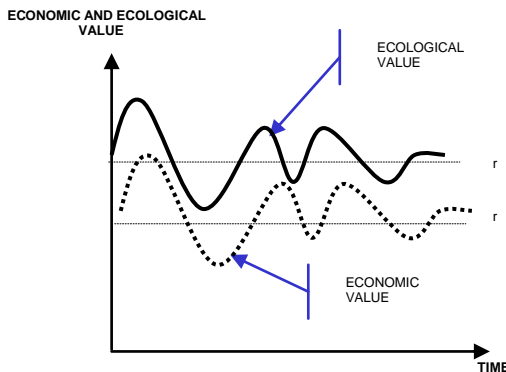


Fig.2. Changes in value over time in the predator–prey system with simultaneous amplitude change development will remain constant.

To stimulate development, asymptote r has to be assigned a positive slope (Fig. 3). The slope for each value can be modified, but within a different range. The above is due to differences in the dynamics of change in biotic components and anthropogenic factors. A critical point, i.e. a point at which ecological value is below economic value, may be encountered. This implies that the changes introduced by human activity are extensive enough to cause a radical decline in ecological value.

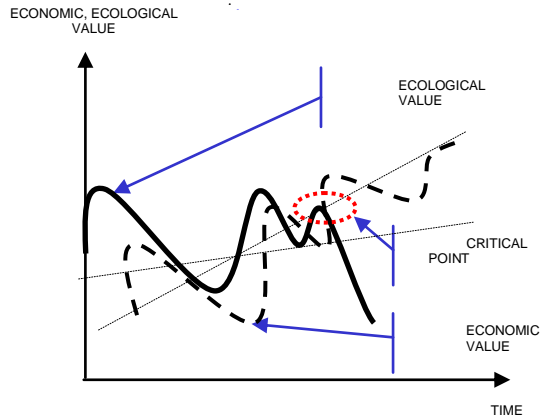


Fig. 3. Sustainable development model

The above is a model (theoretical) presentation of sustainable development. Yet models are a mere simplification of complex spatial systems in reality, including planning space which is actively shaped through human activity. An attempt to compare economic and ecological values on a single scale poses yet another methodological problem in presenting factors that affect sustainable development.

Sustainable development in spatial planning

In every developed country, spatial planning has to meet various legal requirements. Environmental protection in Poland has a long history – the first legal act banning the felling of yews dates back to 1423, and the first parliamentary act on nature conservation was passed on 10 March 1934. Despite the above, the concept of sustainable development was adopted as the key prerequisite for spatial planning only in the most recent Act on spatial planning and management of 23 March 2003. In line with the above act, local zoning plans have to be developed in accordance with environmental impact assessments and

reports on the anticipated financial consequences of local zoning plans (art. 17, items 4 and 5 of the Act on spatial planning and management).

Firstly, the act creates a formal basis for an in-depth analysis of the costs and benefits that follow from the planned undertakings. A cost-benefit analysis should not be considered solely in economic categories. It should study the predator-prey relationship to identify the parameters conditioning this relationship (dependency).

Secondly, statutory predictions facilitate a comparison between ecological and economic costs and benefits of other, similar undertakings. They should enable planning experts to draw conclusions regarding those projects – to what extent the changes in spatial planning, as justified by the draft zoning plan, are consistent with the sustainable development model?

The process of creating a local zoning plan as an act of local law leads to the development of two official reports focusing on environmental protection. Together with other comments and remarks, they contribute to the final zoning plan. Such reports include:

- environmental impact statements,
- predictions concerning the financial consequences of a local zoning plan.

Financial predictions, including:

- the cost of paid compensations or, in special cases, the cost of acquiring real property from owners and usufructuaries whose property decreased in value following the adoption of the local zoning plan,
- municipality's revenues in virtue of the sale of real property whose value increased,
- revenues in virtue of planning fees charged on owners and usufructuaries of property whose value increased,

contain a detail statement of the municipality's costs and revenues in virtue of adopting the local zoning plan and an increment in property value (marked with symbol $\Delta W_{\text{ECONOMIC}}$ in Fig. 4) in locations with a minimal area equivalent to the area of a municipality.

While financial forecasts can be easily presented in terms of monetary units, the situation is more complex as regards environmental impact predictions and the determination of changes in ecological value. The existing ecological value has to be defined before (W_1) and after (W_2) the adoption of the local zoning plan. At the final stage of the prediction process, an increment in ecological value (marked with symbol $\Delta W_{\text{ECONOMIC}}$ in Fig. 4) is determined by subtracting

or adding the existing ecological value of a given location from/to the ecological value that accounts for the provisions of the draft zoning plan. $\Delta W_{\text{ECONOMIC}}$ is determined only in view of the increment in value that follows solely from the adoption of the local zoning plan, i.e. the relevant increase may not be determined for time interval $T_1 - T_2$.

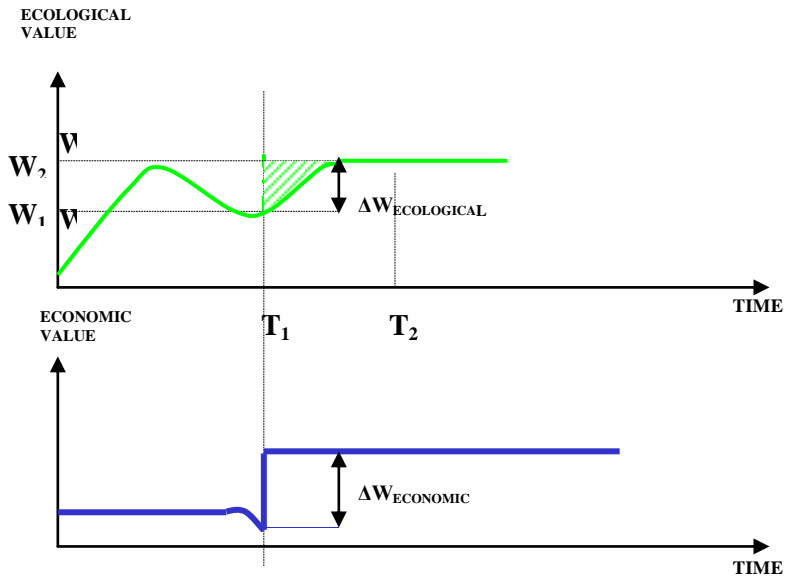


Fig. 4. Adoption of a local zoning plan (T_1) and an increment in economic and ecological value

The determination of an increase in economic value based on the anticipated economic consequences of the local zoning plan and an increment in ecological value, as defined in the environmental impact report, creates a basis for developing a local zoning plan focusing on sustainable development, as presented in Figure 3, where economic and ecological values increase over time. Simultaneous growth of the two values is not required, but each value should increase over a period longer than the time cycle.

The ecological value of the environment may be measured in terms of the ecologic worth of every environmental component. The higher its ecological value, the greater planning restrictions are imposed on a given area.

The economic value of environmental components is determined or estimated in terms of absolute values (in natural units or value units) or at least relative comparisons that determine the hierarchy of those

components. The greater the ecological worth of environmental components, the higher their ecological value.

A value-oriented evaluation of environmental components may be based on:

- labor expenditure required to use environmental resources for income-generating purposes,
- labor expenditure required to recover a given resource,
- the effects of using a given resource in the production process,
- future labor expenditures which will have to be borne by the society to eliminate losses resulting from environmental pollution.

Environmental protection in spatial planning in Poland

The Act on spatial planning and management constitutes the legal basis for spatial planning activities in Poland. It sets the principles which have to be observed by territorial governments and central administration agencies in the process of developing their planning policies. The act sets procedures for zoning various types of land and defining the terms of property development and construction.

In Poland, spatial planning policies are developed by both territorial governments and central administration bodies:

- spatial planning policies in a municipality, including the adoption of the land use plan and local zoning plans, are developed by municipal authorities;
- spatial planning analyses and studies covering the district as well as local development analyses are developed by the competent district authorities;
- spatial planning policies in a voivodship, including the adoption of the voivodship's zoning plan, are developed by voivodship authorities;
- spatial planning policies of the State, including the outline national plan for spatial management, are developed by the Council of Ministers.

Environmental protection and selected planning studies

In the light of the Act on spatial planning and management of 27 March 2003 (art. 1 point 2), planning activities and studies have to account for the following:

- environmental protection requirements, including water management, farmland and forest protection requirements,

- requirements for the protection of cultural heritage, historical monuments and objects of contemporary culture,
- objects of architectural and scenic value.

The above three requirements of the nine stated in art. 1 point 2 of the act refer directly to environmental protection. In addition to general provisions concerning planning activities, environmental protection requirements also have to be taken into account during the development of planning studies.

Environmental protection in planning studies developed at the national level

In view of the objectives formulated in the government's strategic documents, the Government Center for Strategic Studies develops outline national plans for spatial management which are consistent with sustainable development principles and take into account environmental, cultural, social and economic considerations.

The outline national plan for spatial management determines the prerequisites, objectives and directions for the sustainable development of the country as well as the measures required to achieve the above, in particular the requirements for the protection of the natural environment, historical monuments and special conservation areas.

Environmental protection in planning studies developed at the voivodship level

A voivodship's spatial management plan has to be consistent with the provisions of the voivodship's development strategy, and it determines, in particular:

- the system of protected areas, including areas for the special protection of the natural environment, cultural landscape, resorts, cultural heritage, historical monuments and objects of contemporary culture,
- areas threatened by a flood.

A voivodship's spatial management plan is also consistent with the provisions of the outline national plan for spatial management.

Environmental protection in planning studies developed at the municipal level

Two types of planning studies are developed at the municipal level: the land use plan and the local zoning plan. The two studies have a different character and scope of coverage:

- the land use plan covers the entire municipality, the local zoning plan – only fragments of municipal territory;
- the land use plan is an obligatory planning study, the local zoning plan is obligatory only under certain circumstances;
- the land use plan is not an act of local law, the local zoning plan is a local legislative act.

In the two studies, environmental protection is addressed as follows:

a) land use plan indicates:

- existing zoning designation, the level of development and the availability of technical infrastructure;
- spatial order and the relevant protection requirements;
- state of the natural environment, including farmland and forests used for production, the quantity and quality of water resources, requirements for the protection of the natural environment and cultural landscape;
- condition of objects of cultural heritage, historical monuments and objects of contemporary culture;
- presence of objects and areas that are subject to special conservation pursuant to separate regulations;
- presence of areas marked by natural geologic hazards;
- presence of documented mineral deposits and underground water resources;
- presence of mining areas mapped pursuant to separate regulations.

The land use plan also indicates:

- directions of changes in the municipality's spatial structure and land zoning principles;
- directions and indicators for land management and land use, including areas excluded from development and construction;
- nature conservation areas, principles for protecting the environment, natural resources, cultural landscape and resorts;
- principles and areas for protecting cultural heritage, historical monuments and objects of contemporary culture;
- areas to be covered by local zoning plans, including areas where farmland and forests will be converted to alternative uses;
- directions and guidelines for developing areas with agricultural and forestry production;
- areas threatened by the risk of flood and landslide;
- sites and areas for which protective pillars are determined in mineral deposits;

b) local zoning plan.

The local zoning plan contains the following statutory information:

- land designation and boundary lines separating areas with different types of zoning designation and different types of development;
- principles for protecting and developing spatial order;
- principles for protecting the environment, nature and the cultural landscape;
- principles for protecting cultural heritage, historical monuments and objects of contemporary culture;
- boundaries and manner of developing protected areas and sites mapped pursuant to separate regulations, including mining areas, areas threatened by the risk of flood and landslide;
- special land management requirements, land use restrictions, including construction bans.

Subject to need, the local zoning plan indicates:

- boundaries of areas designed for the rehabilitation of the existing buildings and technical infrastructure;
- boundaries of areas requiring transformation or reclamation.

Spatial planning, which aims to distribute various objects and forms of human activity, has significant bearing on the preservation of valuable environmental components. The protective functions of spatial planning are established by:

- introducing overriding regulations that protect the environment from excessive business use, introducing planning solutions that account for environmental protection needs,
- introducing restrictions that protect the natural environment in spatial planning solutions.

Environmental protection requires more than effective spatial planning solutions, yet by introducing suitable conservation measures and restrictions, the legislators are able to protect the natural environment from degradation.

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