

PREFERABLE DIRECTIONS OF SUSTAINABLE DEVELOPMENT IN SĘKOWA COMMUNE (BESKID NISKI MTS)

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Abstract

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Sękowa Commune is situated in the middle part of the Beskid Niski Mts – the largest region in the Polish Beskidy Mts. The commune occupies an area of low and medium mountains, typical of the region in question. The present work proposes directions for the economic development of the commune on the basis of the analysis of the following environmental elements: land relief, climate, waters/hydrology, soils, vegetation, and landscape. Their usefulness from the point of view of potential directions of the economic development of the area has been valued according to the criteria adopted from relevant literature. The main directions of the sustainable development of Sękowa Commune are tourism and recreation, agriculture, forestry, and pasturing. These forms of land use display horizontal and vertical diversity within the boundaries of the commune.

Key words: sustainable development, Beskid Niski Mts, environmental resources, valuation and classification

Introduction

The interdependence between the environment and the socio-economic development has been a widely discussed issue in recent years. All considerations on the subject of sustainable development should take into account the knowledge about the environment and its resources, as well as the knowledge about the society. Most crucial, however, is the awareness that development can be sustainable only if it is based on environmental foundations (Munn, 1989). Thus, to determine the possibilities of sustainable development of an area requires the characterisation of its environment and the valuation of its resources (Andrzejewski, 1983; Kozłowski, 1996). This provides the ground to determine which kinds of economic activity are environmentally justified, and which should

be limited due to unfavourable conditions and undesirable impact on the environment. The comparison with spatial management plans makes it possible to conclude whether the existing forms of economic activity are environmentally well-founded, and if necessary, to modify them.

Objectives and methods

The aim of this work is to indicate optimum directions in the development of Sękowa Commune on the basis of its environmental resources. If these directions are to meet the criteria of sustainable development they have to be based on the characterisation and classification of the commune's environment and its resources. Environmental resources are defined here as those elements of the environment that can be utilized in various forms of human economic activity.

The methods employed in this project include the analysis of topographic maps 1:25 000, military maps 1:100 000, maps of slope inclinations, maps indicating the agricultural usefulness of the soils, maps showing the distribution and structure of the forests, and air photos. These methods have been complemented by field-work, such as mapping of landsliding areas, valleys and built-up areas, as well as by questionnaires and interviews with local residents and tourists.

The analysis of the commune's environment features the characterisation of the following elements: geology, relief and morphogenetic processes, vertical climatic zones, vegetation season length, types of bioclimate, water resources and mineral waters, agricultural usefulness of the soils, forests, and landscape. The valuation and classification of these elements with regard to their suitability for various forms of economic activity have been developed according to criteria adopted from relevant literature. This classification, together with the analysis of the distribution of the resources within the commune's territory provide the basis to determine which forms of human economic activity are the most suitable from the point of view of its environmental resources. Digital maps of the valuating the area's relief from the point of view of their economic usefulness and maps featuring the distribution and types of forests as well as vertical climatic zones and types of bioclimate were overlain. As a result, a map has been produced that shows a proposed spatial distribution of optimal forms of economic activity, that is, the preferential directions of the commune's economic development.

Nearly the whole territory of Sękowa Commune lies in the western part of the Beskid Niski Mts, which is a low and medium mountains area; the highest point is Watkowa (847 m a.s.l.). The relief of the research area is characterised by rectangular river net and parallel ridges and valleys (Henkiel, 1982).

Up till the World War II the research Lemki, who gradually migrated there from the Eastern Carpathians, has predominantly inhabited area. The expulsion of the Lemki population, who amounted to as much as 98% of the rural population in that area (Soja, 2000), carried out in the years 1941–1947 initiated the processes of re-naturalisation of the environment and forest expansion, from approximately 30% of the present commune's territory in 1950 to 67% in 1997 (Dygoń, 2001; Lach, 1975). The economic development of Beskid Niski in last 50 years has been markedly different than in most other parts of the Carpathians: unlike other parts of the Western Carpathians, extensive economy prevails in Beskid Niski Mts.

Tourism and recreation

Tourism and recreation, as well as spa activity are potentially the most important direction in the economic development of Sękowa Commune. It follows from the environmental resources of the area.

Geology

In the commune's territory, in the geological reserve "Kornuty," situated in the Magura Wątkawska Ridge, there is interesting rock forms built from magura sandstone. They are a remarkable tourist attraction.

Relief

Slopes with the gradient above 20° in the Magura Wątkowska Ridge, the Magura Małastowska Ridge, the Ostra Góra and Działmera Range provide favourable conditions for the development of downhill skiing, whereas long fragments of valley bottoms and lower parts of the slopes, with the gradient less than 10°, can be utilised by cross-country skiers. Steep areas, with big differences in elevation (dominant in Małastów, Owczary, Bodaki, and Bartne) are also attractive because of the picturesque scenery. Deeply incised valleys, e.g. of the creeks such as Małastówka, Zawoja, and Bartne, are particularly quiet areas, which gives the landscape the air of wildness. Similar land use schema was also postulated for the area under consideration by Starkel (1972) in a classification of the relief suitability for human activity.

Landscape

Landscape is one of the most important resources of Sękowa Commune. Several elements contribute to its attractiveness: long, parallel mountain ranges, highly dissected and separated by deep valleys, large areas free from human impact, expansive forests, which are particularly attractive visually in September and October when the beeches predominating there become vividly colourful. Equally important for the attractiveness of the area are numerous historical monuments of the Lemki culture, such as Orthodox churches, and stone crosses, as well as 24 military cemeteries from World War I. The questionnaire investigation carried out among tourists visiting the Sękowa Commune in the summers of 2001 and 2002 points to the relatively small degree of human created transformation of the environment, and the resultant "wildness" of the landscape, as a central element of the landscape attractiveness.

Bioclimate

According the classification developed by Kozłowska-Szczęśna (1988) the climate in the middle and lower part of the slopes and in the valley bottoms (to 750 m a.s.l.) – moderately or slightly stimulating – is favourable to recreation (Fig. 1c).

According to Krzymowska-Kostrowicka (1998) the prevailing beech forests (Fig. 1d) have strong detoxicating properties and a stimulating bioclimate, generally favourable to health, with the exception of the people suffering from chronic respiratory diseases and

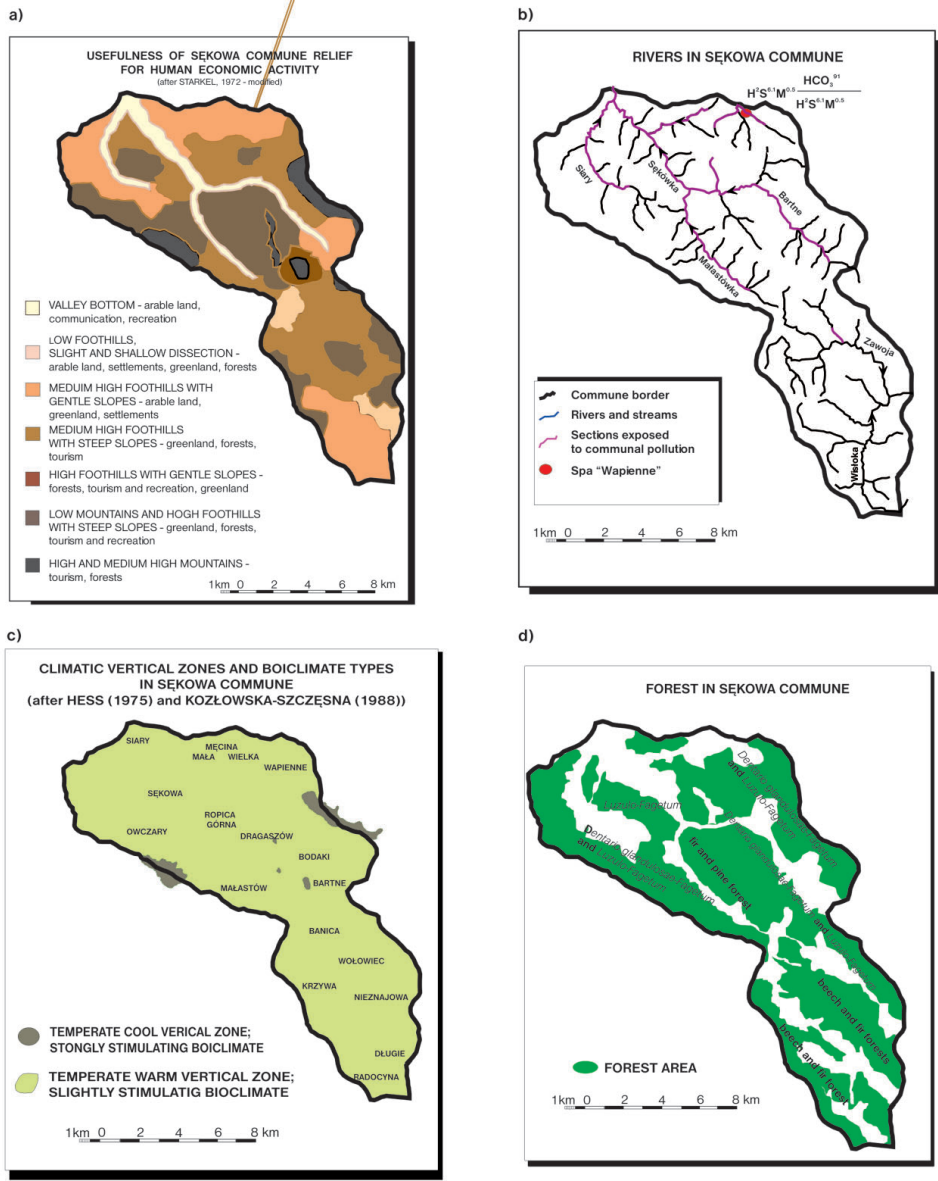


Fig. 1. Natural environment of Sękowa commune.

high blood pressure. This is an important factor facilitating the development of recreation, tourism, and spa activity.

Hydrology

Within the territory under consideration there is around 550 springs (the number determined on the basis of 1:25 000 and 1:10 000 maps and fieldwork) with the output of 0.7–0.6 litres per second (Ziemońska, 1973). Long fragments of creeks have the water in the first (lowest) category of water pollution. The commune is self-sufficient as regards the water supply for the residents.

Mineral waters found in Wapienne might play an especially significant role in the development of the commune. Three, highly efficient sulphide springs (Fig.1b) provide the basis for spa activity to be resumed.

Sanitary condition of the environment

According to the data collected in 1999–2001 the overall air condition in Powiat Gorlicki (Gorlice Administrative Unit), to which Sękowa Commune belongs, is satisfactory. This holds as well for the water condition, since most of the creeks have first class water.

Agriculture

Soils

The soils in the agricultural areas of Sękowa Commune are predominantly *Dystric Cambisol* and *Eutric Cambisol*. In the most part they belong to complex 11 and 12; small areas in Siary and Sękowa villages are occupied by soils included in complex 8. The soils in greenlands are classified as medium (2z) and poor (3z). The most favourable conditions for agriculture exist in the northern part of the commune, in Siary, Sękowa, Męcina Mała, Męcina Duża, and Owczary.

According to data collected in 1999–2001, the soils in the area in question display a negligible level of pollution by heavy metals (cadmium, lead, nickel, copper, zinc). They belong to 0 and 1st class of pollution.

Relief

Good conditions for agriculture and settlement exist in Krzywa, Banica, Czarne, Radocyna, Nieznajowa, Sękowa, and Siary, in lower part of the slopes where the slope gradient is mostly smaller than 15° (Table 1).

T a b l e 1. The usefulness of the natural environment for human economic activity in Sękowa Commune (own compilation)

ELEMENT	FEATURES OF THE ENVIRONMENT	OPTIMAL FORMS OF ECONOMIC ACTIVITY	DISTRIBUTION WITHIN THE RESEARCH AREA	
RELIEF	SUMMIT SURFACES- INTERMONTANE PLANATION LEVEL	SLOPE GRADIENT 0-10°	Hiking, biking, forests	
	SUMMIT SURFACES- FOOTHILLS PLANATION LEVEL	SLOPE GRADIENT 0-10°	arable land, orchards	
	SLOPES	ASPECT	SW, S, SE	arable land, orchards
			E	arable land, greenland, tourism
		W	arable land, greenland, tourism	
		NW, N, NE	forests, skiing	
	SLOPE GRADIENT	0-10°	arable land, tourism, settlements	valley of the Sękowska river valley, valleys of the creeks: Małastówka, Siary, Barne, Wapienne
		10-15°	arable land, greenland, settlements	Owczary, Bodaki, Barne, Wołowiec, Wapienne, Krzywa
		15-20°	greenland, orchards, tourism	Małastów, Bodaki, Owczary, Barne
	LANDSLIDES	VARIED GRADIENT AND ASPECT	> 20°	tourims, skiing, forests
> 20°			greenlands, forests	
SLOPE GRADIENTS 0-3°		arable land, tourism	Bodaki, Barne	
SLOPE GRADIENTS 0-3°		greenland, forests	valleys of Sękowska, Małastowski, Barne, Siary	
V-SHAPED VALLEYS, VERTICAL CLIMATIC ZONE-TEMPERATE WARM		VARIED ASPECT VALLEY BOTTOMS SLOPES	forests, water protection arable land, tourism greenland, orchards, tourism	whole research area all creek valleys valley sides and slopes below 750 m a.s.l.
CLIMATE	VERTICAL CLIMATIC ZONE-TEMPERATE COOL	SLOPES	forests, water protection, skiing, tourism	
		SUMMIT SURFACES	forests, tourism, water protection	
SOIL COVER	CATEGORIES OF AGRICULTURAL USEFULNESS	8, 10	arable land, orchards	
		11, 12,	arable land, orchards, greenland	
		13, 14,	greenland, forests, water and soil protection	
		2z, 3z	greenland, forests	
HYDROLOGY	CATEGORIES OF WATER POLLUTION	I	tourism, settlements, water supplies	
		II		
		III		
	SPRINGS MINERAL WATERS HEADWATERS AREAS		water protection, potential water supplies spa activity, tourism water protection, forests	Owczary, Małastów, Barne, Krzywa, Banica, Nieznajowa Wapienne
VEGETATION	FORESTS	<i>Dentaria glandulosa</i> - <i>Fagetum</i>	soil and water protection, tourism (detoxifying capabilities, stimulating bioclimate)	
		<i>Luculo-Fagetum</i>	as above	
		<i>Abietum incanae</i>	water protection	
		FIR FORESTS	soil and water protection	
FORESTLESS AREAS	SUMMIT SURFACES	tourims, greenland, orchards	Krzywa, Radocyna, Męcina Wlk, Wapienne	
	VALLEY BOTTOMS, SLOPES	greenland, settlements	Radocyna, Krzywa, Jasionka Banica, Męcina Mł, Wlk	

The predominant orientation of the mountain ranges along NW–SE direction means most of the area has the southwestern and northeastern aspect. Particularly large areas with

the southwestern, southern, and southeastern aspect – most favourable to agriculture – can be found in Bodaki, Banica, Owczary, and Czarne (Table 1).

According to the relief classification by Starkel (1972) developed for the agricultural purposes, in the southern part of the commune arable land and greenland should dominate (Fig. 1a).

Climate

Most of the Sękowa Commune area lies in the temperate warm climatic zone (Fig. 1c), which is a factor favourable to agriculture. Long vegetation season, beginning around 15 III and lasting 190–200 days, is also conducive to agriculture (Obrębska-Starkel, 1977, 1983).

Forestry and pasturing

Forests

Forest occupies 67% of the Sękowa Commune area (Fig. 1d). The dominant forest type is *Dentario glandulosae-Fagetum*, but fir forests, *Alnetum incanae*, and *Luzulo-Fagetum* cover considerable areas. Apart from its significance for tourism, forests are an important source of income for the local population, due to wood and wood products trade and because forest create jobs, such as tending and wood felling. Additionally, the abundance of forest fruit and mushrooms might be a source of income, and potentially, a basis for a larger-scale economic activity.

Greenlands

Greenlands occupy 16.8% of the commune territory, mostly in valleys and lower parts of the slopes. These areas are mainly used for seasonal pasturing (sheep). However, apiculture is another interesting trends in the greenlands use, with a considerable potential for further development. The largest areas of greenlands are in Radocyna, Krzywa, Banica, Męcina Mała and Męcina Wielka (Table 1).

Conclusions

The analysis carried out in this work leads to the following conclusions concerning the distribution of preferable forms of economic activity based on the spatial diversity of resources:

- tourism and recreation, spa activity

- hiking and downhill skiing – in the upper parts of the slopes, with slope gradient exceeding 15%, that is, mainly in Owczary and Małastów (the ridges of Magura Małastowska and Działera), Bodaki and Bartne (the ridges of Magura Wątkowska and Ostra Góra), and Nieznajowa (Uherec ridge)
- agrotourism, horse-riding and biking, cross-country skiing – mainly in lower parts of the slopes and in the valleys
- spa activity – in the vicinity of the mineral water springs in Wapienne
- agriculture – mainly in valley bottoms and lower parts of the slopes with the gradient to 10%, with southern, south-western and south-eastern aspect, and soils of 8, 10, and 11 category of agricultural usefulness – in Siary, Sękowa, Owczary, Męcina Mała and Męcina Wielka
- forestry and pasturing
- forestry – mainly in lower and middle parts of the slopes, predominantly with the gradient 6–15% – mainly in Męcina Mała, Męcina Wielka, Ropica Górna, Krzywa, and Wolowiec
- pasturing – in the valleys, where greenlands and fallowlands prevail: in Długie, Czarne, Krzywa, Radocyna, Nieznajowa, and Owczary.

Only a small percentage of Sękowa Commune's territory lends itself to only one or two forms of economic activity (hiking and skiing in the upper parts of the slopes). Most of the research area provides the possibility of multidirectional economic activity (agriculture, pasturing, agro tourism and recreation in valley bottoms and lower slope parts). In such cases the choice of the form of activity is usually dictated by economic factors and belongs to the competence of the commune's authorities.

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