



# Assessment of implementation of protection of mineral deposits in spatial planning in Poland



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## ABSTRACT

A complex of raw materials available in a given commune shapes its functional – spatial structure and affects local economic development. The use of the resource base of minerals depends largely on the management of the space and respecting the zoning restrictions connected with protection of mineral deposits. The urgent need to protect them is due to their non-renewable nature and progressive development of the land. Preserving access to deposits is essential to ensure future mineral supply necessary for the economic development. This article presents the results of the assessment of implementation of rules of protection of mineral deposits in spatial planning at the level of territorial units in Poland.

The study has been conducted in twenty-three communes of the Lesser Poland voivodeship, for thirty-one unexploited mineral deposits designated for protection in the Spatial Development Plan of the Lesser Poland (Małopolskie) Voivodeship of 2003. In the study of conflict with development of the selected mineral deposits with the environment, factors related to land use, forms of nature protection, water conservation and planned land development have been evaluated. The assessment has taken into account the importance of individual factors of conflict by giving them weights by means of pairwise comparison method. Five classes of conflict of the deposit management have been proposed: non-conflicting deposit, small conflict, medium conflict, major conflict and very big conflict. Almost equal numbers of deposits (9) belong to the class characterized by a of medium, small and large conflicts. Road and technical projects as well as expected significant impact of exploitation on the environment restrain exploitation. The impact is related to the necessity of use of explosives during the exploitation and by the cumulative effect of the mining activity already existing nearby. Analysis of the planning documents of the communes has shown both inadequate protection of mineral resources, including designation of areas of deposits for single-family housing, and a few examples of properly maintained spatial planning in the field of protection of mineral deposits. Information obtained from the environmental survey has been supplemented by assessment of the social aspect. In nine communes it has been determined that the areas of mineral deposits are not subject to spatial conflicts but in seven communes there is opposite situation. The most important benefits from the mineral exploitation which has been indicated in the studied documents included: jobs, access to construction materials and development of the commune.

Present work allowed to define the areas and the scale of conflicts induced by development of mineral deposits and to propose measures for rational management of mineral resources. Recognition of the existing and potential conflicts can help to make the right decisions concerning development of the area and minimising impacts of exploitation of the mineral deposits.

## 1. Introduction

Minerals are natural resources essential for proper functioning of the key sectors of the economy, for example, energy industry, construction industry, infrastructure, chemical industry, etc. Most of the elements: 76 of 90 of the most frequently used by the society come from extraction of minerals. The extraction of mineral resources is an essential source for sustainable development and at the same time it has a

big impact on the environment and meets with social resistance (EC, 2005; Bloodworth et al., 2009; Gyozo, 2009).

Due to uneven distribution of scarce and non-renewable mineral resources and requirements of the protection of nature and landscape, increasing investment pressure and the need to ensure the security of raw materials and energy, significance of potential conflicts regarding protection of mineral deposits and land development as well as land use increases (Gałaś and Gałaś, 2014; Bloodworth et al., 2009; Nieć and

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Radwanek-Bąk, 2014; Nieć et al., 2014; Bohatkiewicz et al., 2016). Unlike other natural resources, minerals are non-renewable ones and their extraction is strictly spatially restricted to the place of their occurrence. Location of mineral deposits depends on the geological structure, while such factors as spatial planning, land use and environmental conditions, social, economic or technological factors may limit access to them. Due to that, the minerals should be under protection based on providing access to the deposit, rational management and comprehensive usage of the minerals (Gałaś and Gałaś, 2014; Wrighton et al., 2014).

The term “protection of mineral deposits” is generally understood as ensuring the access to undeveloped mineral deposits, in terms of their potential use. In practice, this means protecting the area over the deposit of minerals from such management and use of land, which would prevent or greatly restrict its future exploitation, e.g. permanent land development (urbanization, road network, polder etc.) or designation of a national park. The most serious obstacles are conflicts in spatial planning (land use conflict) arising from existing or planned land use, forms of nature and landscape protection and investment pressure. Agriculture or recreation are not a physical barrier for the extraction and in the most cases do not result in total loss of resources.

The primary objective of environmental resources management is to ensure constant supply of the raw materials for the present and future generations, while preserving the environment. Environmental damage caused by mining activities should be compensated during the operation and after that by a proper and well thought out reclamation of postmining area. Re-use of the site after the end of exploitation is an important aspect of the rational management of environmental resources and spatial planning (AHWG, 2014).

Protection of mineral deposits against loss of access to their resources (by some authors referred to as sterilization of deposits (Bloodworth et al., 2009; Wrighton et al., 2014)) is a global problem. In many European Union (EU) member states there is still lack of a clearly defined resource policy at the country level which would essentially define the strategic planning concerning availability of mineral resources at the national level and at lower levels of spatial planning (AHWG, 2014; Nieć et al., 2014). The need for sustainable use of natural resources has been called for in such publications as (Gałaś and Gałaś, 2016a): Thematic Strategy on the Sustainable Use of Natural Resources (EC, 2005), Responsibility for Raw Materials: Transparency and Sustainable Growth (G8, 2007), The Raw Materials Initiative: Meeting our Critical Needs for Growth and Jobs in Europe (EC, 2008) or Roadmap to a Resource Efficient Europe (EC, 2011). Significant importance of efficient use of natural resources is also indicated in the new growth strategy of the European Union “Europe 2020” (EC, 2010).

Exemplary solutions to protection of mineral deposits may be found in the United Kingdom, Denmark, Belgium, Germany, Austria, France and Slovakia (Wrighton et al., 2014). In those countries, “buffer zones of mineral deposits” are identified and designated for the purposes of land use planning. Within the zones, special rules concerning decisions on land use are applied. Protection of deposits of significant economic value should be implemented through appropriate provisions in the planning documents relating to the land located over the bed.

In Poland, the basic regulations concerning the protection of mineral reserves are included mainly in the three acts (Table 1):

- Environmental Protection Law of 27 April 2001 (Environmental, 2001),
- Spatial Planning and Land Use Management Act of 27 March 2003 (Spatial Planning, 2003)
- and the Geological and Mining Law of 9 June 2011 (Geological, 2011).

Under the current legislation, protection of mineral deposits should be implemented at different levels of the public administration. The essential ones are assignments in planning documents enacted at the

commune level (the Study of Conditions and Directions of Spatial Development, SCD, and the Local Spatial Development Plan, LDP), which must be consistent with the superior planning documents approved at the level of the region (the Voivodeship Spatial Development Plan, VDP) and the country (National Spatial Development Concept). However, according to the literature and practice, provisions in individual acts do not provide adequate protection for carrying out mineral deposits (Radwanek-Bak, 2008; Koziół, 2013; Nieć, 2013; Kostka, 2014). In recent years, the Committee for Sustainable Mineral Resources Management the Polish Academy of Sciences has prepared materials for public discussion under the name The Proposal of Statutory Protection of Undeveloped Mineral Deposits (PAoS, 2011) (Table 1). The proposed Act introduced such provisions as indexation of measured mineral deposits and protection of prospective areas of occurrence of mineral deposits apart from their protection. It also set the rules for management of areas of occurrence of deposits at the local, regional and national level and the rules for exclusion of the areas of deposit from the protection together with the charges for reclassification of the land where deposits are used for purposes other than mining. In 2015, the Ministry of the Environment of Poland published the White Book of protection of mineral deposits (MoE, 2015), which presents proposals for a wide debate on system solutions for protection of strategic mineral deposits. After a social discussion and criticism of its substantive significance, the document was withdrawn from the inter-departmental discussion and the work on it will not be continued. The current government has announced that the new document will have been released in three years (The statement by the Chief National Geologist, 2016).

The scale of conflicts and the threat of a deficit of mineral resources require decisive action to protect the non-renewable mineral resources, both those of strategic economic importance, as well as common ones, apparently easily available, which are important for the local economic development. The aim of this article is to assess implementation of protection measures for mineral deposits in spatial planning based on selected communes in the Lesser Poland voivodeship, where there are mineral deposits designated for protection in accordance with applicable the Spatial Development Plan of the Lesser Poland Voivodeship of 2003 (Plan, 2003). The assessment included conflict of the potential exploitation of undeveloped mineral deposits with the environment in terms of land use and conservation, as well as protection level of minerals in the planning documents and the public opinion.

## 2. Subject of the research and its spatial range

Assessment of the implementation of protection of mineral deposits in land use planning was conducted for mineral deposits designated for protection under the VDP of Lesser Poland voivodeship (VDP-LP) of 2003 (Plan, 2003). The Lesser Poland (Polish: Małopolskie) voivodeship is one of 16 voivodeships of Poland and it is located in the southern part of the country. It is characterized by varied natural conditions and largely unspoiled natural environment and its population density equals to 222 people/km<sup>2</sup>. The structure of land use is dominated by agricultural lands – 60.8% of the area of the voivodeship, followed by forests 29%, urban areas 2.2%, lands under water 1.4%; 0.8% of the area is covered by wastelands and the other areas 5.9% (Central Statistical Office of Poland, 2016).

The VDP is a key element of the planning system in the region and it is used to determine the spatial aspects of the development policy. It is the tool which enables to transfer the development strategy to the local planning (Spatial Planning, 2001; Plan, 2003).

The Lesser Poland voivodeship area comprises four important geological structures: the Carpathians, Carpathian foreland basin, Upper Silesian Coal Basin and Silesian-Cracow Monocline. It is a region with a long mining tradition. Significant reserves of coal, natural aggregates, backfilling sands, sandstones and limestones have been surveyed within the area of the voivodeship. Natural aggregates (130 deposits) and road

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