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**ГЕОГРАФИЧЕСКИЕ НАУКИ
В ОБЕСПЕЧЕНИИ СТРАТЕГИИ УСТОЙЧИВОГО РАЗВИТИЯ
В УСЛОВИЯХ ГЛОБАЛИЗАЦИИ**

(к 100-летию со дня рождения
профессора Н. Т. Романовского)

**GEOGRAPHICAL SCIENCES
IN REALIZATION OF SUSTAINABLE DEVELOPMENT STRATEGY
IN GLOBALIZING WORLD**

(to the 100th anniversary
of Professor N. T. Romanovskij)

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Географические науки в обеспечении стратегии устойчивого
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В издании отражены научно-методические и прикладные результаты научных исследований в области современных структурных и региональных сдвигов в мировом хозяйстве, социально-экономической модернизации стран, регионов СНГ и Беларуси в условиях глобализации, демографического развития и социально-демографических рисков стран, современных проблем развития туризма, природно-ресурсного потенциала стран и регионов, геоэкологических аспектов стратегии устойчивого развития.

Адресуется преподавателям, научным работникам, студентам и аспирантам вузов, сотрудникам органов управления.

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**THE CONCEPTION OF MANAGEMENT OF POST-INDUSTRIAL
LANDSCAPES IN THE LIGHT OF SUSTAINABLE DEVELOPMENT**
Rahmonov O., Szymczyk A., Majgier L., Banaszek J., Parusel T., Karkosz D.
University of Silesia, Faculty of Earth Sciences, Sosnowiec, Poland

Silesian and Cracow Upland are belonged to the most industrial region in southern Poland. It is connected with occurrences of natural resources, mainly hard coal. The most of their are located in Upper Silesian Region and they are exploited by many hard coal mines. With the coal mining are associated numerous sand-pits, which are located on the edge parts of this region. They are also many power plants, like Laziska Gorne, Bedzin and Jaworzno, which produced high amount of power station wastes. Recently was exploited zinc (Zn) and lead (Pb) ores among other in Olkusz Region and iron ore in Czestochowa Ore District. The wastes was deposited also by ore smelters, e.g. in Dabrowa Gornicza, Ruda Slaska, Katowice, Sosnowiec and Zn-Pb smelters in Katowice-Szopienice, Bukowno and Miasteczko Slaskie. Actually in this region also functioning industrial factory as Coke Plant.

The areas under influence of intensive human activity, with special regard to mining, are often characterized by a great degree of the natural environment degradation and the important landscape changes as a consequence. Each component of the environment in the past and present have been undergone remodelling, beginning from the interference in geological structure, through changes in relief, climatic conditions, features of hydrographic network and underground waters or soil, vegetation cover and animal world, often resulting from the earlier mentioned transformations. The changes are visible in terrain morphology in diverse form of waste composition (mining, metallurgical and power ash waste), vast quarries and subsidence depressions.

The management of post-mining waste looks: to store near the coal mine (hydraulic filling or rock filling), to engineering works, to the production of building materials, to the leveling of the areas (e.g. in reclamation processes) and to the over-ground dumping. The decreasing of human pressure in last times and lack of suitable management of post-industrial landscapes do not influence on improvement of natural processes and it is still the problem in context of their protection.

In these areas is necessary to conduct rational economic operation which will be led to restoring natural and landscape values. This action should be based on the scientific methods. In the southern Poland the areas with waste compositions in majority cases reclaimed in form of parks. This type of reclamation is strongly required in such areas due to lack of natural places in Upper Silesian Region. These parts may be used in the future as recreation objects, the part of anthropogenic areas are designed as sport objects also (e.g. golf and ski slope destination). The example of ski slope restoration management is "Bobrowniki-Blachówka" dolomite quarry in Bytom. The exploitation of ore-bearing dolomites was conducted in this place for over 500 years and there appeared excavation of about 60-metre depth. A lot of dolomite waste remains as raised heaps, part of which undergoes the process of gradual reclamation. One of them, on having been

shaped, was used for the creation of the full year ski slope. This sport and recreation object is recently a popular attraction among the inhabitants of Upper Silesian Region.

But very important to mention is the fact that in many of this places are located the dangerous fragments, which are connected with steep slopes and deep pits. These fragments significantly hinder the reclamation and restoration processes. In this work we will analyzed the management ways of all types of post-industrial landscapes in Upper Silesian Region. The mine waste dumps, ash and smelter waste landfills and sand-pits are the most characteristic component of post-industrial landscapes in this region.

The management of filling sand exploitations areas is realized often through the forest or water reclamation ways. The effects of reclamation in forest direction as a general are plantings. There are used trees (*Betula pendula*, *Robinia pseudacacia*, *Pinus sylvestris*, *P. nigra*, *P. strobus*, *Populus x canadensis*, *Quercus rubra*) and shrubs (*Hippophaë rhamnoides*, *Caragana arborescens* and others from genera of *Rosa* sp.). The spontaneous vegetation succession is often initiated by the association *Calamagrostietum epigeji*, a one-species aggregation. This association, over a large area in many of reclaimed and non-reclaimed post-industrial sites, is worthy of special note. Thanks to its ecological plasticity, this grass develops very successfully in such an extreme environment, like the post-industrial landscapes. Within this association, other species of vascular plants rarely occur.

The forest point of reclamation may have protection and economic significances, may create promotion and recreation complex (parks, bicycle path, fitness trail, tourist path, footpath and others). The results showed that in natural points of view the reclaimed areas in forest direction are very poor in term of biodiversity in compare with unreclaimed surfaces in the same area. The low level diversity in reclaimed areas is caused by introduction of alien plant species (mainly *Robinia pseudacacia*). We conclude that the most negatives influence has the plant litter and their chemical composition which caused crucial changes in the soil functioning.

Initial results of research on processes of spontaneous vegetation introduction into areas of excavation after sand exploitation indicate their high value as polygons for research on the regeneration of ecosystems, as well as the course of vegetation-soil succession in deformed areas, especially at their not-reclaimed parts.

From the point of view of the nature protection unusually important is the fact that initial stages of succession formation at excavations create conditions for many unique plant species to keep relatively numerous populations. They can be convenient places for the survival and development of many valuable, rare plant species and species threatened by extinction in Poland. Despite the legal duty of land reclamation in post-exploitation areas, the interesting objects should be left to their fate. The fact, that in post-exploitation terrain, substituted habitats for species threatened by extinction are formed, should be regarded in species saving programs.

In this connection we purpose that the sand-pit or some its fragments to keep without reclamation in order to keep the processes of spontaneous succession and particular stage of ecosystem regeneration by natural ways. Moreover, during the exploitation in the bottom of quarry appear water-head and small streams which due

to heterogeneity of ground which have great importance because of landscape observation in their initial stage of development.

High differentiation of natural habitats and the occurrences of hydrological phenomena in the bottom of quarry allow on presentation of specific group of organisms and the rules of this objects in evolution of hydrological systems. It has also teachings importance and should be taking into account during management of such objects.

The water point of reclamation in the area of southern Poland is applied in huge scale. In this result originated water reservoirs which have economic (retention, potable reservoir) and recreation significant (aquatic sports, swimming pool, bathing beach). It seems that such type of developed from ecosystem processes and landscape formation point of views is adequate. Only in case of some objects in this region insufficient is infrastructure base.

The most important elements in developed this objects are teaching sphere and recreation and active tourism. Along with the growing ecological awareness of society health requirements and increase the sense of safety and aesthetics of the surrounding terrain. In such understood of landscape evolution perfectly fits development of tourism in devastated post-industrial areas. Water reservoirs originated in place of former quarry today a place of rest within the urban areas an important element of post-industrial.

The exploitation of natural resources should not be conducted with view of the profits. Should be based on respect for the natural environment and their values. According to the idea of sustainable development in mining activities, take priority over environmental, ecological demands for economic and social.