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AGRICULTURE, LANDSCAPE, BIODIVERSITY: SCENARIOS AND STAKEHOLDER PERCEPTIONS IN THE POLONINY NATIONAL PARK (NE SLOVAKIA)

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Abstract

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Landscape and biodiversity changes within agricultural scope, which are the main issues of our interest, have been shown in the most dynamic way during last 50 years. Traditional extensive farming with individual farmer attitude to landscape was transformed to collectivisation with overall interest for land exploitation. During last years agricultural trends have been shifting again, towards environment friendly farming with aim to maintain natural values of the territory. The main milestones of historical changes in the landscape give us basic information to form and explore future trends in agricultural land, in 25 years perspective. Scenarios are defined by simple assumptions, which are easier to handle with. The essential idea is that each scenario defines a trajectory of change in terms of the structure of land occupancy, use and management and finally uncovers strong and weak points of future trends. Scenario evaluation counts also with stakeholder engagement, in the form of their understanding and feedbacks.

Key words: landscape, agriculture, changes, scenarios, stakeholders

Introduction

Institute of Landscape Ecology of Slovak Academy of Sciences is participating at project of the Fifth Framework Programme of EU, BioScene – *Scenarios for reconciling biodiversity conservation with declining agricultural use in the mountains of Europe* (Oszlányi et al., 2004). The overall aim of BioScene is to investigate the implications of agricultural restructuring and decline for biodiversity conservation in Europe's mountain areas. The target is to provide practical outputs enhancing implementation of Natura 2000 and the European Biodiversity strategy through integration of agri-environmental, conservation and rural development policy. In each study area is defined form that various scenarios of

future agriculture change could take and is used ecological modelling to explore the biodiversity consequences in a range of agri-environmental settings. The scenarios, or "BioScenes", will include a *Business As Usual Scenario,* based on an extrapolation of current market and policy trends; a *Managed Decline Scenario,* based on the effects of withdrawal of agricultural support in the transition to free market conditions and a *Biodiversity Enhancement Scenario*, based on a major reform of agricultural and rural development policy geared to maximising biodiversity conservation.

Location and character of the study area

The study area represents marginal region of the Slovak Republic, situated at the north-eastern part of Slovakia, on the border with Poland and Ukraine. The territory falls to Snina district belonging to Prešov region. At the present time there are 10 villages within the study area, but study area includes cadastral areas of 17 villages. During period of 1980–1986, seven villages were removed as a result of construction of water reservoir Starina. Total area of the territory is 34 191 ha, with population of 2957 inhabitants. Population density is much below the Slovak average. The number fluctuates from 4.1 inhabitants/km^2 to 42.9 inh./km^2 (Slovak average: 109.7 inh./km^2).

The territory is a typical region with mountain agriculture, where grasslands dominate in agricultural landscape (10% of the area). Mosaic of forests (85% of the area), pastures and meadows together with narrow small fields around villages represent the basic elements of the land use of the study area. Other types of land use are very limited.

With its well-preserved nature and geographical location at the border of the West-Carpathian and the East-Carpathian bio-geographical regions the study area ranks among the most valuable areas for biodiversity in Slovakia (Vološčuk et al., 1988). The whole study area lies in the Poloniny National Park (NP) or in its buffer zone and in the UNESCO Man and Biosphere (MAB) East Carpathians Biosphere Reserve. It has a high proportion of threatened and rare species (including big carnivores) and great taxonomic diversity: 2769 plant species (1010 of them are vascular plants), 4488 invertebrate and 314 vertebrate species are known (end of 2004). The most valuable forest and grassland communities (original beech forest and extensive grasslands) belong to sites of the highest degree of protection (fifth and the fourth degree).

Historical milestones of landscape changes

The study area came through many changes, and last 50 years can be considered as the most dynamic (Boltižiar, Petrovič, 2004), having significant impacts on landscape, biodiversity and livelihood of the local people. Main drivers of these changes together with their impacts are described as follow (Bezák, 2005):

- Declaration of conservation areas (1964–67-State Nature Reserves, 1977-Protected Landscape Area Východné Karpaty, 1997-National Park Poloniny)
  - limits for agricultural intensification (e.g. heavy machinery, fertilisers) and recreational activities in protected areas
  - forest management regulated, increase of continuous forest areas (protection forests)
  - planning strategies and efforts for maintenance of valuable forests and grasslands, realising management measures (like mowing)

- Collectivisation, formation of big farms (from 70-ies), intensification of the agriculture, decline of traditional farming
  - narrow fields and grasslands merged into large blocks
  - establishment of intensive grasslands, inconvenient forms of grazing
  - abandonment and overgrowing of hardly accessible localities (mountain meadows)
- Construction of water reservoir Starina (1987) and establishment of hygienic protection zones (HPZ) of water sources
  - settlements removed, human activities very limited
  - grazing and wood cutting excluded from part of the area
  - arable land transformed into grasslands many localities abandoned, overgrown by shrubs and trees, rapid succession
- Political and socio-economical transformation of society (from 1990), total economic crisis, decline of agriculture, emigration of local inhabitants
  - significant abandonment of grasslands and narrow fields around villages, rapid overgrowing and succession
  - some positive impacts on environment by decreasing of intensification
- Accession of Slovakia to EU (from 2004), implementation of Common Agricultural Policy of EU (CAP)
  - increased subsidies for extensive environmental friendly farming, support for sheep and cattle breeding, for maintenance of biotops
  - restoration of landscape management activities to maintain grassland communities and typical landscape mosaic.

Assumptions of three scenarios and their implications

Scenario No. 1: Business as usual (BAU)

Business as usual scenario assumes continuation of current trends in sense of support payments for agriculture maintenance (Fig.1, 2). Current trends in the territory are derived from accession of Slovak republic to EU, where socio-economical conditions are rapidly changing and national legislation is adapting to EU (Bezák, Petrovič, 2004). Implementation of CAP in Slovakia (European commission (1999), European commission (2003)) has been transformed into practical implementation of new agricultural, environmental or rural programmes to provide support payments for environment friendly agriculture and rural development (Ministry of the agriculture of the SR (2003a, 2003b)).

Because of increasing role of subsidies, larger part of agricultural landscape will be farmed (compared with situation in last 15 years), majority of area by non-intensive way (Fig. 3). Due to implementation of agro-environmental programmes, return of traditional activities like horse and sheep breeding, bee farming is assumed, while decrease of intensification, farming towards protection against erosion and protection of biotopes are progressing trends coming to agriculture in this territory. Finally, character of agriculture must

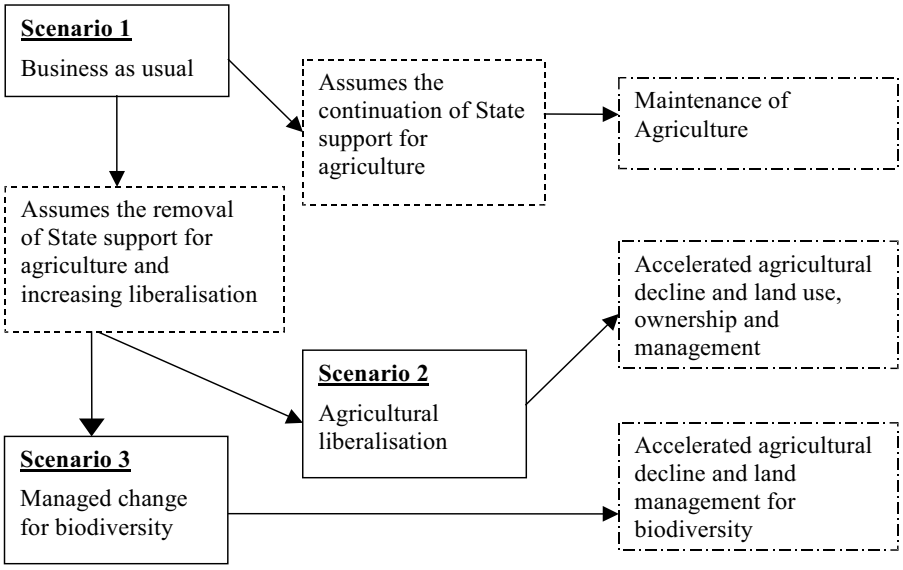

Fig. 1. Relationship between scenarios and land-use footprints.

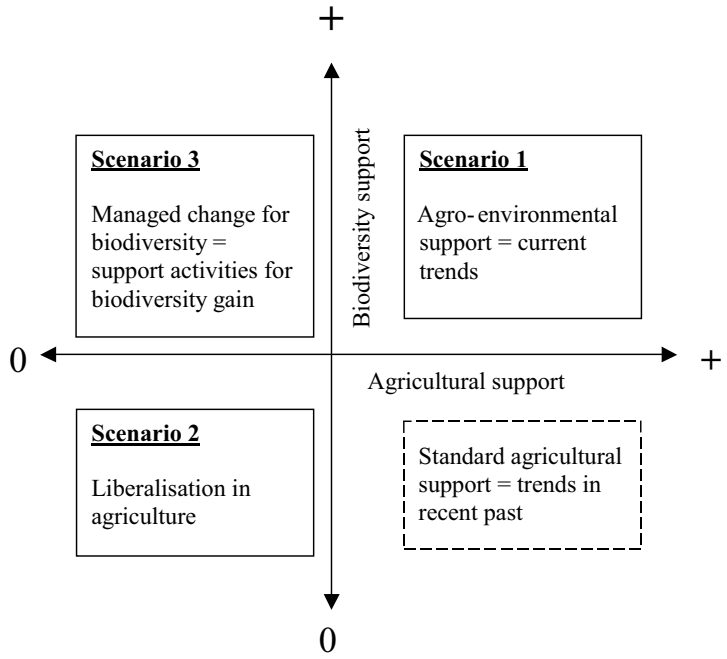

Fig. 2. Scheme of agricultural and biodiversity support relationship.

be oriented on biodiversity protection and environment maintenance as it is grounded in the essence of current support payments. Besides, there is a great potential to integrate environment friendly farming with tourism activities, what has not been performed in the region yet.

Restoration of agricultural land management can stop or reduce succession processes in parts of agricultural landscape, abandoned in the past. Start of extensive management of formerly abandoned grasslands will create better condition for grassland species and in such way can contribute to the biodiversity maintenance in the study area. Although, agriculture tends to be focused on management of grasslands in the basins, nearby villages, therefore persistence of "poloniny" – mountain meadows might not be secured.

Fig. 3. Scenario 1: Business as usual.

Scenario No. 2: Agricultural liberalisation (LB)

Liberalisation is based on one key assumption, which is withdrawal of all support to the agriculture sector, including support for any agri-environmental/rural development programmes (Fig.1, 2). Future trends and changes are derived from current stage and processes in the study area, supplemented by assumptions of finished governmental support (Bezák, Petrovič, 2004). Liberal conditions in the region cause decline of agriculture, although some individual farming remains, mostly related to nature protection interests. End

of organised support can lead to stronger development of other activities in the territory, though even stronger abandonment is possible too.

Significant restriction of farming means end of crop production, mowing (except areas of nature protection), grazing, milk production, livestock breeding, etc. Agricultural machinery is sold off to prosperous farms or various companies outside the region or arranged for using in the forestry. Farming activities stay only in the form of tiny individual parcels and fields near villages, however in decreasing number. Forestry and nature protection stay in the region, other activities hardly survive due to continuous depopulation and abandonment of the territory. Abandonment causes overgrowing of the most of agricultural land, gradual increase of shrubs and trees, forest expansion, the loss of the landscape structure and scenery of the narrow, small fields and meadows, forming mosaics in vicinity of villages, together with loss of habitat of plants and animals of these habitats (Fig. 4).

Fig. 4. Scenario 2: Agricultural liberalisation.

Scenario No. 3: Managed change for biodiversity (MCB)

Third scenario is based on one key assumption, which is withdrawal of all support to the agriculture sector, including support for any agri-environmental/rural development programmes. Management regimes are oriented right on conservation with aim of biodiversity

enhancement, which is directly supported (Fig.1, 2). Future trends and changes are derived from current stage and processes in the study area (Bezák, Petrovič, 2004). Scenario is based on domination of the trends and features of the territory like strict conservation, connected also with compensation payments (property harm) for local owners. These compensation payments are emerged from current legislative instruments – Law No. 184/2002 on Waters, Law No. 543/2002 on Nature protection. Land is managed mostly by conservation authorities – National Park Authority, NGOs, and through local people working in harmony with conservation management.

There are not expected as many changes in the landscape structure as in the second scenario (Fig. 5), because some grasslands must be kept in good state due to priority of biodiversity (Ministry of Environment of the SR (1997), National park Poloniny Administration (2000)). Surely, some agricultural localities stay without management, due to limits of nature conservation possibilities, mostly valuable grasslands are maintained (Halada, Ružičková, David, 2004). Nature protection is aimed also at the maintenance of the specific landscape structure of the territory – small fields and meadows, forming mosaics in vicinity of villages. Some of currently maintained private parcels around villages will be overgrown due to decrease of number of inhabitants, but there is increase of the utilisation of the plots for agro-tourism. Forest cover is slightly expanding, at the expense of some grasslands (especially those with-

Fig. 5. Scenario 3: Managed change for biodiversity.

out good access and intensive grasslands), the forestry is concentrated at the regulated cutting – health cutting, growing native tree species, the forest represents important habitat for animal species, however great part of forest ecosystem is taking own course.

Scenarios perception by local stakeholders

Suggested scenario process includes also feedbacks from local stakeholders, representing various institutions and local people from territory. As they have own experience, knowledge about landscape and activities within, this is important to involve in. Aim is to consult all scenarios and their impacts with stakeholders to reach more valuable and exact picture about future development. Work with local stakeholders consists of several steps (Petrovič, 2005):

- visual change of landscape under scenarios (questionnaire)
- assumptions and basic description of scenarios (questionnaire)
- all impacts of scenarios (questionnaire + discussion).

First set of questionnaires was based on graphical expression of possible scenario impacts on landscape change. Five localities from the study area were chosen and photographed, afterwards image of pictures was modified to present possible changes under different three scenarios. Time horizon of changes is stated 25 years, so picture expresses landscape image in 2030. These visualisations of landscape were evaluated by respondents – local stakeholders, to get their opinion on landscape just based on image perceptions. Results from this questionnaire are presented in the Table 1.

T a b l e 1. Summary of visualisation questionnaire of three scenarios by local stakeholders [%]

Scenario/ respond	I strongly agree	I rather agree	Undecided	I rather disagree	I strongly disagree
Scenario No.1	40.00	38.18	10.91	7.27	3.64
Scenario No.2	10.91	20.00	21.82	32.73	15.55
Scenario No.3	34.55	50.91	7.27	7.27	0.00

More detail explanation of 3 scenarios we provided at stakeholder meeting, which was linked with questionnaires and discussion too. Aim of the first questionnaire was to get primary feelings of locals on basic descriptions of scenarios, without giving them idea of probable landscape and biodiversity change. Favour of scenarios is seen from Table 2.

T a b l e 2. Summary of the first rating questionnaire (before consequences explanation) of three scenarios by local stakeholders [%]

Scenario/ respond	I strongly agree	I rather agree	Undecided	I rather disagree	I strongly disagree
Scenario No.1	58.82	17.65	5.88	17.65	0.00
Scenario No.2	11.76	41.18	5.88	17.65	23.53
Scenario No.3	11.76	35.29	0.00	23.53	29.41

Having presentations of probable changes of landscape and biodiversity at the same stakeholder meeting we gave stakeholders another reason to look at scenarios again and re-evaluate their ranking. Firstly, through mutual discussion among partners landscape and biodiversity matters were clarified and through next questionnaire the final opinions were identified (Table 3).

T a b l e 3. Summary of the second rating questionnaire (after consequences explanation) of three scenarios by local stakeholders [%]

Scenario/ respond	I strongly agree	I rather agree	Undecided	I rather disagree	I strongly disagree
Scenario No.1	64.71	23.53	0.00	11.76	0.00
Scenario No.2	5.88	17.65	5.88	23.53	47.06
Scenario No.3	5.88	58.82	11.76	11.76	11.76

Realisation of questionnaire with 3 steps showed some changes in perception of landscape changes by stakeholders. The greatest difference is in evaluation of LB scenario, where pictures within visualisation caused indecisiveness in stakeholder thinking, some of them agreed with image of the landscape, some of them not. After brief explanation of this scenario, second questionnaire proved mostly agreement with liberalisation, while after explanation of all impacts of this scenario stakeholders significantly shifted their opinion towards refusing liberalisation scenario. This was result of not fully considering of scenario implications by stakeholders in first two questionnaires. Scenario BAU was always supported in questionnaire, as in visual or text form, its increased dominance came after full clarification of all impacts and stakeholders are very in favour of agricultural maintenance. Scenario MCB is the most debatable, what causes problems to stakeholders to identify their relation. While landscape pictures were liked by stakeholders, second questionnaire brought mixed attitude about this scenario, where stakeholders did not know to estimate its possible impacts in the territory. Detail explanation of landscape and biodiversity impacts confirmed validity of this scenario in stakeholder's opinion.

Views on particular scenarios are influenced by several facts, as different implications of historical development and socio-economical changes on individual inhabitants, structure of stakeholders and their current position and in many cases also by feelings of injustice. Original inhabitants of evacuated villages have the most radical attitude towards refusing LB scenario. This process has already started in HPZ of water sources in 15–20 years ago, after total abandonment. They are still owners of the land in this area, which they would like to farm, but they were refused, instead of that succession processes prevail. The same idea is shared also by local inhabitants and farmers, arguing rising negatives from depopulation and unprofitable agriculture, which is the main subsistence for these people. Without sufficient support, agriculture can not survive here and without agriculture this region will die out. Institutions of nature protection are bit more restrained about support to agriculture, they considered MCB scenario equally important for landscape and biodiversity in the area as BAU. However, they understand necessity of such support as driver for keeping local people in the region and securing living conditions for them. Local individual

farmers, understanding relations of agriculture-environment, mean the greatest importance for nature protection, even more when agricultural support has trend of shifting from big farms to individual farmers, better fulfilling ecological principles of farming. Except these positions, there are few voices from other conservation institution (NGO) to leave most of the area and let nature takes own course, what is mostly represented by liberalisation scenario. This is extreme position and unacceptable for the most of stakeholders, at least at the majority of the territory.

Conclusion (critical view on scenarios)

Aim of defining various scenarios of landscape and biodiversity change give attention on possible future trends in the region, including extremes, of which local people or institutions could be aware of. It also helps to find way for sustainable development in the study area (Huba, Ira, 1988; Izakovičová et al., 2003). The final result for local management in the landscape doesn't lie on choosing one of the scenarios, but in making some realistic view on all of them to select and bring issues favourable for all participants in the sense of maintaining landscape and biodiversity.

BAU would benefit local people the most, on the other side, claims of such kind of support make demands on skilfulness of farmers to adopt this new support system, requiring many administrative tasks. Considering current structure of inhabitants and their abilities, it would be a difficult task. Another risk relates potential efforts for reaching the maximal amount of subsidies for farming, which would become primary target instead of sensitive agricultural management aims. Finally, to be focused on biodiversity, decrease of small mountain meadows would occur, because activities under the BAU scenario are mostly focused on large meadows in the basins and accessible locations. This is a big difference with MCB, where mountain meadows have priority importance. These negatives are even more visible, when there are just two big farms managing the agricultural land.

Theoretically, for nature and biodiversity protection MCB scenario creates the best preconditions. Base activities for protection of grassland communities lean on extensive agriculture, direct support of which is considered in less extent here. On the contrary, direct support to biodiversity is something unknown, inexperienced, with many complicated changes and assumptions (who will get the money, who will be responsible, how it will be divided, etc.). This is quite unrealistic in the current situation within study area, therefore people do not trust the trend of MCB very much. Also, there are farming activities in places which are not so important from a biodiversity point of view, but it is important that they are maintained for local inhabitants (e.g. agricultural land in basins). MCB surely cannot secure such economic development as under BAU. In case of limited ability of conservation authorities, their role and management, trends would be closer to liberalisation scenario, in a sense of insufficient number of job positions, continuous population decline and partial abandonment of the landscape.

LB scenario, sometimes called as "nightmare" scenario or "wilderness" scenario looks to be a very drastic for agricultural land. Probably some benefits are perceived only in connection with forest ecosystems, which would be strengthened by land abandonment and overgrowing. Maybe, several alternative forms of land use could partly help the region and few people to stay (e.g. tourism, hunting, local services), but none of them is such important for maintaining landscape and total biodiversity of this specific mountain region as extensive farming.

As mentioned in section above, BAU was the preferred basic driver for restoring agricultural activities and for tourism development. This is based on the preference of between 10–15 stakeholders, where opinions are not exactly the same. Therefore, stakeholders more or less prefer a combination of BAU and MCB, but in the current situation BAU is desirable much more for them and for whole region (and is understandable) than MCB. For them, support for agriculture is essential for such kind of landscape, favouring as farming activities with positive impacts on natural values and biodiversity, as local livelihood, possible forms of agro-tourism, attracting visitors to the region and total economic growth of the region.

Translated by the authors

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References

Bezák, P., 2005: Human impact and landscape changes in the Poloniny National Park: drivers, relations, implications (in Slovak). In Herber, V. (ed.): The physical-geographic collection 3. Proceedings of the international geographic conference Cultural landscape, 14.–15. 2. 2005, GÚ PF MU, The Czech Republic, in press.

Bezák, P., Petrovič, F., 2004: Alternatives of possible landscape development in the East Carpathians Biosphere Reserve (in Slovak). In Midriak, R. (ed.): Biosphere reserves in Slovakia V. Proceedings of the 5th National conference on Biosphere reserves in Slovakia, 29.–30.9.2004, Nová Sedlica, TU Zvolen, p. 73–78.

Boltižiar, M., Petrovič, F., 2004: Land use in the Poloniny National Park in years 1949-2003 (in Slovak). In Midriak, R. (ed.): Biosphere reserves in Slovakia V. Proceedings of the 5th National conference on Biosphere reserves in Slovakia, 29.–30.9.2004, Nová Sedlica, TU Zvolen, p. 57–63.

European commission, 1999: Council Regulation (EC) No 1259/1999 of 17 May 1999 establishing common rules for direct support schemes under the common agricultural policy. 6 pp.

European commission, 2003: Commission Regulation (EC) No 2199/2003 lays down transitional measures for the application in respect of the year 2004 of the single area payment scheme. 4 pp.

Halada, Ľ., Ružičková, H., David, S., 2004: Meadows of the Poloniny National Park – present and future (in Slovak). In Midriak, R. (ed.): Biosphere reserves in Slovakia V. Proceedings of the 5th National conference on Biosphere reserves in Slovakia, 29.–30.9.2004, Nová Sedlica, TU Zvolen, p. 41–48.

Huba, M., Ira, I., 1988: Strategy of the sustainable development of the Eastern Carpathian region (in Slovak). GEF, Bratislava, 83 pp.

Izakovičová, Z., Petrovič, F., Moyzeová, M., 2003: Evaluation of the region East Carpathians from the aspect of the principles and criterions of the sustainable development (in Slovak). In Izakovičová, Z. (ed.): Proceedings of the conference Slovakia one year after Johannesburg, Smolenice, 29.–30. 4. 2003, ÚKE SAV, Bratislava, p. 117–124.

Ministry of Agriculture of the Slovak Republic, 2003a: Agriculture and rural development 2004-2006 (in Slovak). Sectoral operational programme. Bratislava, 121 pp.

Ministry of Agriculture of the Slovak Republic, 2003b: Rural development plan 2004–2006 (in Slovak). Bratislava, 171 pp.

Ministry of Environment of the Slovak Republic, 1997: National Biodiversity Strategy of Slovakia. Bratislava, 109 pp.

National park Poloniny Administration, 2000: Strategic aims of nature protection in the Poloniny National Park (in Slovak). Snina, 59 pp.

Oszlányi, J., Halada, Ľ., Boltižiar, M., Bezák, P., Halabuk, A., 2004: First results of the BioScene project (in Slovak). In Midriak, R. (ed): Biosphere reserves in Slovakia V. Proceedings of the 5th National conference on Biosphere reserves in Slovakia, 29.–30.9.2004, Nová Sedlica, TU Zvolen, p. 49–55.

Petrovič, F., 2005: The perception of the landscape structure and biodiversity changes from a view of stakeholders in national park Poloniny (in Slovak). In Herber, V. (ed.): The physical-geographic collection 3. Proceedings of the international geographic conference Cultural landscape, 14.–15. February, GÚ PF MU, Czech Republic, in press.

Vološčuk, I. et al., 1988: The Protected Landscape Area of the Východné Karpaty (in Slovak). Bratislava, 335 pp.

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Bezák P., Petrovič F.: **Poľnohospodárstvo, krajina, biodivezita: scenáre a pohľad zainteresovaných v území Národného parku Poloniny**.

Zámer definovania scenárov budúceho vývoja poľnohospodárskej krajiny v NP Poloniny sa odvíja od jej súčasného stavu, opisu hlavných zmien v minulosti, ich príčin a dôsledkov, na základe čoho je možné načrtnúť trendy budúceho vývoja krajiny s vopred stanovenými predpokladmi. Zahrnutím i extrémnych scenárov sa sleduje snaha o poukázanie na možné krajné štádiá vývoja krajiny, ktoré môžu jasnejšie napomôcť definovaniu foriem trvalo-udržateľného rozvoja. Výsledky tohto výskumu teda nesmerujú k výberu najvhodnejšieho scenára, avšak k reálnemu zhodnoteniu navrhnutých možností a trendov, za účasti miestnych „zainteresovaných“ obyvateľov, na konečné stanovenie vhodných/nevhodných a reálnych aktivít a iniciatív pre ochranu a zachovanie biodiverzity.