

ASSESSMENT OF LOCAL KNOWLEDGE ABOUT LAND USE RELEVANT TO LANDSCAPE PLANNING IN A CASE STUDY AREA IN LOWLAND SLOVAKIA

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ABSTRACT

Public perception and knowledge of land use changes, and preferences for future landscape development, can contribute to planning processes at different levels from the local to the national. Participatory processes and use of local knowledge are necessary for precise planning purposes and management of public affairs. This paper analyses the results of sociological research with regard to landscape development in Nová Vieska village in the Podunajská nížina lowland in Slovakia. The survey aimed to analyse the answers of local inhabitants and key stakeholders in the field of perception of land-use changes and their causes and biodiversity changes since 1990, as well as expectations of future land use and the driving forces of rural development. Local inhabitants were more likely to perceive changes in the productive parts of the study area (the decline of orchards and gardens, overgrowth of meadows and pastures, etc.), while key stakeholders perceived a broader range of changes in land use. According to the local inhabitants, the disintegration of cooperative farms was the main cause of the land use changes, and unsettled land ownership is the biggest obstacle to development of agricultural production. Key stakeholders cited economic, environmental (climate change) and social causes (ageing of population, change of life style, etc.) as the most important factors in land use change and they also perceived them as the most important obstacles for agricultural development. Local inhabitants (as well as key stakeholders) wished for an increase of the proportion of managed meadows and pastures, gardens, orchards, wetlands and non-forest vegetation, but they expect the opposite trend. The results confirmed that public knowledge of landscape development could provide substantial useful information for future development planning.

Keywords: land use changes, biodiversity, driving forces, stakeholders, local planning

INTRODUCTION

Agricultural landscape in Slovakia has undergone distinct and extensive changes in the last 70 years. The first important change during that period was collectivisation of agriculture in the mid-20th century. The result was the transformation of the traditional mosaic pattern of

land use into large-block fields, first of all in the lowlands but then also in the sub mountain and mountain areas, where accessibility allowed. This was accompanied by the restriction of land ownership rights and the foundation of the cooperatives and state-owned enterprises. This led to alienation of humans from the land, thus breaking a relationship cultivated over hundreds of years.

Another important circumstance was the fall of the Iron Curtain at the end of 1989. Economies that had been centrally planned were transformed to free-market systems (Bezák & Dobrovodská, 2019). Due to the change of institutional regimes and decline of support for agriculture, the majority of cooperatives ended. A new lifestyle, including a preference for other kinds of work, caused demographic changes, especially migration, and a massive abandonment of agricultural land (Hostert *et al.*, 2008; Filho *et al.*, 2017). This trend was also influenced (and, in some places, partially reversed) later on by the accession of Slovakia to the EU in 2004, when, due to financial support, farming activities revived, especially in easily-accessible and larger farming areas.

In recent years, problems have emerged as a result of globalization and newly-established economic and social ties that enable the flow of materials, financial sources, innovations and ideas, but also an increase in waste and emissions. Global competition is increasing, and at the same time the consequences of globalisation, such as the diminishment of biodiversity and climate change, are appearing. Due to this development the ecological, economic, and social situation in Europe will be severely affected by globalization and by various global phenomena which operate on a grand scale but which will also have considerable local effects in future decades (Baboš *et al.*, 2016). In addition to the prevailing negative effects (differing population trends, increasing urbanization, increasing pressure on ecosystems, consequences of climate change, increasing environmental pollution, and others) we can also talk about positive trends, which include diversification of approaches to landscape management due to private enterprise and civic society gaining ground and a larger share of the population participating in the administration of public affairs. This latter trend in Slovakia is quite marked (compared with western European countries, where similar trends happened many decades previously), as the common citizens become aware of their role in the management of the territorial development of their communities.

Sustainability planning requires the involvement of a wide range of actors with different forms of knowledge, interests and value commitments (Meppem & Gill, 1998). In the field of rural development, scientific knowledge provides overall concepts, scholarly methods and information gathered previously from different localities, all of which can be used in a very practical way. However, this requires the concepts, methods and information to be translated and adjusted to local conditions that are often better known by local people (Fehér, 2018). Thus, local knowledge (in combination with other knowledge forms) is very important in rural development (Folke, 2004). It is especially important in the Slovak context, as the above-mentioned economic and socio-political events have often led not only to changes of the intensity of land use but also to a dramatic change in, even loss of, a settlement's *genius loci* – which, however, may be kept alive in the memories, knowledge and perception of local people and land users. From this point of view and also that of sustainable development, preserved landscape elements of biocultural value are extremely precious. They integrate natural and cultural elements, whose interaction gives a particular character to the landscape shaped by man over centuries (Batista *et al.*, 2015). Therefore, their significance is not only ecological and cultural-historical (Dobrovodská *et al.*, 2019) but also social.

To the best of our knowledge, there has so far been little investigation of local knowledge regarding land use and biodiversity changes in Slovakia, and it is seldom incorporated into planning processes (e.g. Lieskovský *et al.*, 2015; Špulerová *et al.*, 2017; Bezák &

Dobrovodská, 2019). The same is true for the expectations of and preferences regarding future landscape development. Furthermore, the situation in the lowland area of Slovakia is less clear in terms of landscape changes because the crucial changes in land use took place in the period of collectivisation of agriculture. This paper therefore addresses the above-mentioned research gap by analysing the results of sociological research with regard to landscape development in the village of Nová Vieska in the Podunajská nížina lowland. The study focuses on an analysis of the answers of local inhabitants and key stakeholders to questions on:

- i) perception of land-use changes and their causes and of biodiversity changes since 1990,
- ii) expectations of future land use and perceptions of the driving forces of rural development.

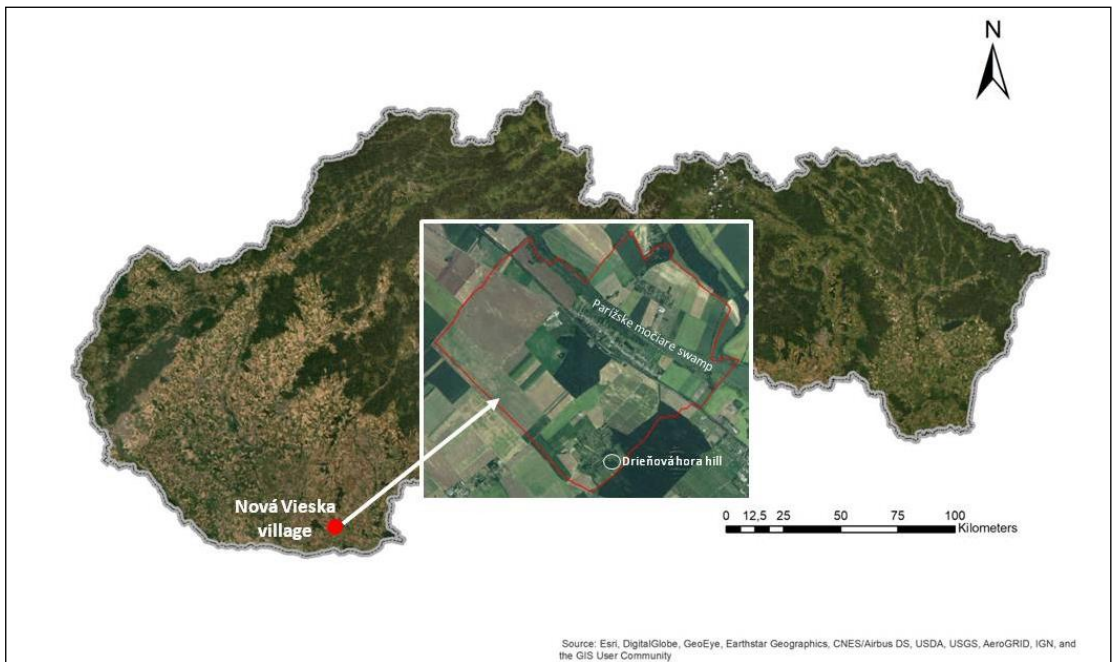
MATERIALS AND METHODS

Study area

Nová Vieska village is situated in western Slovakia in the administrative region of Nitra, in the district of Nové Zámky, GPS coordinates 47°52'15''N, 18°27'43''E. (Fig. 1). The cadastre of the village is in the Podunajská nížina lowland on the southern edge of the Pohronská pahorkatina uplands, at an altitude of 121 m to 183 m. The overall area of the cadastral territory is 1,760.7 ha; the number of inhabitants is 656: 85 % are Hungarians, 13 % are Slovaks; 64 % of locals adhere to the Reformed Church, 16 % are Roman Catholics, 11 % are without religion (SO SR, 2021). The community includes two farmsteads, Arad and Réva.

Settlement in the locality dates back to the Neolithic period. The first written mention of the village is from 1233. In 1650, the whole community converted to the Calvinist church (Süle, 2005). Maps of the 18th century show that these areas contained an extensive waterlogged ecosystem with a number of open water areas, whose character was gradually altered by human interventions (draining and training of the brook Paríž, intensive agricultural activity, etc.) and also by natural succession. The reeds that grow in the swamp were primarily used for building purposes in the past. The establishment of a Nature Reserve (described further on) has put a stop to environmentally-destructive activities in the area and led to better protection of this important site (Gajdoš *et al.*, 2005). In the years 1927 and 1928, the territory was colonized by Slovaks dedicated to fruit growing. Nová Vieska became part of Hungary in the years 1938 to 1945. After WWII, thirty Slovak families moved here from Hungary. They committed themselves to agriculture and processing of reeds. (Süle, 2005). An important element of their farming activities was and still is the cultivation of vines and wine making. After agricultural collectivization in 1947, only remnants of the original vine landscape structures in the vicinity of the Nature Reserve Drieňová hora survived. These remnants consist of mosaics of abandoned land, land overgrown with woody vegetation and still-maintained agricultural land – small vineyards, orchards, permanent grasslands and arable land. Typical elements include vine-growers' houses, cellars and winepress houses, which have existed here since the 19th or 20th century. This area, together with the Parížske močiare swamp and the alluvium of the Paríž brook, are among the most important sites of biocultural value not only in the cadastre, but in the whole region. The wetland territory of Parížske močiare is protected as a National Nature Reserve, and it also belongs to the Ramsar localities and NATURA 2000 network. The alluvium of the Paríž brook enjoys legal protection as a Protected Area (Gajdoš *et al.*, 2005).

Fig. 1: Location of the study area within Slovakia



Data collection

Our sociological research in Nová Vieska village was aimed at two groups of respondents – key stakeholders and local inhabitants. Public opinion reflects social demand, the integration of which into landscape management measures can be facilitated by the insights of key stakeholders. We have assumed that key stakeholders’ perceptions of land use and biodiversity are strongly linked to their everyday experiences and professional practices.

In order to collect information about the perceptions of respondents, we designed a field survey, and carried it out in November 2020. In the case of local inhabitants, we chose a number of respondents (35) which would be a representative sample of the village, constituting 5 % of the 690 permanent residents (as of 2019). We used random sampling techniques to collect the primary data in the streets, as well as going “door to door”. Our selection of interviewees aimed at having a good balance in terms of age of respondents (though only over-18s were selected), gender, and levels of education and engagement in agriculture. The socio-economic profiles of respondents are detailed in Fig. 2. Data was collected by face-to-face survey with individual interviewees. In addition, individual interviews with 5 key stakeholders (two farmers, one representative of the cooperative, one representative of the local administration and one representative of the hunting association) were carried out, also in the form of a face-to-face survey. Their socio-economic backgrounds are listed in Tab. 1.

In order to compare the results of perception of the land use changes since 1990 with real figures we have used data obtained from the mapping of land use changes in the study area. This was based on field mapping and GIS desk analysis, which, along with the questionnaire surveys, formed part of the complex study presented in this paper. The changes in the main land use categories are shown in Tab. 2.

Table 1: Socio-economic characteristics of the key stakeholders, their perception of land use changes, and the driving forces of agriculture development in Nová Vieska village

	key stakeholder No 1	key stakeholder No 2	key stakeholder No 3	key stakeholder No 4	key stakeholder No 5
socio-economic characteristics	<ul style="list-style-type: none"> - female, 50-59 age category - she has lived in Nová Vieska village her whole life - higher education - representative of municipality 	<ul style="list-style-type: none"> - male, 50-59 age category - he has lived in Nová Vieska village his whole life - secondary education - representative of hunting association 	<ul style="list-style-type: none"> - female, 50-59 age category - she has lived in Nová Vieska village her whole life - secondary education - representative of cooperative 	<ul style="list-style-type: none"> - male, 60-69 age category - he has lived in Nová Vieska village his whole life - apprenticeship - self-employed farmer 	<ul style="list-style-type: none"> - male, 70 and more age category - he lives in the neighbouring village of Strekov - higher education - self-employed farmer
perception of land use changes since 1990	<ul style="list-style-type: none"> - overall development of agriculture - new family wine making firms emerged - more areas abandoned by people, areas abandoned and overgrown (meadows, forest, gardens, vineyards) 	<ul style="list-style-type: none"> - overgrowth of the Parížske močiare swamp - overgrowth of vineyards - diminishment of the exploited permanent grassland 	<ul style="list-style-type: none"> - the area of vineyards shrank - pastures shrank after the animal production in Arad was dissolved 	<ul style="list-style-type: none"> - areas overgrown by wood species and reeds increased - mown meadows diminished - part of the forest was felled and it is overgrown by black locust trees - abandoned brick factory 	<ul style="list-style-type: none"> - forest diminished - abandoned of animal production buildings and of the brick factory - overgrown areas of the Parížsky močiar swamp increased
perception of causes of land use changes	<ul style="list-style-type: none"> - no support to marketing and outlet - excessive bureaucracy concerning the sale of proper products - overgrowth of the Parížske močiare swamp - it is not possible to till land near it - population ageing - young people leave for the city, immigration of new inhabitants in pursue of recreation - overpreservation of deer and starlings - they cause damage to vineyards 	<ul style="list-style-type: none"> - climate change - grapes ripen earlier, vineyards are rapidly overgrown, they must be more often hoed - disappearance of pasturing - administrative overburden of subsidies - insecure marketing of farm products - ageing of population - changed life style of young people, they are uninterested in farming 	<ul style="list-style-type: none"> - economic reasons - overall cost of animal production increased 	<ul style="list-style-type: none"> - climate change 	<ul style="list-style-type: none"> - disintegration of the farming cooperative - economic decay after closure of the brick factory
perception of biodiversity changes since 1990	<ul style="list-style-type: none"> - diminishment of small game because of application of chemicals and diminishment of plant species at the locality Drieňová hora (pasque flower, feather grass) and in adjacent old vineyards - increased numbers of deer and wild boar 	<ul style="list-style-type: none"> - decline of the number of hares and pheasants - increase of the number of wild boar and foxes - increased areas of reeds 	<ul style="list-style-type: none"> - the number of wild boar increased 	<ul style="list-style-type: none"> - number of hares decreased 	<ul style="list-style-type: none"> - number of weeds increased (for instance, sorghum) - numbers of wild boar and birds of prey increased
perception of land use over the next 20 years	<ul style="list-style-type: none"> - the status of the landscape will improve - we can expect development of viticulture and wine making, conservationists will be more active and their activity will contribute to landscaping - husbandry will be ecological, development of the sale of proper products - development of recreation 	<ul style="list-style-type: none"> - no comment 	<ul style="list-style-type: none"> - use of the sand pit for educational and edifying purposes regarding the rare avifauna - other areas without change 	<ul style="list-style-type: none"> - area of arable land will not change 	<ul style="list-style-type: none"> - no changes of area and use of farmland will take place - area of forest will diminish
perception of ideal land use	<ul style="list-style-type: none"> - no comment 	<ul style="list-style-type: none"> - greater diversification of land lease - more farmers will clean the land area - cleaning of the Parížsky močiar swamp - mowing of the Parížsky močiar swamp, mowing of reeds and production of baskets - use of permanent grassland for pasturing of beef cattle, sheep and horses 	<ul style="list-style-type: none"> - no comment 	<ul style="list-style-type: none"> - exploitation of the Parížske močiare swamp for recreation (fishing) - development of agritourism under the responsibility of the municipal office 	<ul style="list-style-type: none"> - greater proportion of grassland and development of animal production - does not approve development of agritourism - prospects in the development of wine making and viticulture, return to wine tasting and the development of traditional crafts
confidence in subjects	<ul style="list-style-type: none"> - local inhabitants, mainly older people - local associations - state nature protection 	<ul style="list-style-type: none"> - municipal council 	<ul style="list-style-type: none"> - local inhabitants - large firms 	<ul style="list-style-type: none"> - local small farmers 	<ul style="list-style-type: none"> - local small farmers
perception of obstacles	<ul style="list-style-type: none"> - missing support for marketing of farm products 	<ul style="list-style-type: none"> - improperly set subsidies for permanent grassland; the support should be provided for pasturing and not for mulching, it would increase animal production - unfavourable population age structure - land ownership, a large part of agricultural land has been rented by one big farmer who does not want to share land - existence of protected areas 	<ul style="list-style-type: none"> - environmental protection - obsolete technology 	<ul style="list-style-type: none"> - missing irrigation system; it is not possible to develop vegetable growing because of climate change - low market prices of farm products - high land tax - high social and health care insurance contributions 	<ul style="list-style-type: none"> - low financial security of small farmers - problems with acquisition of subsidy - expensive lease of land - lease of land to big firms - problematic acquisition of credit from banks - farm shops do not exist - poor quality of accession roads to parcels

Fig. 2: Socio-economic profiles of the local inhabitants interviewed in the survey

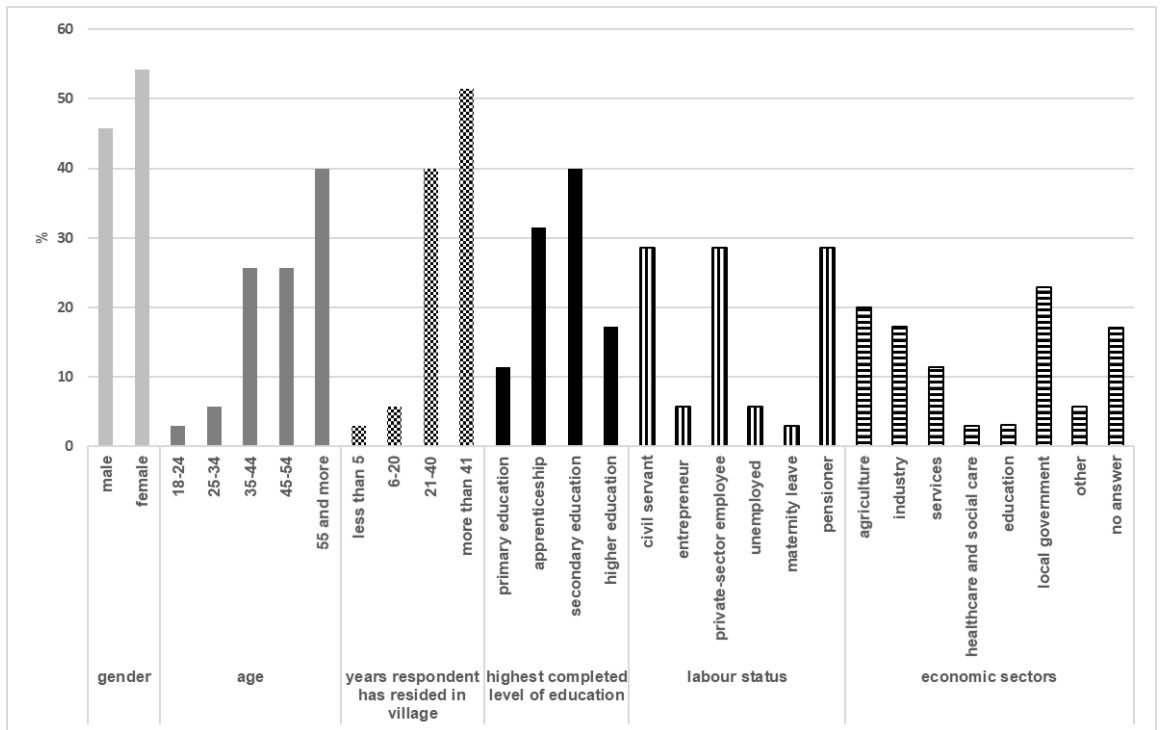


Table 2: Land use changes between 1990 and 2018

Land use categories	Year 1990		Year 2018	
	Area (ha)	Area (%)	Area (ha)	Area (%)
Meadows	41,72	2,38	32,51	1,85
Arable land	1176,58	67,12	1150,14	65,61
Orchards	34,18	1,95	4,5	0,26
Vineyards	64,8	3,7	107,33	6,12
Gardens	46,79	2,67	45,18	2,58
Wetlands	58,95	3,36	58,48	3,34
Linear wood vegetation	17,45	1	18,6	1,06
Groves	26,2	1,49	11,93	0,68
Overgrown meadows and pastures	90,12	5,14	106,98	6,1
Forest areas	130,52	7,45	156,2	8,91
Water bodies	4,38	0,25	3,12	0,18
Built-up areas and others	61,34	3,5	58,06	3,31
Total	1753,03	100	1753,03	100

Design of the questionnaire

The questionnaires for local inhabitants and key stakeholders covered three particular issues, described below, in order to achieve our research goals. For the inhabitants, the survey contained questions with a pre-defined scale of answers; in the case of the key stakeholders, a semi-structured survey with open answers was used.

The questions concerned the following issues:

Perception of land use changes and their causes, and of biodiversity changes

The research focused on perception of changes in the area of landscape elements. The questionnaire for local inhabitants focused on a more detailed distinction of categories for agricultural elements than for other elements, which were more broadly defined. There was also one follow-up question which asked about the causes of the changes mentioned in the previous question. Local inhabitants were able to choose several options: environmental, economic, institutional causes and other causes connected with access to the village or farming areas. They could also cite the disintegration of the farming cooperatives or state properties as a possible cause of changes. From the point of view of changes in biodiversity, we inquired about quantitative changes in the abundance of plant and animal species.

Perception of land use over the next 20 years

Perception of land use change over the next 20 years was divided into expected changes of land use and ideas on optimal use of or ideal changes to landscape elements. Regarding the expected changes over the next 20 years, local inhabitants were asked their opinion about the same categories of land use as were specified in questions about changes that took place after 1990. From the point of view of optimal or ideal land use we put emphasis on the use of arable land, meadows and pastures, while also taking into account the fragmentation of land and size of parcels. The question about ideal land use was accompanied by a related question about preferences regarding selected activities such as plant production, animal production, agritourism, farm shops and traditional crafts.

Perception of driving forces of rural development

With regards to the driving forces of rural development, the survey inquired about the level of confidence in agricultural land management bodies and the perception of obstacles in agricultural development.

RESULTS

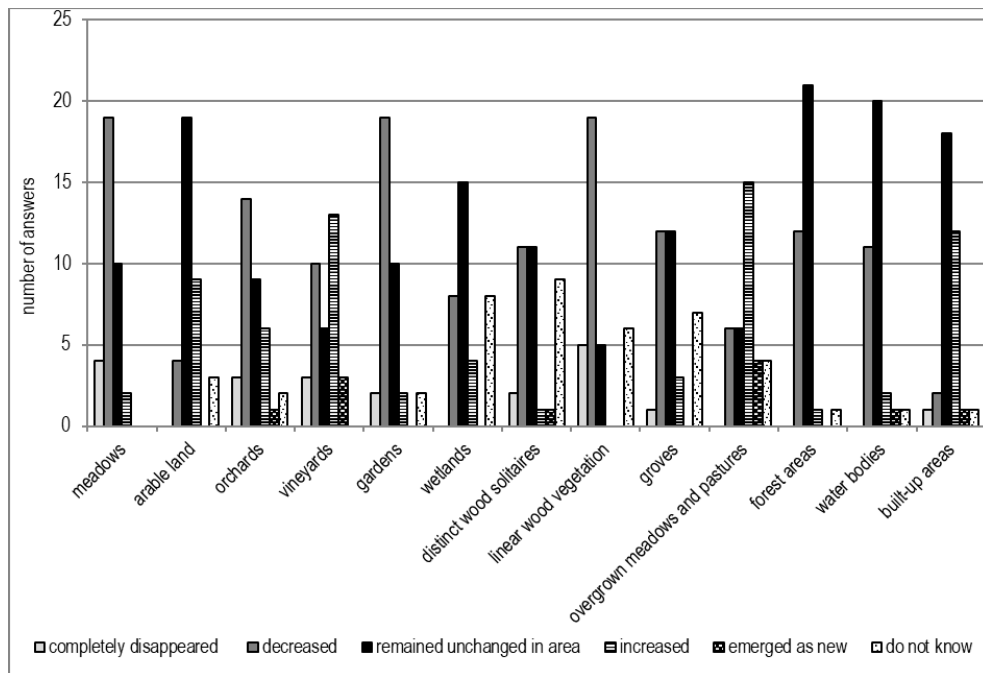
Perceptions of local inhabitants

Perception of land use changes and their causes, and of biodiversity changes

Inhabitants of Nová Vieska village perceive meadows, gardens and linear wood vegetation to have decreased most, which largely corresponds to the results of land use mapping. 40 % of respondents perceive a decrease of orchards (87 % decrease reported by mapping); about a third of respondents also noticed a decrease of groves (54 % decrease) and distinct woody solitaires. Overgrown meadows and pastures and built-up areas are land use elements that public opinion perceives as having generally increased. While overgrowth of grasslands matches the mapping results (with a decrease of 19 % in grassland area), the built-up area has not in fact been extended, as new houses have been built inside the village area. Overgrown meadows and pastures as well as vineyard are perceived by some as new elements. According to prevailing opinion, the areas of forest, arable land, water bodies,

built-up areas and wetlands did not change. As for the mapping results, this is true (that is, there has been little change) for the arable land and wetlands. However, the mapping showed a 20 % increase of the forest area due both to re-categorization of the overgrown agricultural areas as forest and to continuing reforestation; and a decrease of water areas by 29 %, caused by drying out of small streams. Fig. 3 shows the number of each particular answer to the given question.

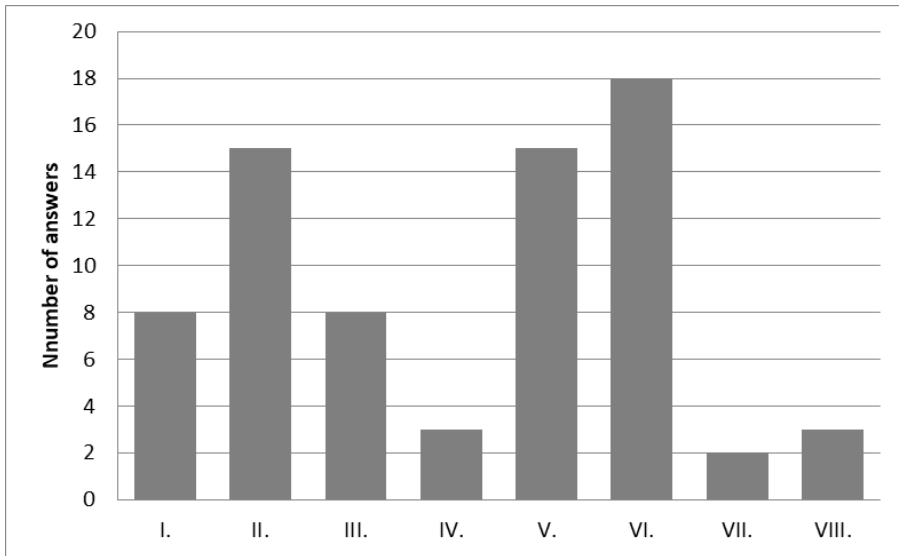
Fig. 3: The number of particular answers to the question: “After 1990, in your opinion, which landscape elements have: completely disappeared; decreased; remained unchanged in area; increased; emerged as new; do not know



When asked about the causes of the land use changes, most respondents indicated the disintegration of the farm cooperative. The second most quoted causes were the economic and social, followed by the institutional and environmental (Fig. 4).

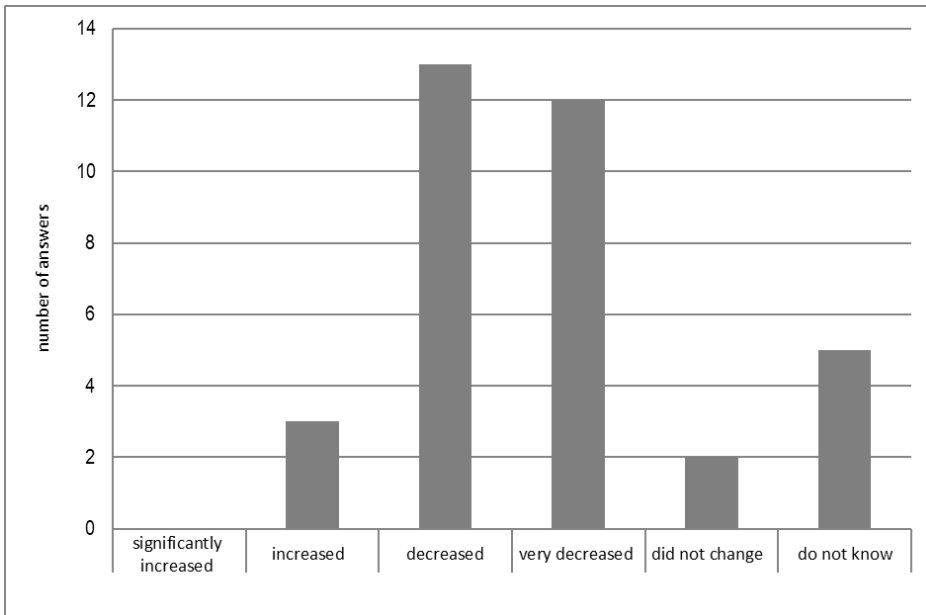
Changes in land use are connected with changes in biodiversity. Most inhabitants of Nová Vieska village perceived a decline of biodiversity after 1990; 12 respondents believe that the abundance of plant and animal species has decreased significantly. Distinctly fewer respondents either do not perceive any change or do not know whether the diversity has changed. Three respondents said that the biodiversity increased (Fig. 5). While data on changes in species diversity in the study area are not available for comparison with local perceptions, we do observe that a decline in landscape diversity was identified by the land use mapping. In particular, there was a decrease of small scale or green elements representing green infrastructure – linear wood vegetation, water bodies, meadows, orchards and groves.

Fig. 4: The number of particular answers to the question: “In your opinion, what were the causes of these changes?”



I. environmental: weather, soil quality; II. economic: labour, financial sources, profit, overall cost; III. institutional: EU, subsidy, ownership; IV. access to the village, to fields; V. social: changed life style, support to family, friends, health; VI. disintegration of the cooperative, state property enterprises; VII. other; VIII. do not know

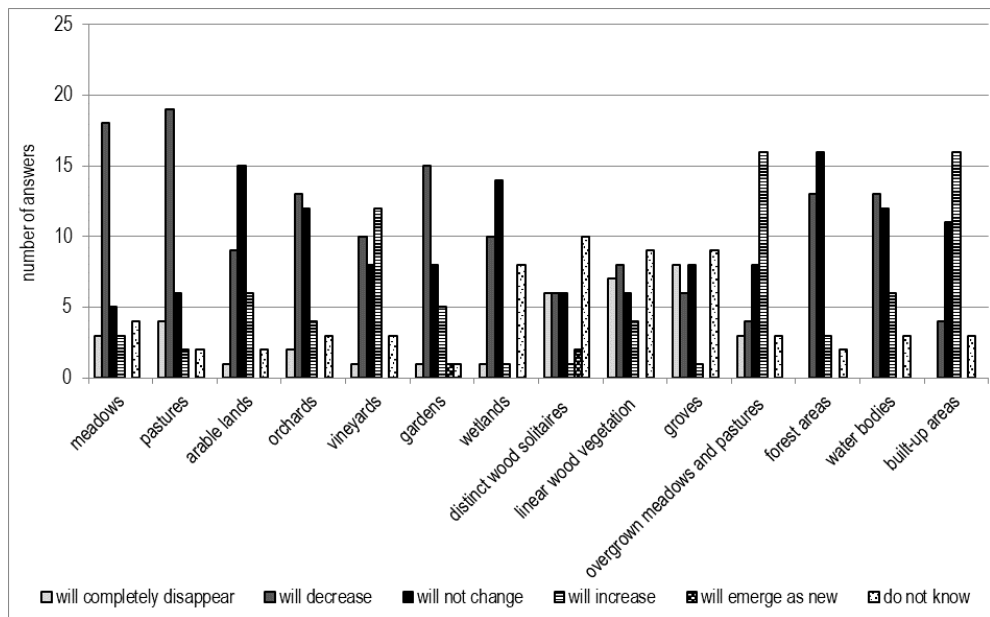
Fig. 5: The numbers of particular answers to the question: “How, in your opinion, did the abundance of plant and animal species change in the cadastre of your village after 1990?”



Perception of land use over the next 20 years

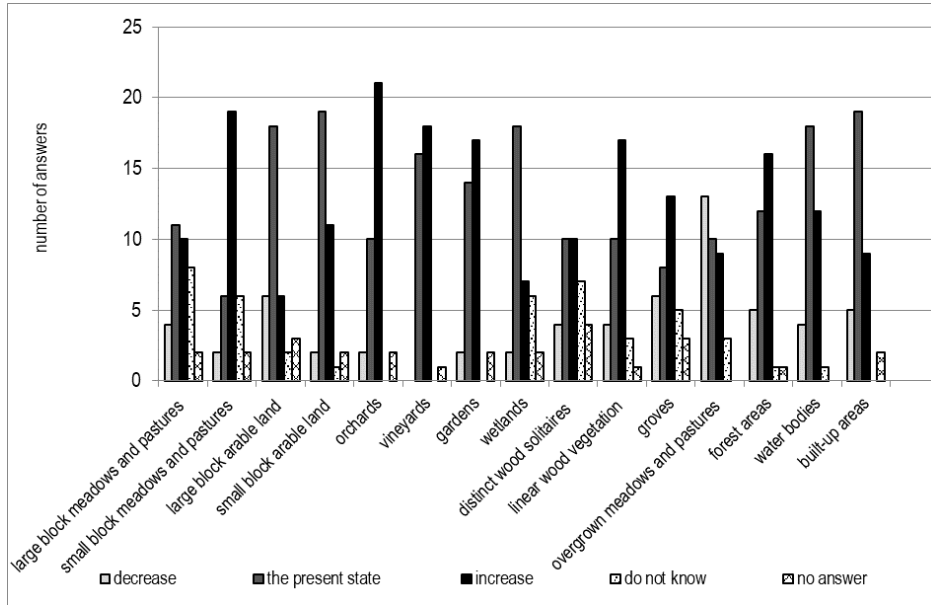
The majority of respondents expected a decrease of meadows and pastures in the next 20 years. Almost half of them expect shrinkage of the area of gardens, forest and water bodies. They believe especially that groves, linear woody vegetation and distinct woody solitaires will disappear. Contrarily, a total of 47 % of the studied population sample expect an increase in the area of overgrown meadows and pastures and of built-up areas (Fig. 6).

Fig. 6: The number of answers to the question: “In your opinion which elements will/will not be in the cadastre of your village after 20 years?”



In terms of ideal land use, more than a half of respondents would primarily like to see an increased area of orchards and small-block meadows and pastures. A high proportion of inhabitants would prefer an increased share of vineyards, linear woody vegetation and forest areas. However, almost half of the sample of inhabitants of Nová Vieska village consider the overgrown meadows and pastures (Fig. 7) to be undesirable. This question was connected with that about the need for development of selected activities. More than 70 % of respondents pointed to the essential need to develop animal production and the farm shops. A high percentage also wish for the development of traditional crafts; 21 out of 35 respondents wish for the development of agritourism, but agritourism was also the activity most objected to (5 respondents did not wish to develop it).

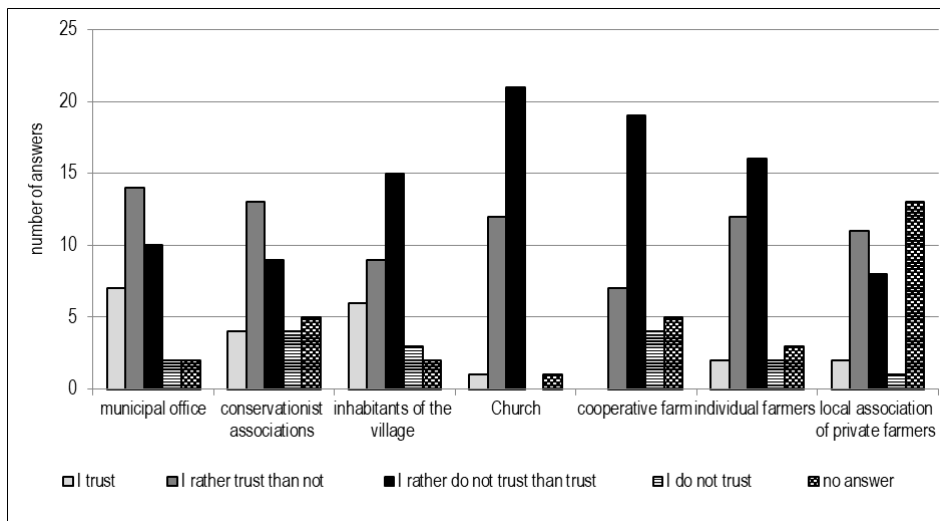
Fig. 7: The number of answers to the question “What is your idea of the ideal land use in your village?”



Perception of the driving forces of rural development

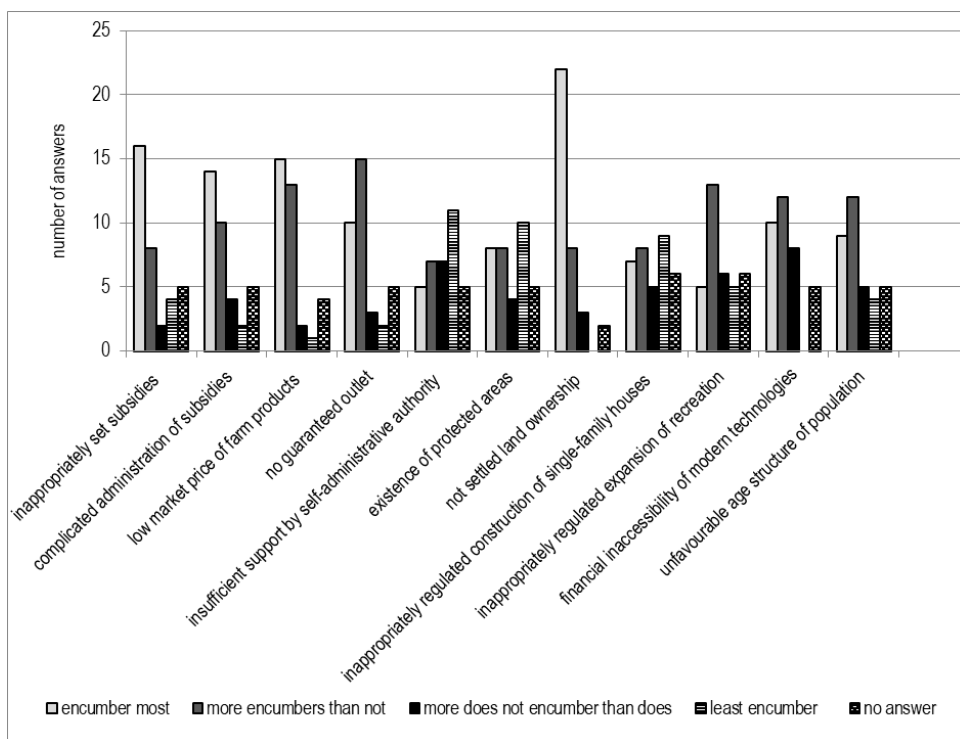
The selected sample of inhabitants trusts the village administration and conservationist associations with regards to sustainable agricultural land use; 60 % of respondents lean towards distrust of the inhabitants of the village; distrust also prevailed towards the cooperative, individual farmers and the Church (Fig. 8).

Fig. 8: The number of answers to the question: “To what extent do you trust the mentioned entities concerning the optimal use of agricultural land?”



Almost 60 % of respondents perceive unsettled land ownership as the biggest obstacle to agricultural activity in their cadastre. Almost half of them also feel that improperly-set rules for subsidies, as well as their complicated administration, and the low market price of farm products, are additional obstacles. Unsecured marketing and financial inaccessibility of modern technology, as well as the unfavourable age structure of the population, and inappropriate regulation of the development of recreation, are also considered barriers to agriculture. Respondents do not perceive the spontaneous development of construction of single-family houses and the existence of protected areas as significant obstacles. They are mostly satisfied with the support for optimal use of agricultural land by the municipality (Fig. 9).

Fig. 9: The number of particular answers to the question: “In your opinion, to what extent do the specified options present an obstacle to agricultural land use in your village?”



Key stakeholders' perceptions

The results of the semi-structured survey of the key stakeholders' perceptions are in Tab. 1. Land use changes had been perceived by the key stakeholders for almost all landscape elements, with representatives of the communal self-administration and the hunting association in particular offering detailed comments on the causes of these changes. They see potential for the development of animal production, wine making and vine growing; they are also inclined to agree with cleaning and reviving of the *Parížske močiare* swamp and diversification of the farmland lease. They trust the local inhabitants, local small farmers and the village council. The obstacles to the development of agriculture in their opinion include

a lack of reliable outlets, difficult access to land leases, unfavourable age structure of the population, and poor financial security of small farmers. Two stakeholders see the protected areas as limits to the development of agriculture. Many perceived obstacles to the development are identical with the perceived causes of changes in land use after 1990 (lack of secured outlets for farm products, improperly-set subsidies, low financial security of farmers, demographic aspects, etc.).

DISCUSSION

Comparison of perception of land use changes after 1990 between the local inhabitants and the key stakeholders revealed certain differences along with certain similarities. Key stakeholders perceived a wider range of changes in land use (diminishment of forest, changes in its species composition in favour of black locusts, overgrowth and shrinkage of vineyards, overgrowth of meadows and pastures, overgrowth of the Parížsky močiar swamp) and in biodiversity (increased number of weed species, wild boar, birds of prey, roe-deer and a decreased number of hares). Local inhabitants, in contrast, tended to pay attention to the changes in the productive parts of the land area (overgrowth of meadows and pastures, diminishment of gardens, increased area of vineyards) and to the decrease in natural elements (linear woody vegetation). Most of them also perceived a drop in biodiversity. Public perception of biodiversity loss was also recorded in other similar studies across the country (e.g. Špulerová *et al.*, 2017). It is possible then to agree with Kelemen *et al.* (2013) who assert that farmers directly experience biodiversity during their daily work. Therefore, their knowledge and perceptions can differ in many ways from those of other social groups. The representative of the cooperative farm in particular focused heavily on agricultural use. Interestingly, none of the key stakeholders mentioned orchards, although 40 % of local inhabitants perceived a decline of their area. The reason for this may be the fact that orchards disappeared mostly during the period of collectivisation of agriculture, and the present key stakeholders no longer regard them as an intrinsic part of the landscape mosaic. Fruit growing thrived in the village in the time between the two world wars, and was a part of the local agricultural system as the local inhabitants remember it. Older local inhabitants, who were predominant in our research, are probably more sensitive to changes in the use of parcels in the traditional vine-growing locality next to Drieňová hora hill. Many of them work, or used to work, small vineyards, orchards, gardens and fields in this area. As summarised by Lieskovský *et al.* (2013), abandonment of vineyards, particularly the smaller ones, was a continuous process that resulted from the economic and cultural changes after the transition to a market-oriented economy.

Perceptions of changes by the local inhabitants and the key stakeholders are slightly different. According to the local inhabitants, the disintegration of the cooperative farm in Nová Vieska village was the main cause of the changed land use, though economic and social causes are also listed as important factors. Key stakeholders cited economic reasons (economic decline, a lack of guaranteed outlets for farm products, and extreme bureaucracy connected with the sale of such products) as well as climate change and social causes (ageing of population, change of life style, immigration of people seeking recreation, departure of the young for the city). According to them, another quite important cause of the change is the disappearance of animal production in response to the overall increase in costs after 1990, which led to the overgrowth of pastures and meadows. This research confirmed that many causes of changed land use in the past, and obstacles to the development of agricultural production, apply to the whole country: specifically, the problem of the adverse population age structure, lack of secure outlets, improperly-set subsidy rules, and their burdensome

administration. Apparently, these are long-standing and serious problems which are difficult to solve. Inhabitants or stakeholders of other rural regions in Slovakia perceived similar obstacles to the development of agriculture to those expressed by the inhabitants of Nová Vieska village (e.g. Bezák & Mitchley, 2014; Lieskovský *et al.* 2015; Bezák & Dobrovodská, 2019). Most of the above-mentioned driving forces of agricultural land use change have been identified as significant across Europe by the review of van Vliet *et al.* (2015), while land abandonment or decreased land management intensity were found to be common in Central and Eastern Europe, following the shift to post-socialism. However, we must note that in Slovakia these concerns apply most to small size plots or small farmers in Slovakia, or farms in relatively inaccessible locations, while big farmers managing vineyards and arable land (both in general, and in the village under study) can better overcome problems with acquisition of subsidies, with marketing their products or with the accessibility of modern technology.

The results of the research into the perception of expected changes in land use over 20 years versus respondents' concepts of the ideal land use, in addition to being important information applicable to the planning of the territorial development of the village, also indirectly informs us about certain feelings or enthusiasms of the population concerning the development of the village. It can also be interpreted as an indicator of the potential of territorial changes from the point of view of human resources, but also as weak spots that should be taken into account when planning local development. Similar conclusions were reached by Izakovičová *et al.* (2022). Diametrical opposition between the expected changes and the concept of ideal land use in the cadastre of Nová Vieska village was found for meadows and pastures, gardens, orchards, groves and linear woody vegetation – in these cases, the local inhabitants expect decline in area or overgrowth, while preferring the opposite, that is, an increase in the area of these. Inhabitants are more optimistic in the case of vineyards as they expect their expansion, which agrees with their preferences. They also expect little change in the area covered by arable land and wetlands; either no change or a decrease in the area of water bodies; and either no change or an increase in built-up areas. Their concepts of ideal land use are closely connected with their stated preferences for the development of animal production, farm shops and traditional crafts. Support for the development of agritourism is not universal, although the majority of those asked support it. The different attitudes are possibly caused by concern about social fatigue after opening the village to strangers when pursuing agritourism activities. The disrupted development of social contacts caused by the transmigration of the Slovak and Hungarian ethnicities in the 20th century must be taken into account in this case. This was also manifested in answers given to the questions about the trust in selected entities, when the majority did not trust the local inhabitants or individual farmers. In contrast, the key stakeholders trust the locals and small farmers. This result matches the findings of a similar study in other rural regions of Slovakia (Bezák & Dobrovodská, 2019), as do the mixed responses regarding trust in local government. Trust of the population in the local municipal representation and the conservationist association provides a basis for deeper cooperation and respect of the ecological and economic limits of the development of this territory. The prevailing distrust of the inhabitants inter se and of the local farmers may delay the process of removing obstacles to agricultural development on the part of the responsible institutions.

As far as the attitude of the key stakeholders is concerned, the representative of the municipal administration expects the greatest changes in the forthcoming 20 years. It was key stakeholder No. 2, the representative of the hunting association, who commented in most detail on his concept of ideal land use in the cadastre of Nová Vieska village. He believes that the diversification of land leases is the basis for an optimal landscape structure, and would

provide a good solution to the issue of unsettled land ownership, perceived as the most serious obstacle to the development of agriculture by the local inhabitants. The issue of unfinished land consolidation was found to be an obstacle to farming for most Central East European countries (van Dijk, 2007) and has not yet been solved in many regions in Slovakia (GCCA, 2022). In the opinion of the representative of the cooperative farm, the sand pit, a rare bird habitat, also offers potential in terms of education and edification.

The remaining answers of the key stakeholders regarding obstacles to the development of agriculture roughly correspond to those of local inhabitants. However, the protected areas in the cadastre of Nová Vieska village are not perceived as a limitation by the local inhabitants, in contrast to the feedback from the key stakeholders. The prevalence of trust in the municipal administration constitutes an asset for the future development of the village.

CONCLUSIONS

As the results of our research suggest, the overall public awareness of past, present and future land use and the identification of the driving forces of rural development are good indicators for the development of multi-functional landscape.

Information obtained from local inhabitants and key stakeholders suggest that it is necessary to concentrate on the development of animal production and the ensuing management of meadows and pastures, development of small block orchards, gardens, arable land, small vine growing and wine making firms in the traditional agricultural area next to Drieňový vrch hill, and development of ecological husbandry. It is also necessary to provide assistance to small famers with the selection of and application for subsidies, to provide optimal solutions regarding land ownership or the mechanism of land lease, and to improve support for farm shops and marketing of farm products. Implementation of management measures for Parížske močiare swamp (especially reed mowing), providing for the use of reeds in the production of traditional craft products, planting of linear greenery and groves, and care for the forest are also desired by inhabitants. Development of tourism should be regulated; in particular, accommodation and agritourism should take into account the specific social features of the population. Respondents suggest that it is necessary to concentrate on regulated development of constructions with an emphasis on refurbishment of abandoned and decrepit structures (brick factory, stables). According to them it would be useful to realise the potential educational function of the sand pit with a habitat of bird associations, which is an important biocultural asset.

Furthermore, information from local inhabitants, accompanied by key stakeholders' attitudes, integrated with the scientific knowledge, would constitute a solid basis for the rural development planning in Nová Vieska village.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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