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Review / Pregledni znanstveni lanak

Owner's Opinion on Finished Land Consolidation Projects in Slovakia: Selected Cases

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ABSTRACT. Land consolidation (LC) is stagnating in Slovakia despite problems in landscape needing a resolution (including a huge land ownership fragmentation), allegedly also due to the resistance from the landowners. This contribution sought positions of owners in 4 areas with finished land consolidation (LC) projects and tried to verify the negative opinion in that matter. It also attempted to identify if there are some differences between groups of owners in perception. 15 question survey conducted by local, credible interviewers familiar with the topic has been applied to find out the answers. The research was motivated by personal experience of authors (as LC designers) with mandatory interviews of owners during LC project and the fact that a feedback on the project from the owners is not currently collected after the LC in Slovakia. There was no confirmation of rather negative positions of owners towards LC. Contrary to it, collected answers document a positive LC perception of respondents and allowed to confirm 3 key groups (higher educated middle-aged people, seniors with lower education and young adults) that demonstrate some differences in their positions. Authors tried to show that owners' feedback after a LC project could provide useful information and help to address potential issues including promotion of LC by adapting the approach with respect to the opinions of owners.

Keywords: land consolidation, questionnaire survey, perception, opinion, ownership, Slovakia.

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1. Introduction

Imagine a historical three-hectare field owned and worked by a single farmer. On average, three generations will have lived there over 100 years. The farmer has five children and, upon his death, they each inherit an equal share. Because three of them are well-meaning, they sign half of their property over to their children or their spouses. With the first generation of heirs, the field will now be owned by eight people. All of the five children have five children of their own and the result will be 25 co-owners of the field. Half of them have actually split the field to create 12 tiny, belt-like narrow plots while the other half (13 people) continue to farm in proportion. Out of these three owners, two sell their shares to strangers outside the family. Such fragmentation did go on for generations. Because of inheritance law, the original, single plot of arable land has now morphed either into dozens of smaller plots or a couple of larger plots with multiple co-owners, each with their own interests. Despite large-scale cultivation, fragmented ownership remained preserved in land that had been forcibly consolidated (for land use) in the socialist era. Any effort to create order from this chaos came only after 1989 with the appreciation of the value of land title. Fragmentation and the long-term failure to address it resulted, not just in Slovakia, in the necessity to optimize ownership and the location and shape of these properties (Muchová et al. 2017, Hudecová et al. 2017, Ilková et al. 2020).

Several sources (Janus and Markuszewska 2019, Wójcik-Leń et al. 2019, Odak et al. 2017) outline land consolidation as the most widespread instrument to settle fragmented ownership. The demand for it arose from the need to modify unfavourable distribution of land including agricultural parcels. According to Sonnenberg (2002), the objective behind land consolidation should be to merge multiple agricultural businesses or, in other words according to Demetriou et al. (2013), eliminate scattered plots on individual farms and merge certain fragmented land holdings into a single unit. Božek (2019) or Liu et al. (2019) claim that fragmentation can be addressed by consolidating a number of plots belonging to a single owner into an optimal shape and size with guaranteed access. In general, most definitions present land consolidation as an instrument to 1) organize ownership (land use, title, and other rights) and 2) provide special physical planning (roads, landscape management, soil protection, erosion control).

FAO (2008) also mentions the sometimes-incorrect interpretation of land consolidation as a simple redistribution of land to remove the consequences of fragmentation. Especially in the late 20th century, it was transformed into a rural development instrument with multi-purpose objectives that can be further used to improve infrastructure (Lin et al. 2019, Baranowska et al. 2019), enhance landscape and nature conservation (Lisec and Pintar 2005, Špulerová et al. 2018), develop various recreational areas (Vitikainen and Tech 2004) and optimize rural environments (He et al. 2019). Land consolidation's multifunctionality is particularly emphasized, or comments are made about comprehensive reallocation of rural land and sustainable development in (Yu et al. 2018, FAO 2008). For example, Lisec et al. (2014) assert its main objective to

be about improving property structure and, where necessary, to support landowners and land users by building new road infrastructure to encourage rural development and putting more land into agricultural production.

Sonnenberg (2002) claims the same, while land consolidation may also include the development of road and water infrastructure (Tarnik and Igaz 2020, Huska et al. 2017, Pagáč et al. 2018), drainage networks (Kirmikil and Arici 2013) and any other infrastructures in the consolidated land. It will be transformed into a wider instrument for rural development when more objectives besides agriculture are included (van der Molen et al. 2005). In addition to reducing land fragmentation, land consolidation can also aid in the improvement of natural conditions and thus enhance livelihood. It should be a tool for managing the environment and conserving nature, or at least take them into account (Cegiel-ska et al. 2018). These instruments should also include many other concerns, with land consolidation being a part of wider rural and suburban development (Pašakarnis and Maliene 2010).

Despite the apparent benefits, land consolidation is having difficulty in Slovakia catching the general public's attention as an instrument benefiting individuals, communities, businesses and the government, also improving agriculture, farmland market and tax collection (Colombo and Manuel 2019). It is also evolving slowly towards comprehensive infrastructure measures (Muchov and Petrovi 2019, Koick et al. 2018). In order to establish a suitable approach, it is necessary for the views of the residents and landowners that de facto own the land, work it, rent it and live in the particular environment to be respected. Similar analyses of active participants have been published in many studies, e.g. Muchov (2019) and Noszczyk et al. (2017).

Land consolidations are stagnating in Slovakia, for more than a decade now, one of excuses being alleged negative stance of owners towards LC (which contradicts personal experience of the authors). This contribution tries to show that owners' feedback after a LC project could provide useful information and help to address (perceived) potential issues including promotion of LC.

The objective of this paper is to find out the positions of respondents involved in land consolidation toward the entire process and show if their perception of LC is indeed negative and they refuse it for whatever reasons. If this is not the case, it could mean that owners might support LC as means to address issues in the landscape if their interests are respected and they are appropriately approached by the other stakeholders. Moreover, the homogeneity of the LC perception among the owners is of interest. If it varies due to the structure of the owners, there might be a need and, also, a possibility to address the respective groups (their objectives, interests, and concerns) differently to achieve a satisfactory consensus.

In particular, this contribution seeks assessment on two expectations (hypotheses): 1) the opinion of participants about land consolidation projects is rather negative; 2) there are identifiable differences in positions between groups of owners based on education, age and maybe gender.

2. Materials and Methods

Land consolidation requires developers to cooperate with landowners and tenants. Land can only start to be consolidated when a legal interest in it has been declared in accordance with the Land Consolidation Act [1991]. It can be initiated by the government for comprehensive land consolidation typically covering an entire cadastral district, or when a group of participants or investors wish to address a specific area for a specific purpose, i.e. a simple land consolidation. Each land consolidation is under the umbrella of a government authority guaranteeing compliance with applicable legislation. It supervises mandatory communication between the contractors, other participants and local authorities and is wholly based on a symbiosis of legal procedure and dialogue. Land consolidation is divided into phases where the first is fact-finding both on site and in Land Registry databases. The next stage is to set out land arrangement principles for new landscape exploitation and conservation. Proposed new land arrangement is discussed by the project contractor individually with each participant. Once all the objections have been addressed, plots are staked out and the whole consolidation is recorded in the Land Registry as new graphical and written data for the area concerned. To date, there have been 431 comprehensive land consolidations recorded in Land Registries throughout Slovakia Fig. 1.

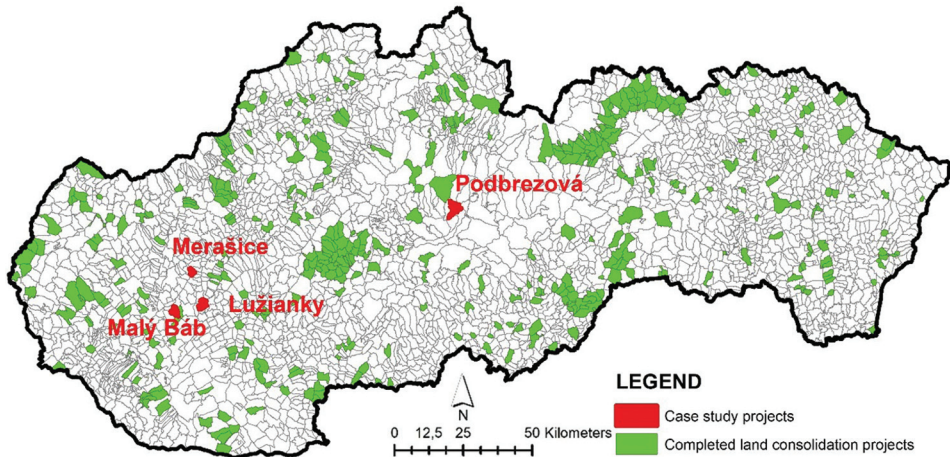


Fig. 1. Overview of completed land consolidation projects (green) in Slovakia, including locations of the case studies (red) (Merašice – 48°27'43"N 17°56'51"E, Malý Báb – 48°18'42"N 17°52'15"E, Podbrezová – 48°48'37"N 19°32'20"E, Lužianky – 48°20'30"N 18°01'55"E).

A survey was conducted to find out satisfaction with land consolidation (LC) and collect opinions about it in the cadastral areas of Malý Báb, Merašice partial

results in Muchov et al. (2015), Podbrezov and Lužianky, where finished projects have already been recorded in the Land Registry. Projects have been finished at the costs of €347,000 (Mal Bb), €202,000 (Merašice), €524,000 (Podbrezov) and €324,000 (Lužianky), according to registration documents. Some details regarding these land consolidations are included in Tables 1 and 3.

Table 1. *Basic information on land consolidation projects in model areas.*

	Start (date)	End (date)	Duration (years)	Area (ha)
Mal Bb	01.06.2005	28.12.2011	6	879
Merašice	27.02.2009	05.11.2014	6	443
Podbrezov	30.07.2003	13.07.2009	6	1856
Lužianky	03.03.2003	30.01.2012	8	1656

Data presented and discussed in this paper are responses to a questionnaire. The 15 questions have been based on personal experience of authors (as LC designers) with mandatory interviews of owners during LC projects. The questions have also been consulted with some of the elected representatives of owners (active at the time of the LC project). The whole questionnaire concerns only one type of land consolidation – a complex state-financed land consolidation. A feedback on the project from the owners is not currently collected after the LC. This is one of the reasons why model areas have been selected where such projects have already taken place, the other one being the availability of credible interviewers familiar with LC. The interviewers were residents (known for impartiality and genuine interest in opinions of the respondents) familiar with the local conditions. The questions were asked always in person, the interviewer guided the conversation. The deliberately simple questions were oriented on identifying possible problem area(s). It was the local interviewer who had the opportunity to explain what was not obvious to the owner even after the LC project. The interviewer was not bound by the order of questions, except the first and the last three ones. The interviewer also recorded any additional information that emerged during the interview and was discussed, except the identity of the respondent. Answers to questions have been collected in binary form. Yes (Muchov et al. 2017) meaning complete agreement, full satisfaction, clearly positive response. No (0) represented all other cases of reactions (i.e. negative, missing / refused, unclear / partial). 306 questionnaires in total were completed: 60 in Mal Bb, 86 in Merašice, 60 in Podbrezov and 100 in Lužianky. Appendix 1 shows how the survey was worded. Groups of respondents are given in Table 2.

Table 2. Respondent groups by parameter categories.

Parametric information		Categories	Percentages by locality [%]				
			Malý Báb	Merašice	Podbrezová	Lužianky	Slovakia
Gender	1	female	48	34	52	58	48
	2	male	52	66	48	42	52
Age	1	18–24 years-juniors	23	24	28	22	15
	2	25–64 years-working age	33	50	42	47	69
	3	Over 65 years-seniors	44	26	30	34	16
Education	1	Secondary schools education or less	72	77	52	62	80
	2	Higher education or university	28	23	42	40	20

The items in the questionnaire (Appendix 1) were divided into three categories:

- Category 1 (Questions 1–3) inquire into whether the randomly approached respondent has already heard of land consolidation and whether he/she has actively participated therein. If yes, the interviewer asks the Category 2 questions. If no, the interviewer skips Category 2 and asks the Category 3 questions instead.
- Category 2 (Questions 4–12) provide specific information to determine the impressions the respondents actively participating in land consolidation, ascertaining its positives and negatives from their own perspective.
- Category 3 (Questions 13–15) provide parametric information, namely AGE, GENDER and EDUCATION. This information Table 2 is used to subsequently seek dependencies.

Common methods of descriptive statistics and cluster analysis (<http://cran.r-project.org>) were used to evaluate the data collected, while contingency table

analysis with chi-squared testing (p -value < 0.05) was deployed to investigate the dependence between the answers and GENDER (1 = female; 2 = male), AGE (1 = 18–24 years – juniors; 2 = 25–64 years – working age; 3 = over 65 years – seniors) and EDUCATION (1 = secondary school education or less; 2 = higher education or university). Cronbach alpha for the first two categories of questions has been determined ($\alpha = 0.851$) to check the reliability and correlations (Spearman rho) between answers in the selected localities have been checked to assess eventual differences among those.

Table 3. *Basic information on ownership before and after land consolidation.*

	Malý Báb		Merašice		Podbrezová		Lužianky	
	before	after	before	after	before	after	before	after
Number of ownership relations	7673	2867	1533	415	36876	13823	6957	2351
Number of parcels	1600	1336	420	324	2928	1782	1250	1656
Average number of co-owners per parcel	4,8	2,15	3,47	1,28	11,87	7,76	4,26	1,42
Average number of parcels per owner	7,85	2,93	6,31	1,74	11,54	0,62	5,46	1,85
Average area per parcel (ha)	0,55	0,65	0,99	1,35	0,51	0,89	0,60	0,57
Study area (ha)	879		438		1596		980	

Obvious limitation of this study is its size. Therefore, as simple means as possible (including the questions, presentation and evaluation of the collected data) have been used. Nevertheless, it may indicate some trends in owners' opinion about land consolidation that might even be different from positions of decision makers and other influencers.

2.1. Land consolidation in Slovakia

Land consolidation arose from the historical perception of inheritance law when land was parcelled and the different parcels were inherited by all heirs of a deceased landowner equally (Hudecová et al. 2017); significantly increasing the number of owners over time. Owners would eventually lose track of

the land they actually own, with no idea of the location and, in many cases, no way to claim it because they only have shares of the land. The enormous ownership chaos has been described in studies, e.g. Uhlík (2014), Muchová et al. (2017). The basic contradiction of socialism, where people owned the land, but could not use it or farm it, contributed to the need to address both title to the land and managing it. Agricultural workers were employed by cooperatives and symbolically received rent in kind. More on the history of these agricultural cooperatives can be found elsewhere, e.g. Ilková et al. (2020). The change of regime in 1989 drove society to address these issues and the legal framework was established in the Land Consolidation Act [1991] prior to the dissolution of Czechoslovakia (Muchová et al. 2017). The amended Act is still applied in Slovakia today. Despite sophisticated technology and legislation, land consolidation has not become a priority and is currently stagnating (Leitmanová et al. 2015).

3. Results

In all cadastral areas, the respondents' answers to Questions 1 and 7 tended to be positive Table 4, with the vast majority of respondents clearly replying 'yes'. In Question 1, 89% of respondents had heard of land consolidation, while only 11% had not. More than 87% of respondents answered 'yes' to question 7; in other words, they knew where their properties were located, which can be interpreted as them taking an active interest therein. Most respondents gave positive answers to Questions 2 and 12, but there was a greater share of negative answers recorded. Respondents perceived land consolidation positively, had been reasonably informed about their property even before the land started to be consolidated and they would agree to land consolidation if they were asked again.

Negative answers were recorded in all cadastral areas for Question 9 except in Merašice, which had a larger percentage of 'yes' answers. Three cadastral areas rate negatively awareness with respect to addressing environmental issues.

Opposing answers were recorded for Questions 4, 5, 6, 10 and 11. While in Malý Báb, Podbrezová and Lužianky respondents felt that they had benefited from the consolidation of their lands, results from it were viewed as not having been met in Merašice. Respondents in Malý Báb and Podbrezová believed that the procedures had not been sufficiently explained to them, while the opposite was claimed in Merašice and Lužianky. Respondents in Malý Báb, Podbrezová and Lužianky saw the benefits in the new land arrangement, while no changes were noticed in Merašice. Respondents in Malý Báb were unhappy about the contribution to common facilities and measures, yet in Merašice, the survey confirmed 100% satisfaction since the contribution was zero, meaning the owners contributed nothing to common facilities and measures. In Lužianky and Podbrezová, the need for contribution was understood, although the opinions of the respondents varied with respect to satisfaction with the approach

of the land consolidation designer and other government stakeholders. While satisfaction with the approach prevailed in Podbrezov, both in Merašice and Lužianky negative answers prevailed by a narrow majority and respondents in Mal Bb were the least happy with the approach.

Table 4. Summary percentage of 'yes' answers to survey questions regardless of education, age and gender.

Answers [%]	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Mal Bb	90	77	48	57	47	65	82	33	27	42	48	57
Merašice	90	58	68	46	63	39	83	20	39	100	51	68
Podbrezov	81	78	56	77	48	54	77	17	65	71	88	66
Lužianky	91	74	84	70	77	72	95	19	48	67	53	75

The last three survey questions (Q13E, Q14A and Q15G) cover GENDER, EDUCATION and AGE and it was these parameters whereby the respondents were evaluated. The dendrogram Fig. 2 shows the similarity of the responses among the respondents sorted by their age, gender and education. The first digit in the three-digit code is 1 = female, 2 = male; the second digit: 1 = lower education, 2 = higher education; and the third digit: 1 = young; 2 = middle age; 3 = senior.

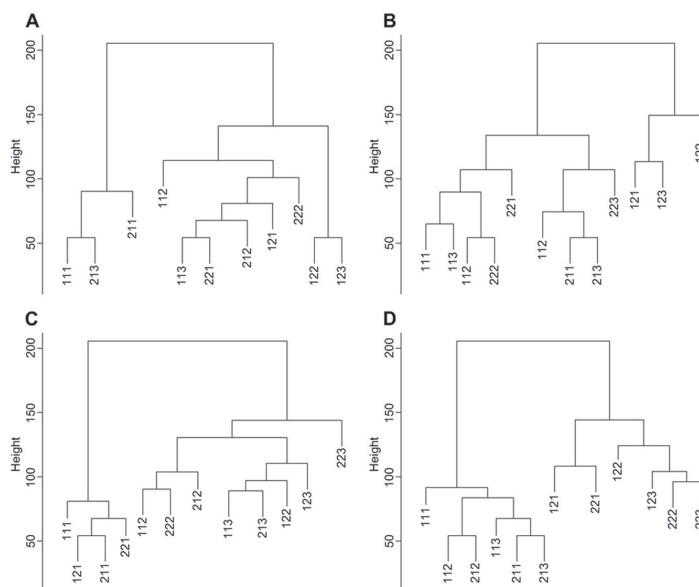


Fig. 2. Dendrogram – Diana (divisive hierarchical clustering) for all available (non-empty) GENDER (1 or 2), EDUCATION (1 or 2) and AGE (1, 2 or 3) of respondents in: A) Mal Bb, B) Merašice, C) Podbrezov, D) Lužianky.

The results Tables 5–7 were analysed for possible dependencies on education, age or gender (chi-square with p -value < 0.05). In Mal Bb, replies to Questions 6 and 9 appeared to be gender dependent, Question 12 to be education dependent and Questions 2, 11 and 12 age dependent. On the other hand, replies to Question 1 were gender dependent in Meraice and yet no replies were gender dependent in Luianky, where replies were education dependent in the case of Questions 2, 4, 5, 6, 8, 9, 10, 11 and 12, and age dependent in Questions 3, 6, 7, 8, 9, 10 and 11. There were no replies dependent on gender and education to the questions in Podbrezov, while replies to Question 12 were education dependent and to Questions 1, 2, 3, 8 and 12 were age dependent.

Table 5. Percentage of 'yes' answers to gender-related questions.

Answers [%]	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Gender
Mal Bb	97	79	59	62	55	79	86	41	31	59	59	62	1
	84	74	39	52	39	52	77	26	23	26	39	52	2
Meraice	86	52	55	56	75	44	88	31	19	100	50	63	1
	93	59	75	42	65	44	86	21	35	100	51	67	2
Podbrezov	81	74	58	42	29	29	35	13	32	42	48	32	1
	83	83	55	48	28	34	55	7	45	41	55	48	2
Luianky	90	76	83	75	83	77	98	25	48	69	58	77	1
	93	71	86	64	69	67	92	11	50	67	47	72	2

Table 6. Percentage of 'yes' answers to education-related questions.

Answers [%]	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Educa- tion
Bb Mal	51	44	60	77	35	23	35	44	47	51	44	60	1
	71	53	76	94	29	35	59	59	82	71	53	76	2
Meraice	46	61	39	85	24	26	100	46	61	46	61	39	1
	46	92	62	92	23	46	100	69	85	46	92	62	2
Podbr- ezov	77	74	57	51	31	31	43	11	40	43	54	49	1
	88	84	56	36	24	32	48	8	36	40	48	28	2
Luianky	95	95	92	94	97	97	100	0	89	97	86	94	1
	89	61	79	52	63	54	92	33	19	46	29	60	2

Table 7. Percentage of 'yes' answers to age-related questions.

Answers [%]	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Age
Mal Bb	86	79	36	64	43	64	86	36	21	50	50	57	1
	90	95	45	60	60	75	85	25	20	40	70	80	2
	92	62	58	50	38	58	77	38	35	38	31	38	3
Meraice	76	43	57	33	83	42	100	8	33	100	50	67	1
	95	65	73	50	69	44	78	34	34	100	47	69	2
	95	52	71	47	53	47	93	13	20	100	60	60	3
Podbrezov	47	41	6	6	0	6	6	6	6	6	6	12	1
	96	96	88	64	52	40	68	12	60	64	80	44	2
	94	89	61	56	22	44	50	11	39	44	56	61	3
Luianky	76	62	67	64	79	64	71	0	71	64	57	64	1
	91	80	87	80	85	85	100	18	73	85	70	83	2
	100	73	91	60	67	60	100	30	7	47	30	70	3

4. Discussion

Responses in Meraice and Luianky were generally similar, with some differences from Mal Bb and Podbrezov Table 8. Here, it can be assumed that the reasons are connected to the approach of planners and other authorities (mayor, deputies, state administration, etc.) that influenced the overall impression and the credibility of the land consolidation (LC) process. It appears that in Podbrezov, the approach of both the project contractor and the state administration has been evaluated very positively. The approach in Mal Bb was not rated very favourably. The contribution to common measures and facilities (which is related to awareness that is associated to the very approach) might have also played a role. Based on the replies given, the respondents clearly knew about the existence of land consolidation (89% gave positive answers) and they also overwhelmingly perceived it as positive (70%), especially by owners with title to a number of scattered properties and having unified it through consolidation. However, some respondents also replied that it had not helped them at all, but rather gave them the impression of the land they had received to be not equally valuable. The reason they provided was the decreased amount they had received for renting the land under the new arrangement. This is considered by us to be unfounded since the legislation governing consolidation does not allow an owner to be disadvantaged either financially or qualitatively when the land is consolidated, with respect to the quality of the land on the allocated plot. Here is where the lack of awareness about the legally defined basic principles of adequacy in the original and new land is noticeable. Hostile interpersonal relationships between neighbours also played a role, with frequent objections to the location of their land relative to adjacent land. People are aware of the

inconsistencies and chaos in property ownership (records) introduced in the period of socialist regime (1948–89) because they encounter this phenomenon in other areas of their lives. Naturally, they are aware of the desirability of remedying the situation. Due to insufficient information, however, some are unable to assess whether land consolidation is a suitable solution, which is also accompanied by their natural human fear of the unknown.

Unfortunately, it is not until the land has been consolidated that the benefits from it are fully perceptible by a simple comparison, with no complicated explanations, of title to the land before and afterwards. 62% of respondents clearly stated that consolidating the land had helped them, while the remainder had doubts that can be spread to other future consolidation participants.

Contribution to common facilities and infrastructure for optimizing and functionally organizing the landscape, such as the road network, the water management and erosion control system, the environmental and landscape design system, is seen rather negatively because land consolidation participants provide a certain percentage of their ownership free of charge for a purpose which, at the time of delivery, is on an imaginary plane with no specification of a concrete use and goal, so they are unable to assess either the costs and benefits or the return. Government-owned land, either national or local, is preferably used for collective contribution, yet if there is not enough of it to cover proposed common facilities and infrastructure, the owners themselves have to contribute toward it in proportion to the amount of land they own. Experience has shown this contribution seldom to exceed 5%. Naturally, there is satisfaction if there is no contribution. This was the case in Merašice where owners did not contribute any land.

Owners had shown active interest in their property even before the land was consolidated, stating that no new property was discovered during the consolidation that might have been lost to them due to historical events. Land consolidation also provided further in-depth revision of existing titles which, in certain cases, may have alerted owners to undiscovered property. The quality of records is confirmed by the replies to this question. The respondents had taken good care of their property even before the land was consolidated. Once it was completed, they had better information about where their land had been located and where it was now.

There were statements about insufficient explanation of the landscape aspects of the consolidation (more than half of all respondents replied negatively). Past separation of ownership from land has caused a lack of any natural perception of the need for nature conservation through environmental elements, and a lack of awareness of the landscape's aesthetic and recreational potential. This situation is assumed to improve gradually as ecology and the environment are becoming more important, particularly in the need to adapt to climate change. It is also desirable to make the local landscape attractive for business, live, vacation or investment. Raising awareness well in advance of any land consolidation is necessary.

5. Conclusion

Respondents (in the selected areas after finished project) are well aware of land consolidation, grasp it positively and consider it in a certain way useful because it contributes to a better understanding of the land they own, and a majority would even agree to further consolidation, which also suggests that using arguments about negative stance of owners towards projects to excuse the long-term stagnation in Slovakia might not be generally correct. Negative perception of some topics seems to be caused by an insufficient comprehension of the environmental aspects and of land consolidation as a whole. Obviously, the approach of planners and authorities affects the perception as well.

The results also show a positive perception of land consolidation (67%), where the owners would agree to it again in their cadastral district. Nevertheless, they added that, in light of their current experience, they would have approached it more responsibly and sought more information, e.g. through elected representatives of owners inquired more about possibilities of management and protection of the landscape, regional development, protection of the area against floods, water and wind erosion, drought, etc. This also means that the complex state-financed land consolidation stagnation in Slovakia, for more than 10 years now, might be due to missing political consensus (will). A negative stance of owners towards LC which contradicts personal experience of the authors and presented results can't be generally used as an excuse.

The contractor's communication and approach toward land consolidation and how it was administered was also considered questionable. Cooperation was rated as standard, with criticism of the lengthy negotiations. Land consolidation was not usually explained sufficiently, with only 57% of the respondents expressing satisfaction with the approach taken. This can be seen as a major problem since it is the lack of will to re-explain particular land consolidation phases that leads to tension and disagreement which, in turn, cause misunderstandings of the whole process. On the other hand, owners themselves often ignore and not pay enough attention to land consolidation information. It has also been argued that awareness in such a long process is problematic and participants often fail to notice an important deadline due to inundation by other life-related obligations.

Table 8. Percentage of 'yes' answers to questions regardless of education, age and gender.

Answers [%]	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
yes	89	70	67	62	63	61	87	24	41	70	57	67

One of identified groups comprises middle-aged, university-educated respondents who believe consolidation to be an adequate instrument for addressing a

wide range of land ownership and development issues. This was an anticipated result. It can be assumed that most of them own land of a certain size that they inherited, purchased or legally acquired. Their education evokes the potential of sophisticated land use to manage the property as a source of income. Managers of agricultural enterprises also belong to this group.

Among less educated seniors, some aspects of the land consolidation process are seen negatively, (bad) experience (from the past) prevails in this group. Members of this group also fail to fully understand the proportionality criteria that they confuse for market price.

In our opinion, another key group is composed of young people up to 24 years of age, whose answers showed ignorance, uncertainty and especially very limited knowledge of the entire process. It is not as surprising. Nevertheless, those young people are (contemporary educated) adults that did experience the land consolidation either personally or through their family / community as (future) owners. The LC process could be made more engaging for younger people through support of their interests.

In view of the findings, further attention can be directed toward the following areas:

- Summarizing ownership in terms of location, proportion and overall structure before land consolidation starts, while encouraging owners to be actively engaged with their own property regularly and not just while the land is being consolidated when many uncertainties and questions provoke discussion and also slow down the consolidation.
- Finding appropriate ways to explain current land ownership conditions and issues in historical context and introduce the technical aspects of Land Registry data.
- Pointing out the benefits of land consolidation, making land ownership more transparent and, in particular, opening up the land market.
- Using real-world examples of landscape creation and conservation, and the positive experiences of landowners and tenants therefrom after land has been consolidated.
- Consolidating land with no lengthy preparatory administration.
- Promoting the idea of returning life and leisure activities as well as sports activities to the countryside and increasing rural attractiveness (building aesthetic, landscape and protective features and providing access to them).
- Improving communication among land consolidators, administrative bodies and other stakeholders not only during consolidation itself, but also by raising awareness about the entire process and its benefits and objectives.

Identified key groups consist of middle-aged respondents with higher education (perceiving it as an adequate instrument), seniors with a lower level of education (conservative, with distrust based on past negative experiences) and younger people (lacking awareness and knowledge). These respondent groups should be appropriately engaged in future by improving communication and

raising public awareness through the use of positive examples and information campaigns.

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Appendix 1

Q1 – Have you heard of land consolidation?

Q2 – Do you perceive land consolidation as positive?

Q3 – Have you been an active participant of land consolidation before?

Q4 – Do you feel that land consolidation helped you with something?

Q5 – Have the procedures of land consolidation project been sufficiently explained to you?

Q6 – Do you have better overview of your ownership/property than before the land consolidation project?

Q7 – Do you know the location of your parcels now?

Q8 – Have new parcels been discovered during the land consolidation project you were unaware of?

Q9 – Do you have information about environmental aspects of the land consolidation project?

Q10 – Do you agree with the contribution for common facilities and measures?

Q11 – Do you evaluate the approach of planners and other participants (mayor, deputies, authorities, etc.) positively?

Q12 – Based on your experience, would you agree (again) with the initiation of a project in your cadastral area?

Q13E – Have you completed (technical) university (bachelor, master, engineer)?

Q14A – Age of respondent (determined by interviewer!)

Q15G – Gender (determined by interviewer!)

References

- Baranowska, A., Zarzecka, K., Rudzki, Z. (2019): The Process of Land Consolidation as the Element of Arranging Rural Space on the Example of the ubka and Zaliszcze Villages, *J. Ecol. Eng.*, 20, 9–15.
- Boek, P. (2019): Determining the parameters of arable land fragmentation, *Geod. Cartogr.*, 68, 163–176.
- Cegielska, K., Noszczyk, T., Kukulska, A., Szylar, M., Hernik, J., Dixon-Gough, R., Jombach, S., Valanszki, I., Filepn Kovacs, K. (2018): Land use and land cover changes in post-socialist countries: Some observations from Hungary and Poland, *Land use policy*, 78, 1–18.
- Colombo, S., Manuel, P.-V. (2019): A practical method for the ex-ante evaluation of land consolidation initiatives: Fully connected parcels with the same value, *Land use policy*, 81, 463–471.
- Demetriou, D., Stillwell, J., See, L. (2013): A new methodology for measuring land fragmentation, *Comput. Environ. Urban Syst.*, 39, 71–80.
- FAO (2008): Opportunities to mainstream land consolidation in rural development programmes of the European Union, Italy.
- He, Q., Tan, S., Yin, C., Zhou, M. (2019): Collaborative optimization of rural residential land consolidation and urban construction land expansion: A case study of Huangpu in Wuhan, China, *Comput. Environ. Urban Syst.*, 74, 218–228.
- Hudecov, L., Geisse, R., Gaincov, S., Bajtala, M. (2017): Quantification of Land Fragmentation in Slovakia, *Geodetski list*, 71(94), 4, 327–338.
- Huska, D., Jurik, L., Tatošov, L., ˇSinka, K., Jakoboviov, J. (2017): Cultural landscape, floods and remote sensing, *J. Ecol. Eng.*, 18, 31–36.
- Ilkov, Z., Lazikov, Z., Bandlerov, A., Lazikov, J. (2020): Development of the Legal Regulation of the Cooperative in Slovakia, *EU Agrar. Law*, 8, 6–16.
- Janus, J., Markuszewska, I. (2019): Forty years later: Assessment of the long-lasting effectiveness of land consolidation projects, *Land use policy*, 83, 22–31.
- Kirmikil, M., Arici, I. (2013): The role of land consolidation in the development of rural areas in irrigation areas, *J. Food, Agric. Environ.*, 11, 1150–1155.
- Koick, E., Diviakov, A., Koick, D., Belanov, E. (2018): Territorial system of ecological stability as a part of land consolidations (cadastral territory of Galanta – Hody, Slovak Republic), *Ekol. Bratislava*, 37, 164–182.
- Leitmanov, M., Baik, J., Muchov, Z. (2015): New methods for gathering the spatial data from land consolidation project, *Sci. Acta Circumiectus. Form.*, 14, 1, 125–133.
- Lin, Y., Ye, Y., Wu, C., Yang, J., Hu, Y., Shi, H. (2019): Comprehensive assessment of paddy soil quality under land consolidation: A novel perspective of microbiology, *PeerJ*, 1–22.
- Lisec, A., Pintar, M. (2005): Conservation of natural ecosystems by land consolidation in the rural landscape, *Acta Agric. Slov.*, 85, 1, 73–82.
- Lisec, A., Primoi, T., Ferlan, M., ˇSumrada, R., Drobne, S. (2014): Landowners' perception of land consolidation and their satisfaction with the results – Slovenian experiences, *Land use policy*, 38, 550–563.

- Liu, J., Jin, X., Xu, W., Sun, R., Han, B., Yang, X., Gu, Z., Xu, C., Sui, X., Zhou, Y. (2019): Influential factors and classification of cultivated land fragmentation, and implications for future land consolidation: A case study of Jiangsu Province in eastern China, *Land use policy*, 88, 104185.
- Muchov, Z. (2019): Assessment of land ownership fragmentation by multiple criteria, *Surv. Rev.*, 51, 265–272.
- Muchov, Z., Petrovi, F. (2019): Prioritization and evaluation of land consolidation projects-itava River basin in a Slovakian case, *Sustain.*, 11, 1–12.
- Muchov, Z., Baik, J., Petrovi, F., Hreko, J., Konc, L., Michal, P. (2015): Perception of land consolidation by landowners: A case study, *Folia Oecologica*, 42, 2, 113–121.
- Muchov, Z., Leitmanov, M., Juskov, K., Konc, L., Vaek, A. (2017): Identification of stagnation reasons in the field of land consolidation in Slovakia compared with the Czech Republic, *J. Water L. Dev.*, 33, 141–148.
- Noszczyk, T., Hernik, J., Glowacka, A., Taszakowski, J. (2017): Preventing and resolving social dissatisfaction in spatial management in rural areas, *Eng. Rural Dev.*, 16, 1057–1063.
- Odak, I., Tomi, H., Masteli Ivi, S. (2017): Vrednovanje fragmentacije poljoprivrednog zemljita, *Geodetski list*, 71(94), 3, 215–232.
- Pag, J.,inka, K., Konc, L. (2018): Assessment of compliance with the delimitation erosion control criteria in the Nitrica river basin, Slovakia, In *Proceedings of the SGEM 2018*, Sofia, 95–102.
- Paakarnis, G., Maliene, V. (2010): Towards sustainable rural development in Central and Eastern Europe: Applying land consolidation, *Land use policy*, 27, 545–549.
- Sonnenberg, J. K. B. (2002): Fundamentals of Land Consolidation as an Instrument to Abolish Fragmentation of Agricultural Holdings, *Proc. FIG 12th Int. Congr.*, 1–12.
- pulerov, J., Petrovi, F., Mederly, P., Mojses, M., Izakovicov, Z. (2018): Contribution of traditional farming to ecosystem services provision: Case studies from Slovakia, *Land*, 7.
- Trnik, A., Igaz, D. (2020): Spatial scale analysis of soil water content in agricultural soils of the Nitra river catchment (Slovakia), *J. Ecol. Eng.*, 21, 112–119.
- Uhlk, V. (2014): Land consolidation in Slovakia, In *Proceedings of the 22. Slovensk geodetick dni*, 1–10 (in Slovak).
- van der Molen, P., Lemmen, C., Uimonen, M. (2005): Modern land consolidation: Multipurpose approach for modern land consolidation, In *GIM International*, 1–3.
- Vitikainen, A., Tech, D. S. (2004): An Overview of Land Consolidation in Europe, *Nord. J. Surv. Real Estate Res.*, 1, 124–136.
- Wjcik-Le, J., Le, P., Mika, M., Kryszk, H., Kotlarz, P. (2019): Studies regarding correct selection of statistical methods for the needs of increasing the efficiency of identification of land for consolidation – A case study in Poland, *Land use policy*, 87.
- Yu, D., Wang, D., Li, W., Liu, S., Zhu, Y., Wu, W., Zhou, Y. (2018): Decreased landscape ecological security of peri-urban cultivated land following rapid urbanization: An Impediment to sustainable agriculture, *Sustain.*, 10.

Mišljenje vlasnika o završenim projektima okrupnjavanja zemljišta u Slovačkoj: izabrani slučaji

SAŽETAK. Okrupnjavanje zemljišta stagnira u Slovačkoj unatoč problemima u krajoliku koji zahtijevaju odlučnost u rješavanju (uključujući ogromnu rascjepkanost vlasništva nad zemljištem), a također i zbog otpora vlasnika zemljišta. Ovaj rad je istražio mišljenja vlasnika u 4 područja u kojima su završeni projekti okrupnjavanja zemljišta te pokušava provjeriti negativno mišljenje vezano uz ta pitanja. Također, pokušalo se identificirati postoje li neke razlike u mišljenjima između skupina. Kako bi se pronašli odgovori, provedena je anketa metodom upitnika s 15 pitanja koju su proveli lokalni vjerodostojni ispitivači upoznati s ovim područjem. Istraživanje je bilo motivirano osobnim iskustvom autora (kao dizajnera okrupnjavanja zemljišta) stečenim u obveznom intervjuiranju vlasnika kroz projekt okrupnjavanja zemljišta te činjenicom da povratne informacije od vlasnika trenutno nisu prikupljene nakon okrupnjavanja zemljišta u Slovačkoj. Nije bilo potvrde o prilično negativnim mišljenjima vlasnika o okrupnjavanju zemljišta. Naprotiv, prikupljeni odgovori dokumentiraju pozitivno mišljenje ispitanika o okrupnjavanju zemljišta te omogućavaju potvrđivanje 3 skupine (visokoobrazovni ljudi srednjih godina, starije osobe s nižim stupnjem obrazovanja i mlađe osobe) među kojima su iskazane neke razlike u mišljenju. Autori su pokušali pokazati da bi povratne informacije vlasnika nakon provedbe projekta okrupnjavanja zemljišta mogle pružati korisne informacije te pomoći u rješavanju eventualnih problema uključujući promociju okrupnjavanja zemljišta uz prilagodbu pristupa na temelju mišljenja vlasnika.

Ključne riječi: okrupnjavanje zemljišta, anketa metodom upitnika, percepcija, mišljenje, vlasništvo, Slovačka.

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