

LAND CONSOLIDATION IN SLOVAKIA, WHERE IT HANGS?

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Abstract

Land consolidations in Slovakia are regarded as an instrument for solution of ownership fragmentation in accordance to rural development. In the introduction of this paper, we describe problems in Slovakia associated with the ownership fragmentation. Country, rural areas were significantly influenced by the period of collectivization. The benefits of land consolidation project are shown in a case study area for Kanianka cadastre. We compare ownership relations before and after the land consolidation. Statistical values as number of resolved ownerships by LC, number of plots and average size of plots are shown. New infrastructure, water management and ecological elements are discussed. In conclusion, we give the reason why activities related to land consolidation in Slovakia stagnates despite positive response.

Key words: land consolidation, ownership fragmentation, land consolidation project, rural development, Slovakia.

Introduction

If we want to evaluate the process of land consolidation, we need to consider two major problems. The first is a specific problem of ownership fragmentation in Slovakia. The second problem is related to the landscape development, which was significantly influenced by the course of history.

Problems with land fragmentation

High number of land co-owners is typical for Slovakia. Average number of co-owners' shares per one plot is 11.11 (Urban, 2013). In some cases, plots are only 2 m wide, but 700 m long. Individual owners have their land scattered throughout the whole cadastral area and extreme fragmentation of land is very common. Meaningful use of these plots is very difficult, as they are not accessible, often located in the center of large agricultural units and high number of co-owners prevents selling or renting.

High fragmentation of land is due to the inheritance laws from the time of the Austro-Hungarian Empire. Generally, all children inherited equal shares of land. Constructions of technical projects such as railways, roads, water flow regulations also had significant impact on land fragmentation (Dumbrovský et al., 2004). Narrower and more elongated shapes of plots are caused by inheritance and dividing. Problems with ownership are characterized mainly by the following features: dispersion and fragmentation of plots, improper shape and inaccessibility of the plots. Many authors abroad also indicate problems related to the inaccessibility of plots (Hartvigsen, 2015; Sky, 2014; Parsova, 2014).

Statistical overview of the average land ownership in Slovakia is as follows: average number of parcels of one owner – 20.6; average number of co-owners per parcel shares – 11.1; number of proprietary relations in SR – 98 million; number of parcels – 8.8 million; the average area of plot– 0.55 ha; number of

landowners – 4.1 million (Ministry of Agriculture and Rural Development of the Slovak Republic, 2013).

Problems in the landscape

Agricultural land in Slovakia frequently looks monotonous. Gigantic arable units are erosion predominant. This kind of condition, however, entails a large number of environmental problems, such as washing away of top soil, degradation of fertile soil, sudden local floods, pollution of streams, damage on public structures and buildings. The large units of arable land paradoxically hide a large number of original plots with high number of co-ownership relations.

Ecological imbalances persist and continue since the period 1948-1989, when land use was oriented in completely different direction – towards establishing and maintaining large scale agriculture (collectivization). With the new organization of territory, in the form of economic-technical adjustment of land (ETAL, HTÚP in Slovak), all natural barriers in the landscape were plowed (barriers, roads between plots, etc.) and plots were further consolidated to gigantic proportions. Joint agricultural cooperatives (JAC, JRD in Slovak) have been created (Muchová and Konc, 2010). The owners of these plots could not cultivate their land. Discrepancy between ownership records in the Slovak Real Estate Cadastre and the actual state, with large-scale units, inaccessible landscape, inaccessible plots which are often located in the center of large arable unit, high water and wind erosion, decreased soil quality, lack of natural ecological barriers, reduced ecological stability of landscape and biodiversity, etc. (Bažík et al., 2014) is still prevailing.

Land consolidation – a possible solution

Issues mentioned above, e.g. the high fragmentation of ownership and natural imbalance can be solved

through the land consolidation. It returns natural barriers into the landscape such as erosion control measures, environmental elements, road networks, flood control measures. Purchase of land from unsettled ownership is problematic. If municipality, state or other public entity cannot obtain the land at the required location from the owners, good projects are not feasible.

Land consolidation (Varga and Bažík, 2013) includes rearrangement of ownership and ownership relations (consolidation, inheritance, etc.) and technical, biological, economic and legal measures related to new reorganization of legal relations. Land consolidation returns natural barriers to the landscape which had been disturbed due to historical/political reasons. Proposals of these elements rearrange ownership and after their implementation, they change the landscape character and improve its functioning.

The basic legislative regulation in the area of land consolidation in Slovakia is Act No. 330/1991 Coll. on land arrangements, settlement of land ownership rights, district land offices, the land fund and land associations as amended (land consolidation law).

Land consolidation is generally carried out for whole cadastral area, mostly in rural areas, which form perimeter of land consolidation. It is composed of surveying and project activities that are compiled into stages due to time and content. These stages are linked to each other and may also overlap in time. The time sequence of individual steps during the LC project according to the land consolidation law is as follow (Muchová and Antal, 2013):

Initial documentation contains: area of land consolidation, updating of the soil-ecological units (SEU) and land-value maps, initial state registry, general principles of functional organization of the local territorial system of ecological stability.

Proposals for a new arrangement of plots in the land consolidation perimeter contains: principles of the placement of new parcels, plan of shared facilities and measures and plan of public facilities and measures, partitioning plan in the form of placement and marking plan.

Implementation of the land consolidation project contains: demarcation and marking/labelling of break points at the borders of new plots, updating of both the registry of initial state and the partitioning plans in the form of placement and demarcation plan, partitioning plan in the form of geometric plan.

Aim of this paper is to describe problems in Slovakia associated with land consolidation and also to show the benefits of this process. Problems are described through the ownership fragmentation. The benefits are shown through comparison of ownership relations before and after the land consolidation. Also new infrastructure, water management and ecological

elements can be beneficial. Final task is to describe reason why activities related to land consolidation in Slovakia stagnates despite positive elements.

Materials and Methods

Slovak Republic (SR) with total area of 49036 km² and population of 5415949 is one of the smallest countries on the European continent. Agricultural land covers 49.7%, forest areas 41%, water bodies/flows 2%, built-up areas 5% and other area 3% of the total area. Population density is 110 people per square kilometer. Landscape of Slovakia is much diversified; highlands and mountains cover 60% and lowlands 40% of the territory. Elevation ranges between 94–2655 m. Slovakia has 9115 m² of land per capita, from which agricultural land is 4518 m² (2653 m² arable land), forest area 3731 m², water areas 173 m², built-up and other areas 692 m².

Case study

To demonstrate the importance of land consolidation in Slovakia, cadastral area of Kanianka was picked as a case study area. Land consolidation in cadastral area of Kanianka, in Trenčiansky region, has been completed and registered in the Slovak Real Estate Cadastre in January 2011. Intensive agricultural production is concentrated mainly in the eastern part of the cadastre. In the western part of the cadastre, mainly grassland, pastures and forests are located. Some parts of the area were endangered by water erosion and therefore relevant measures were proposed. Agricultural land accounts for about 17% of the total area of the cadastre (Muchová et al., 2008).

Indicators of changes in rural areas

Indicators of changes in land use consist of elements that are divided by main categories: arable land, forest land, vineyards, gardens, orchards, grasslands, water areas and other areas. On this basis, we evaluate the tendency of changes in land use in 100 years period.

Three time horizons were used for evaluating of changes in land use: historical landscape structure (second military mapping), current landscape structure and proposed landscape structure.

Second military mapping survey of Austrian empire (Zeman, 2012) took place in 1806–1869. Unlike the first military mapping, the geodetic bases have been already made, which served not only for topographic but also for land surveying. These maps show the historic character of the environment, which either completely disappeared from landscape or is gradually disappearing. These materials can be and should be a guideline for revitalizing river systems, the restoration of the original road network etc.

Planimetric mappings for land consolidation project were selected for purpose of interpretation current landscape structure. These mappings are focused on the current situation in landscape and identify changes between actual and registered state in the Slovak Real Estate Cadastre. They are performed in the 3rd class of accuracy (0.14 m) for scale 1:10000. All features are the object of planimetric mapping.

New organization of road network, new system of erosion control and flood protection, system of ecological stability, etc. are the results of land consolidation. Proposed landscape structure is defined within general principles of functional organization of the territory and it defines new organization and skeleton of existing and proposed measures.

Ownership structure of case study

Changes in the ownership structure were evaluated before and after land consolidation using the following indicators: number of plots of common property, number of owners, number of ownership relations, number of plots with one owner 1/1, number of plots in co-ownership, average number of co-owners of one plot, maximum number of co-owners of one plot, average size of one plot (m²), average number of co-owners of one plot, average number of plots per one owner, average size of property per one owner (m²).

Results and Discussion

Results

On the basis of input and output parameters of land consolidation in cadastral area Kanianka the

process of LC with our active participation (Muchová et al., 2008) is demonstrated. The main reasons of land consolidation in this cadastre were arrangement of ownership relations mostly due to historical development, access to plots and functional and spatial rearrangement of agricultural land.

Land fragmentation

Considering the size of cadastre (794 ha) ownership fragmentation was very high. Figure 1 (left panel) presents current land ownership according to the Slovak Real Estate Cadastre. These very narrow plots contain multiple shares of several co-owners. Figure 1 (right panel) presents the state after the land consolidation, where even in this complex ownership ‘chaos’ the problems of individual owners were resolved.

Comparing input and output values of LC (Table1) shows that the number of plots decreases more than three-fold and average size of plot increased more than three times. An important benefit is the reduction of ownership relations by nearly half. Plots in co-ownership decreased from 997 to 157. Owners who own only one plot increased from 81 to 157. Moreover, the numbers of plots in co-ownership with 2-5 co-owners decreased from 659 to 102 and co-ownership with 6-10 co-owners from 243 to 28.

Landscape

Historical landscape structure of Kanianka was different than today. Location in Strážovské Mountains intensively influenced the use of the cadastre back in

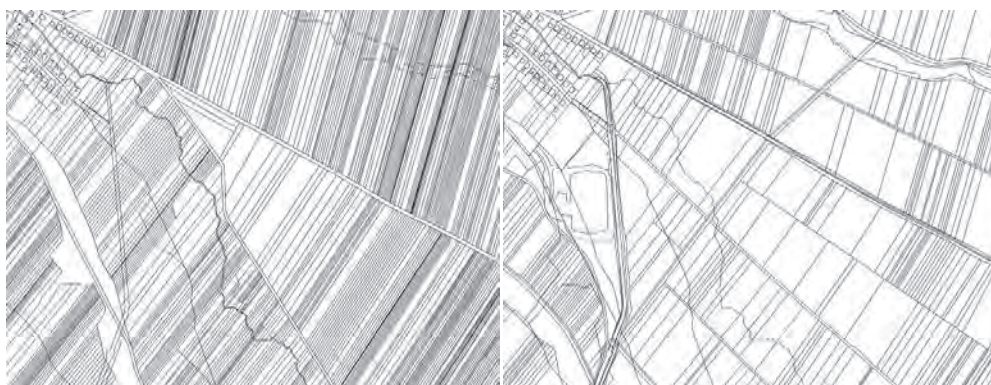


Figure 1. Map of ownership fragmentation before (left) and after (right) the land consolidation.

Table 1

Land fragmentation before and after land consolidation

Parameters	Before LC	After LC
Number of owners	565	565
Number of ownership relations	12596	7351
Number of plots	1711	951
Average size of plot	0.40 ha	0.74 ha



Figure 2. Historical landscape structure.

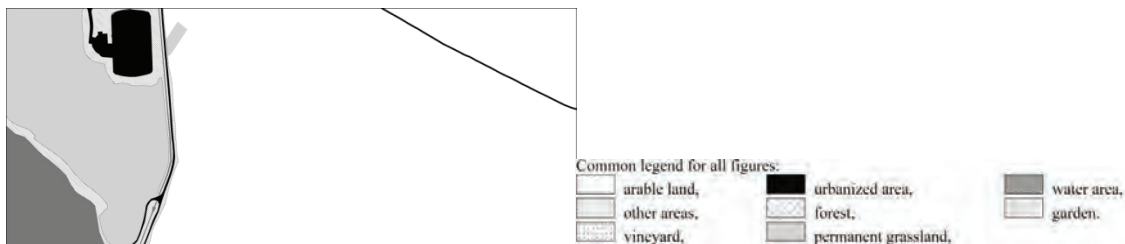


Figure 3. Current landscape structure.

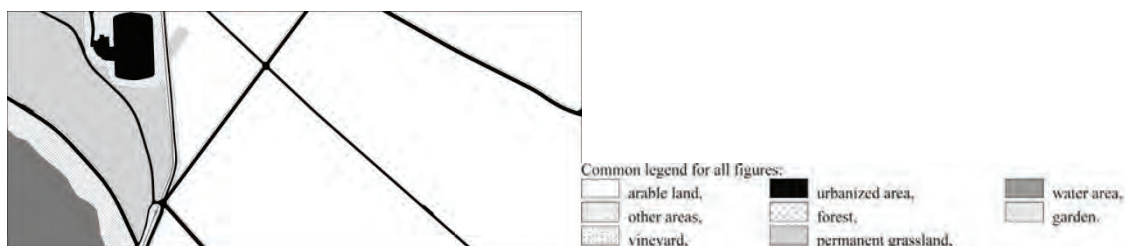


Figure 4. Proposed landscape structure.

1845. A relatively compact complex of mixed forest covered almost 57% of the total area. The second largest landscape element on almost 28% was arable land, while the grassland took 11% surrounding the stream Kanianka in south part of cadastre. Road network directed mainly to neighboring communities. Figure 2 shows parts of historical landscape structure, which are, subsequently, compared with same parts in other time horizons.

Current landscape structure (Figure 3) shows that cadastre is mostly covered by forest (70%). Representation of arable land is 17% and permanent grassland is 6%. It means that this area is intensively used for forestry and agricultural use is only complementary. In the area of about 9 ha the reservoir Kanianka was built for irrigation as a regulatory reservoir. It is now also used for recreation. Ecological stability of the area is positive and it is very significant.

Land consolidation in cadastral area of Kanianka was initiated in 2007. Proposed activities were focused on comprehensive rearrangement of the rural landscape, whose main goals were to protect and ensure renewable resources (water, soil), plant

and animal species and their communities and new land use. The main goals of proposed measures were (Figure 4):

- a) accessing of plots and buildings on them,
- b) slowing down the degradation process on the agricultural land, preserving and promoting the natural productive soil functions,
- c) protection and management of the environment, increasing ecological stability,
- d) preservation and creation of the landscape (support of structural elements of the landscape and aesthetic values, uniqueness and multiplicity of the landscape).

Because of bad slope conditions, the cadastre is less suitable for agriculture and the forest is dominant type of land structure. This also determined the owners to preserve arable land as much as possible, because the negative environmental factors, according to their opinion, do not affect the territory.

Changes in land use

Table 2 shows changes in spatial representation of land use in all three time horizons. It is obvious that the current landscape structure was significantly

Table 2

Representation of landscape structure in different time horizons

Land type	Historical landscape structure		Current landscape structure		Proposed landscape structure	
	ha	%	ha	%	ha	%
Arable land	221	27.84	122	17.23	118	16.63
Garden	7	0.94	0.1	0.02	0.1	0.02
Permanent grassland	54	12.44	47	6.62	42	5.97
Water area	2	0.52	10	1.46	10	1.46
Built-up area	3	0.63	9	1.28	14	1.97
Other area	3	2.34	17	2.47	28	3.99
Forest	459	57.80	500	70.92	498	69.96

Table 3

Landscape parameters

Parameters	Before LC	After LC
Agricultural land	197 ha	161 ha
- Arable land	122 ha	118 ha
Forest land	500 ha	498 ha
Length of field roads	4.32 km	13.79 km
Length of forest roads	17.05 km	36.17 km
Area of erosion control measures	0 ha	3.48 ha
Area of water management measures	11.92 ha	11.92 ha
Area of ecological measures	13.66 ha	30.80 ha

influenced by large-scale production during the period from 1948 to 1989. This period clearly brought to the landscape large, up to 200-300 ha, land units. These were created at the expense of permanent grassland and non-forest wood vegetation. Proposed landscape structure, through the land consolidation, reintroduces the green area in the landscape and gives the opportunity to create the conditions for rural development.

Land consolidations are not performed only for the sake of owners or users but also for the whole country as well. Ecological measures are priority, together with erosion control and water management (Table 3). More than half of the area share for common facilities and measures were used for these measures. The rest of share was used for road network. The ecological

character of land consolidation is more evident when there is vulnerability to anthropogenic impacts and intense agricultural use.

Land consolidation projects are a tool, which significantly affects the creation of landscape. Realization of common facilities and measures as they were proposed allows for significant positive changes. In our case study area many common facilities and measures have been proposed (Table 3.) They are going to be gradually implemented.

Discussion

Despite the benefits from land consolidations, these processes are not continuing as expected. Figure 5 shows number of projects started since 1991. Currently (31.12.2014) land consolidations are carried

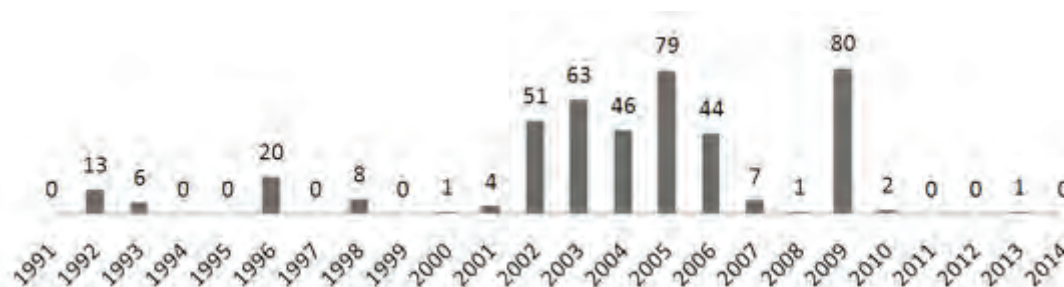


Figure 5. Number of land consolidation projects assigned by the years.

out in 426 cadastral areas which cover approximately 12% of Slovak Republic territory. 261 projects are finished and 165 are in progress.

As figure 5 shows, land consolidation projects are assigned very unequally. Reasons for that are mainly because cycles of programming period regarding the EU funds, political priorities, deformed business environment (low demand), deformation of prices and obstructions in the process of evaluating public tenders etc.

Many projects were assigned in the early years, when there was a hope for successful completion based on a new land consolidation law. Based on 'concept of ownership organization' in 1993, most projects were completed to the elaboration stage of 'initial state registry'. This happened because of extreme ownership fragmentation. In period of 1991–1995, the initial state registry methodology was prepared. Based on this methodology the 'Register of Renewed Real Estate Cadastre' (ROEP in Slovak) must be performed before LC project. The transparency of ownership registry is improved by ROEP.

From the original 52 projects, only 12 have been completed and entered into the Slovak Real Estate Cadastre but behind schedule. In the years 1996–2003 more complex projects were entered especially in environmentally degraded areas, mainly in the Vysoké Tatry and Žiarska basin. In the period of 2002–2006 (based on the EU pre accession programme SAPARD, the Sectoral Operational Programme and the Rural Development Plan) many projects were started. Unfortunately, there are also years when no projects were started. Despite good methodology, bad period for land consolidation occurred since 2010. This challenging period is a result of wrong political decisions evaluating their importance. There were also problems with transparency and efficiency of implementation of the proposed measures, etc. Some of the land consolidations have even been accelerated so that projects became more simplified and cheaper. New technological process and the price list were proposed, but these activities did not bring recovery of land consolidation.

For the purpose of land consolidation, 80 million euros allocated from the EU funds in the new

programming period 2014–2020. So far, however, all activities related to land consolidation are in the hands of politicians. There are no known aims, how and for what purposes the funds will be used.

Conclusions

Land consolidations have been instrumental in promoting rural development in Slovakia. They have the potential to make significant contributions towards improving the quality of rural life and also to solve ownership fragmentation. New approaches and solutions through land consolidation are able to solve fragmentation, social, cultural, economic, legal, administrative and political environment with financial and other resources mostly from EU funds. In our case study area of Kanianka the main goal was to consolidate ownership of the land. The number of plots decreased more than three-fold and average size of plot increased more than three times. An important benefit is the reduction of ownership relations by nearly half. Plots in co-ownership decreased from 997 to 157. Numbers of owners who own only one plot increased from 81 to 157. Ecological measures became priority together with erosion control and water management. More than one half of the area share for common facilities and measures (of totally 40.09 ha) has been used for these measures. The rest of the share was used for road and forest network. Despite the benefits from land consolidation projects, these processes are not developing as expected. This is a result of wrong political decisions about importance of land consolidation and there are also problems with transparency and efficiency of implementation of the proposed measures.

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References

1. Bažík J., Muchová Z., Petrovič F. (2014) Assessment of ecological situation in a landscape based on calculation of ecological stability coefficient. In: Fialová J., Pernicová D. (eds) *Public recreation and landscape protection - with man hand in hand?* Mendel University in Brno, Brno, CZ, pp. 36–43.
2. Dumbrovský M., Mezera J., Střítecký L., Burián Z. (2004) *Metodický návod pro vypracování návrhů pozemkových úprav (Methodology instruction for land consolidation approach)*. Českomoravská komora pro pozemkové úpravy, Brno, CZ, 190 p. (in Czech).
3. Hartvigsen M. (2015) *Experiences with land consolidation and land banking in Central and Eastern Europe after 1989*, Food and Agriculture Organization of the United Nations, Rome, p. 138.

4. Ministry of Agriculture and Rural Development of the Slovak Republic (2013) Internal materials of Ministry of Agriculture and Rural Development of the Slovak Republic 7 p.
5. Muchová Z., Daniš J., Konc L., Šimora R. (2008) *Všeobecné zásady funkčného usporiadania územia – Kanianka (General principles of functional organization of the territory - Kanianka)*. Prievidza, SK, 108 p. (in Slovak).
6. Muchová Z., Antal J. (2013) *Pozemkové úpravy (Land consolidation)*. Slovak University of Agriculture, Nitra, SK, 336 p. (in Slovak).
7. Muchová Z., Konc L. (2010) *Pozemkové úpravy – postupy, prístupy a vysvetlenia (Land consolidation - procedures, approaches and explanations)*. Slovak University of Agriculture, Nitra, SK, 228 p. (in Slovak).
8. Parsova V. (2014) *Land Consolidation in European countries* [electronic questionnaire]. Questionnaire for: Jaroslav Bažík. 2014-02-20 Available at: https://docs.google.com/forms/d/1PrjuVNEAxDq0bfmq6INOrjKIKFy_oaeWO1yxPKDen-U/viewform, 07 Decembre 2014.
9. Sky P.K. (2014) *Land consolidation organized in a special court experiences from Norway*. Paper presented at the International Symposium “Land Fragmentation and Land Consolidation in Central and Eastern European Countries” by FAO, GTZ, FIG, ARGE Landentwicklung and TUM, Munich, 26 February 2002.
10. Urban J. (2013) *Pozemkové úpravy: nástroj na riešenie rozdrobenosti pozemkového vlastníctva, revitalizáciu krajiny a rozvoj vidieka (Land consolidation: a tool for solving the land ownership fragmentation, landscape restoration and rural development)*. Komora pozemkových úprav SR, Bratislava, SK, 43 p. (in Slovak).
11. Varga V., Bažík J. (2013) Land consolidation as a useful tool for rural development. In: Škarpa P., Ryant P., Cerkal R., Polák O., Kovárník J. (eds) MendelNet 2013. *Proceeding of International PhD Students Conference*, Mendel University in Brno, Brno, CZ, pp. 526-530.
12. Zeman M. (2012) *Historické mapové diela na geoportal.sazp.sk. (Historic map works on geoportal.sazp.sk.)*. Available at: http://www.enviromagazin.sk/enviro2012/enviro5/14_historicke.pdf, 27 February 2015. (in Slovak).