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HYDROLOGICAL AND GEOMORPHOLOGICAL ASPECTS OF DIFFERENT FARMING PRACTICES

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The aim of the paper is an attempt to demonstrate the need to reevaluate some simplifying views of the influence collectivization exerted on soil loss processes in agricultural landscape, which indiscriminately suggest the increase of intensity of such processes after collectivisation. Single parameters of soil loss process controlled by man, relevant to land use patterns in the pre- and post-collectivization periods using evaluations of two model territories were analysed. Results of analysis indicate that after collectivization changes of numerous parameters, in spite of prevailing estimates, caused the decrease of soil loss processes on many places. Evaluation of agro-technology from the viewpoint of susceptibility to the soil loss process was also considered. The obtained results revealed that the collectivization process or the method of farming under collectivization can be in no way one-sidedly and indiscriminately blamed of increased rate of the soil loss process in comparison with the pre-collectivisation era. Reliable comparison of the effect of the land use changes on soil loss processes calls for individual approach taking into consideration the particular circumstances in each case.

Key words: soil loss process, agricultural landscape, collectivization, land use pattern, changes of soil loss process intensity controlled by man

INTRODUCTION

The issue of assessment of the effect of land use changes on hydrological and geomorphological processes has been one of the concerns of experts for many years. Essentially, it is the comparison between the use of farm land with

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a narrow plot pattern in private ownership with that of land in collective (co-operative) ownership and a pattern composed of large blocks or fields. The difference between the two types of pattern concerns rather more dissected landscape types, as the private ownership (estates) with a large field pattern existed in more fertile lowland positions long before collectivization.

Slovakia is a text-book example of a territory where distinct changes in farming occurred in a relatively short time. First of all, there was what is called the collectivization process, which took place from the beginning of the 1950s to the end of the 1960s and in some isolated cases also later.

The aim of the paper is to identify and analyse some, so far not frequently studied, aspects of evaluation of the changes of susceptibility to soil loss processes as the result of different farming practices. The interpretation of the influence of the presented aspects on the soil loss processes should provide an idea of how complicated is the assessment of changes in the intensity of soil loss processes in agricultural landscape in dependence on different ways of management and it should also point to the drawbacks of the often simplified and still used methodology of such evaluations.

Unfortunately, the big and often objective drawback is the academic essence of the considerations of the changes in the rate of the soil loss process before and after the collectivization period. Relevant data, which might make it possible, even indirectly, to assess the size and rate of the soil loss processes in the pre-collectivization period are missing. Consequently, the work of scientists is limited to more or less precise reflections sporadically supported by indirect evidence.

THE PRESENT STATE OF THE RESEARCH ON THE ISSUE

The prevailing majority of the existing theories, methodologies and models dealing with the soil loss process on slopes (water soil erosion) are limited to the issue of intensity and effect of rain, influence of the relevant morphometric and soil parameters and the character of vegetation cover. These procedures are mostly applicable to the individual slopes. For more detailed studies see Minár and Hofierka (1992), Solín (1994), Solín and Lehotský (1996), Hofierka and Šúri (1996), Stankoviansky et al. (2000).

Generally, the idea of an increase of the runoff and soil loss processes in farming landscape with the large field pattern as it is presented on a particular example by Solín and Cebecauer (1998), prevails. At first glance this has its logic. But considering all aspects, which accompany the process of collectivization, i.e. not only the traditionally quoted change: the increased length of fields, the idea of an increase of runoff and soil loss increase in the collectivized agricultural landscape becomes questionable.

Stankoviansky (2000) asserts that as a result of collectivization the structural changes in use of the agricultural landscape inherited from the time of the "kopanitze" colonization increased. Stehlík (1981) also mentioned the fact that the system of pre-collectivization arrangement of agricultural landscape is no guarantee of reduced soil loss. He asserts that if the horizontal tillage is consistently applied, he intensity of erosion on the large-block arrangement typical for collectivization should decrease by about 30-40 % in comparison with the value of erosion existing before collectivization. According to Stehlík the value of erosion depends on the arrangement of arable land in the pre-collectivization period. Jůva et al. (1981) point to the negative effect of the small-area arrangement of the agricultural landscape. These authors consider negative measures such as excessive tillage of the land in unsuitable positions, division of plots on the dividing lines of slopes and foothills in the direction of inclination because of their different fertility, tillage down the slope, accessibility for transport, which caused reduction of the landscape's retention capacity and accelerated the runoff. Even the effects of ideology on the individual concepts (apology for social collective agriculture on the one side and not quite justified criticism of the previous forms of management on the other) is ignored, it must be admitted that the above mentioned concepts of the then top experts did not rely on prejudice, but were based on knowledge and analysis of reality.

It is then obvious, that the opinion on the effect of way of tillage is not altogether uniform.

IDENTIFICATION OF BASIC NOTIONS

This paper is focused on the evaluation of hydrological and geomorphological aspects of different methods of agricultural use of landscape. The basic relevant hydrological process in relation to the theme (change of the method of use of agricultural landscape) is the runoff, the basic relevant geomorphological process is soil loss, here specified as the process induced by water in different forms, that is different forms of erosion. The differentiation of the surface runoff in the sense of hydrological and soil loss processes on the slopes outside the permanent river networks is essentially only formal. Within such a single process two basic processes are initiated: surface runoff and soil loss, formally distinguished and studied by several sciences: hydrology, geomorphology, and pedology. For the sake of simplification the concept of soil loss will be used.

Two methods of agricultural land use in the framework of Slovakia are compared:

- a small-area pattern of narrow fields or the pre-collectivization method,
- large-area pattern of large blocks or the collectivized method of farming.

Properties of landscape structure controlled by man, which influence the soil loss processes

Essentially, two kinds of properties, which influence the soil loss processes are distinguished:

Natural susceptibility of a basin or territory to soil loss processes is considered a permanent property determined by relevant properties of the elements and components of the natural landscape. The most quoted properties of the natural landscape, which determine the soil loss processes should be divided into those that are generally recognized (inclination, length of slope, physical properties of the soil-rock complex, rainfall regime and character). The effect of some other properties (convexness and concaveness of the slopes) is considered questionable, and the effect of still other properties (convergence and divergence of slopes) can by manifested only in certain specific conditions. With regard to the relative stability of these parameters they will not be given attention in this paper.

Consequently, if the effect of the land use changes on soil loss processes is evaluated then the effect of the man-controlled parameters is evaluated, and precisely the method of land use can be looked at as the most important one.

Before focusing on the hydrological-geomorphological aspects of the individual methods of farm land use, a definition of the collectivization process in relation to land use is necessary. Simplified interpretation of this concept prevails and it mostly includes only the problem of the increased length of fields as the consequence of enlargement/joining of blocks of arable land, hence logically the increased intensity of soil loss processes as compared to the pre-collectivization method of land use.

The interpretation of collectivization offered in this paper is much broader. Collectivization was essentially a complex process with direct impact on landscape and the environment, the economic and social spheres, while it also had a political dimension, which was the most important one from the point of view of its protagonists.

This paper is limited to the assessment of the impact of collectivization on the landscape and environment.

Collectivization did not mean, in terms of changes of landscape, only joining of small fields into large blocks. It also had other effects, which both directly and indirectly influenced the intensity of soil loss processes. Collectivization also included forestation of former fields on steep slopes, which became inaccessible for the new heavy farming technology, reduction of field roads, removal of line forms separating the individual fields and cultivation furrows, etc. The process of transformation of the pattern and method of tillage of the farming land from the small-scale to large-scale also brought about straightening of what were originally naturally curved lines (streams, dividing lines between the fields), which is also sometimes referred to as geometrization (Forman and Godron 1993).

More detailed analysis of the individual, man-controlled parameters of soil loss makes possible the following classifications:

- share and structure of eco-stabilizing forms of land use,
- arrangement of fields and line elements,
- method of management.

The share and structure of eco-stabilizing forms of land use

The intensity of the soil loss processes depends on the share of the areas present in the basin, which slow down the runoff, that is areas with higher percolation or water-retention capacity (forests, thin forests, and grassland). Such areas were denoted the eco-stabilizing areas. Apart from their overall share in the basin's area, their structure is also important (number, average size, arrangement).

The character of changes of the eco-stabilizing forms of land use were researched in the upper part of the Torysa basins in the south-eastern part of the Levoča Mountains in eastern Slovakia (Hanušin and Lacika 1997). The total area of the basin is 70 km^2 and the area of the farm land, the subject of a more detailed study, was 33 km^2. This part of the basin was divided into 18 partial basins.

The eco-stabilizing properties from the viewpoint of intensity of runoff and soil loss processes were expressed by means of coefficients for each partial basin for 1949 (pre-collectivization period) and 1989 (culmination of collectivization). The coefficients were evaluated by a 5-grade scale from the smallest to the largest effect on soil loss processes in the particular territory. The difference between the summed up value of coefficients in the years in question expressed the change of the soil loss properties of the territory.

The first coefficient evaluated was that of area of the stabilizing forms. It expresses the share of the total forest area, thin forest area and grassland in the area of the partial basin. Evaluation of changes revealed that the share of eco-stabilizing forms increased in the whole territory by 13 % in 1989.

The second coefficient wast that of linkages between the stabilizing forms. The significance of this coefficient lies in determination of the number of areas of stabilizing forms in the territory. For instance, 50 % forestation concentrated into 1 or 2 continuous areas is evaluated differently from that of the same share of forests in the basin broken into several discontinuous areas. It is obvious that this parameter also depends on the area of a partial basin. With growing area the probability of a larger number and larger discontinuity of stabilization areas also increases. However, with regard to the fact that the same territory in two time horizons is evaluated (compared) the aspect of area is not important. The number of stabilizing forms dropped by 21 (to 120) in the whole territory by 1989.

The third and the last coefficient concerns the average size of the stabilizing form. The average size of the stabilizing form is expressed as the share of the sums of area and number of the stabilizing forms.

This coefficient alone can be partially distorting as ensues from the relativity of the concept "average". The average area of the stabilizing form is the same if it is one large plus two small areas or three approximately equal large areas. From the viewpoint of the accumulation capacity of landscape the second alternative is more appropriate. With regards to this fact the statement force of this co-efficient is of full value only in the context of the two preceding ones.

The resulting value of the landscape's accumulation capacity in the two time horizons was obtained by summing up the resulting values of the 5-grade scale (the sum of three values for each of the analyzed coefficients). The difference between the obtained values for the years 1989 and 1949 indicates the size of change in susceptibility to soil loss processes determined by the changes in land use. If the resulting sum of coefficient values is negative the accumulation capacity of the territory deteriorated (deterioration of the 1989 situation compared to 1949), if it equals zero, a more or less stable situation is presumed and finally, if the values of the resulting sum are positive ($n > 0$) increased accumulation capacity of the landscape is presumed.

Out of 18 evaluated partial basins the eco-stabilizing properties of the territory influencing the rate of soil loss processes are practically unchanged in 12 basins (total area 2478 ha that is almost 76 % of the territory). A decrease was identified on 513 ha that is 16 % of the territory, and the opposite trend, that is increase was identified on 276 ha or 8 % of the territory.

A similar assessment for other model territories, agriculturally used apart of the basins of the Tŕstie brook in the Myjava Hill Land, showed that changes also occurred here between the years 1955 and 1990 concerning the area of eco-stabilizing forms of land use. The percentage of forests increased by 7 %, the built-up area increased by 2 %. On the other side, the area of arable land decreased by 7 % and the grassland area by 2 % (Hanušin 1998).

In connection with the hydrological function of forest the effect of forest on the balance of runoff, which is to great extent influenced by the increased natural accumulation capacity of forest landscape, is generally favourably evaluated. However, the other positive aspect with regard to the reduction of runoff, that is increased transpiration of forest as compared to field crops, documented by the research analysis, for instance, Jůva et al. (1981) or Calders (1993), is less frequently mentioned. This research showed that the total transpiration of forest is higher than that of field by as much as 13 %. Likewise, the increased interception of precipitation by forest trees reduces the amount of water falling on the soil surface, which along with other preceding factors can eventually significantly increase the total volume of water runoff in the forest parts of basin or it can distribute this runoff over a longer period. This is the reason why forestation of what was formerly arable land also contributes to reduction of runoff and consequently, the soil loss risk.

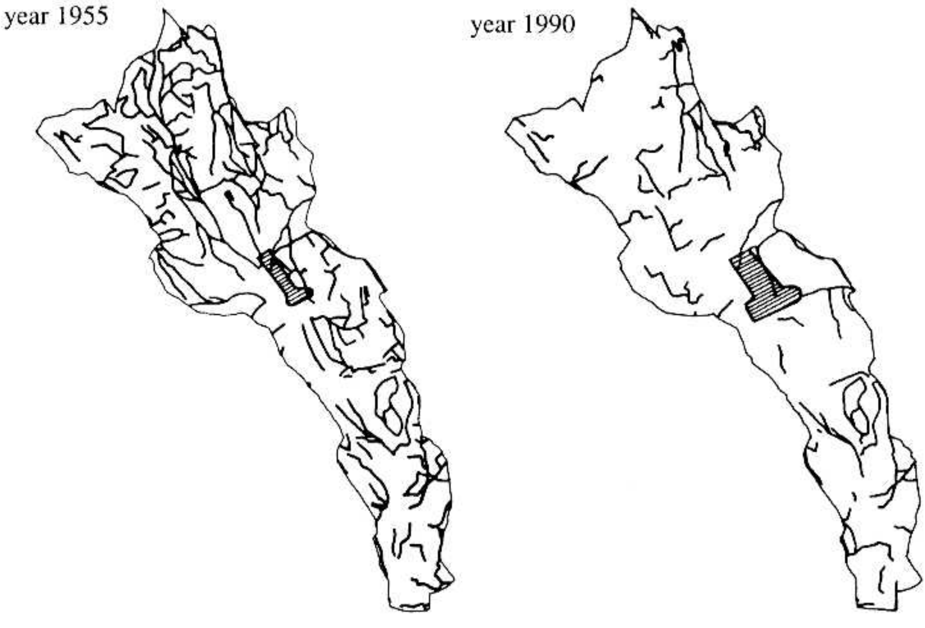

Fig. 1. Comparison of field road network in part of Tŕstie brook basin (Myjava Hill Land)

ARRANGEMENT OF FIELDS AND LINE ELEMENTS

This parameter displays the most significant changes if compared to the pre- and post-collectivization periods. The arrangement of fields means the their size, shape, orientation with respect to land forms (orientation of the field axis with respect to the prevailing slope inclination above all). The line element is the dividing line between the different land use forms (cultivation furrows) and the network of field roads.

Essential changes of this parameter, which were recorded after collectivization include:

- increase of the average size of field as a result of joining several small fields,
- decrease of the length of line elements in the landscape.

Joining of small fields into large blocks led to the increase of the average area and in most cases also the length of field. Soil loss processes on such a field can gain higher intensity (increase of the speed of movement on a longer track) thanks to the removal of barriers.

The change of the second parameter has an opposite effect: decrease of the line elements in the landscape. The length of line forms was substantially higher in the pre-collectivization arrangement of the agricultural landscape, which was caused by the existence and arrangement of small fields. It is important to pay attention to the previously seldom considered aspect of the thick network of line elements in the pre-collectivization agricultural landscape, as an important system of privileged soil loss and runoff forms. It was formed by the cultivation furrows between the field blocks, the field road network and the systems of older gullies. For instance, in the basin of the Tŕstie brook in the Myjava Hill Land the average field road density decreased from 39 $m.ha^{-1}$ in the pre-collectivization periods (1955) to 19 $m.ha^{-1}$ in the post-collectivization period (1990). See Fig. 1 and Hanušin (1998).

Line elements create in certain way an ephemeral runoff system, which occasionally revives after abundant rainfall or in the period of snow melt. The effect of such phenomena in the collectivization pattern was limited because of the smaller number of blocks and dividing lines between them on the one side and because of regular and efficient planation of the primary gullies by high-performing agricultural technology on the other.

Analysis of aerial images of a 60 ha area in the middle part of the Tŕstie basin showed that there was about 22,000 m of cultivation furrows (dividing lines between the fields) out of which 77 % percent were oriented along the gradient line in 1955 while in 1990 there was only about 1800 m (12 times less) of cultivation furrows out of which 61 % was oriented along the gradient line. Although the territory is not representative, it is not a rare case either. Such findings point to the potential pronounced decrease of soil loss process in many places.

The efficiency of this system depends on the density of line elements, their orientation in respect to the prevailing inclination, on the degree and way of linking the system or its part to the natural or quasi natural system of streams, gullies and other relief erosion forms, which secure efficient removal of material by the steady stream from the basins in the form of suspended load or its accumulation outside the field system it originated from. A dense network of line forms in the pre-collectivization small-block arrangement created favourable conditions for soil loss. The "handicap" of shorter field length and short average track of movement of soil particles in the pre-collectivization pattern was substituted within the same pattern by the short average track needed by the soil particle to reach one of the line elements where there was often increased probability of a quick efficient soil loss (Fig. 2). Occasional cleaning and maintenance of cultivation furrows and roads could not have essentially limited the soil loss effect of this system. This is how the rate of soil loss in micro-basin with pre-collectivization structure of small fields could have reached in certain conditions higher values than the soil loss of the same basins during the large-block arrangement.

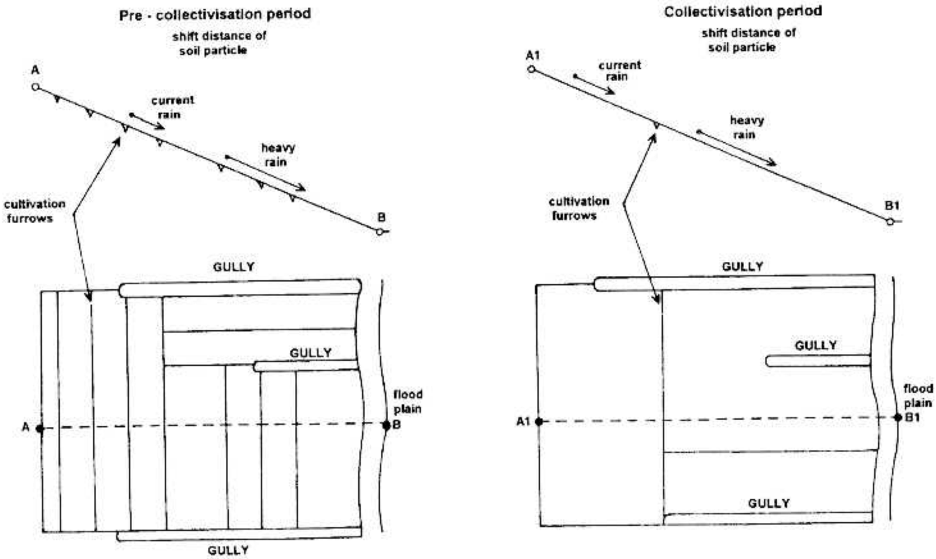

Fig. 2. Function of lina forms during rain

Comparison of the effect of joined fields on the one side and the decrease of line form density on the other makes it possible to assess the change (increase, decrease) of soil loss rate after collectivization in a particular territory.

Obviously, different microtopography controlling surface runoff, percolation, removal of material and its accumulation are important factors of determination of the soil loss in the pre- and post-collectivization time.

AGROTECHNOLOGY AND MANAGEMENT

Evaluation of the metod of tillage is limited to the issue of making the subsoil layer more compact by heavy machines, change of the depth of tillage and the effect of draining. Factors like species and rotation of crops or fertilization have undoubtedly also influenced the rate and regime of soil loss but this subject is not treated here. The negative effect of heavy wheeled technology in terms of making temporary rills during the collectivization period, as well as the destructive effect of hoofs of heavy animals on the surface of field roads in pre-collectivization, should also be mentioned.

Collectivization was also accompanied by the use of heavy machinery which gradually compacted the sub-soil layer. It became less permeable, the fact which most probably contributed to the changes in the runoff and soil loss regimes. The arrival of the heavy and better performing farming technology though, also meant the enlargement of the average thickness of the tilled layer as a result of deeper tillage (by 10-20 cm). This is how two contradicting situations originated in terms of the retention capacity of the tilled landscape: poorly permeable compact layer and increase of the retention capacity of the top soil as a result of a larger/thicker tilled soil layer. It means that the soil tilled in this way in the collectivized landscape can have a higher retention capacity (up to a certain intensity of rain) than the not compacted soil in the tilled pre-collectivized landscape. But if the intensity of rain (percolation) exceeds the retention capacity of the tilled layer, the effect of compacted sub-soil, which supports the accelerated shallow sub-surface runoff appears (Fig. 3).

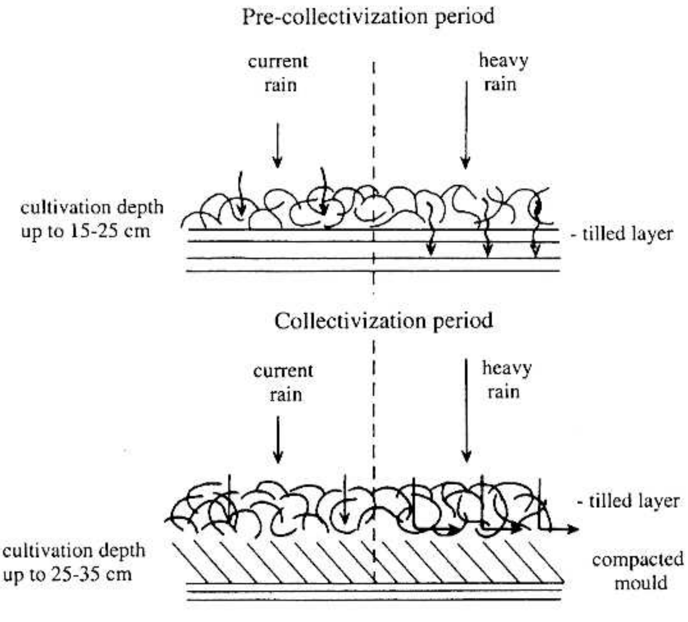

Fig. 3. The changes in hydrological functioning of soil due to compacted mould

The direction of tillage is another important agent determining intensity of soil loss. In the framework of investigation of the tillage direction in the Tŕstie basin (terraced fields tilled along the gradient or contour lines) minimum differences in the share of soil tilled in a certain way before and after collectivization were found. With the exception of a slight decrease of the share of the terraced land (from 2.4 % in 1955 to 0.5 % in 1990) in favour of tillage along the contour line, the share of tillage along the gradient line in 1990 remained at the level of 1955. The absolute areas of the individual directions of tillage was a different matter. In the framework of the overall decrease of the area of arable land from 1955 to 1990 (by 258 ha or 14 %) decrease of the terraced arable land (-36 ha) tilled long the contour line (-115 ha) and tilled along the gradient line (-107 ha) was recorded (Hanušin 1998).

In relation to the soil water regime or its effect on soil loss processes it is necessary to mention the effect of drainage. Introduction of sub-surface drainage systems was one of the frequent interferences into the agricultural landscape in the pre-collectivization period. The ecological impact of these interferences, which was in some cases questionable, (inadequate drying of the natural waterlogged and other eco-stabilizing areas, and the like) is not considered here. There is still about 18 % of the area of arable land (282 ha) drained by subsurface installations in the Tŕstie basin in the Myjava Hill Land. As of 1991 there was a total of about 4,700 km^2 of drained area, prevailingly arable land, in Slovakia. Although the efficiency of drainage is low in the majority of cases, they do drain the moisture from the soil profile, contribute to its accelerated drying and lower the susceptibility to soil loss. It is another positive contribution of collectivization from the point of view of soil loss assessment.

CONCLUSION

The aim of this paper is certainly not an effort to replace the popular opinion that collectivization meant the increased intensity of soil loss processes in agricultural landscape by the opposite statement that collectivization meant decrease of the intensity of soil loss processes in landscape. Our effort is to point to the complexity and ambiguity of the issue. Evaluation of changes of soil loss intensity as a result of big changes in agricultural landscape use (the same as evaluation of other phenomena in landscape) requires an individual approach with consideration of all particulars and conditions rather than application of a generalizing black and white view.

LITERATÚRA

CALDER, I. R. (1993). Hydrologic effects of land-use change. In Maidment, D. R., ed. *Handbook of hydrology*. New York (Mc Graw-Hill), pp. 13.1-13.50.

FORMAN, R. T. T., GODRON, M. (1993). *Krajinná ekologie*. Praha (Academia).

HANUŠIN, J., LACIKA, J. (1997). Priestorová analýza intenzity eróznych procesov na hornom povodí Torysy. In Harčár, J., Nižnanský, B., eds. *Krajina východného Slovenska v odborných a vedeckých prácach*. Prešov (Východoslovenská pobočka Slovenskej geografickej spoločnosti), pp. 129-135.

HANUŠIN, J. (1998). Metodika hodnotenia vplyvu zmien vo využití zeme na zmenu veľkosti rizika vodnej erózie pôdy (prípadová štúdia: časť povodia potoka Tŕstie). *Geografický časopis*, 50, 59-76.

HOFIERKA, J., ŠÚRI, M. (1996). Modelovanie priestorových a časových zmien vodnej erózie pôdy. *Geografický časopis*, 48, 255-269.

JŮVA, K., KLEČKA, A.., ZACHAR, D. a kol. (1981). *Ochrana krajiny ČSSR z hľadiska poľnohospodárstva a lesníctva*. Bratislava (Veda).

JŮVA, K., ZACHAR, D. a kol. (1981). *Tvorba krajiny ČSSR z hľadiska poľnohospodárstva a lesníctva*. Bratislava (Veda).

MINÁR, J., HOFIERKA, J. (1992). Svahové modely vodnej erózie pôdy, súčasný stav a perspektívy. *Geografický časopis*, 44, 330-341.

SOLÍN, Ľ. (1994). Typizácia krajiny z hľadiska citlivosti na vodnú eróziu pôdy – súčasný stav jej výskumu. *Geografický časopis*, 46, 399-407.
SOLÍN, Ľ., LEHOTSKÝ, M. (1996). Susceptibility of the Jablonka catchment to soil erosion. *Geografický časopis*, 48, 153-170.
SOLÍN, Ľ., CEBECAUER, T. (1998). Vplyv kolektivizácie poľnohospodárstva na vodnú eróziu pôdy v povodí Jablonka. *Geografický časopis*, 50, 35-57.
STANKOVIANSKY, M. (2000). Differentiated geomorfic effect of gully erosion due to large-scale land use changes. In Balteănu, D., Ielenicz, M., Popescu, N., eds. *Geomorphology of the Carpatho-Balcan region*. Bucuresti (Corînt), pp. 187-200.
STANKOVIANSKY, M., CEBECAUER, T., HANUŠIN, J., LEHOTSKÝ, M., SOLÍN, Ľ., ŠÚRI, M., URBÁNEK, J. (2000). Response of a fluvial system to large-scale land use changes: the Jablonka catchment, Slovakia. In Hassan, A.. M., Slaymaker, O., Berkowicz, S. M., eds. *The hydrology - geomorphology interface: rainfall, floods, sedimentation, land use. IAHS Publication*, 261. Jeruzalem (The Hebrew University of Jerusalem), pp. 153-164.
STEHLÍK, O. (1981). Vývoj eroze půdy v ČSR. *Studia geographica*, 72, 3-37.

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HYDROLOGICKÉ A GEOMORFOLOGICKÉ ASPEKTY ODLIŠNÝCH SPÔSOBOV HOSPODÁRENIA V POĽNOHOSPODÁRSKEJ KRAJINE

Slovensko je učebnicovým príkladom územia, na ktorom v relatívne krátkom časovom období došlo k výrazným zmenám v spôsobe hospodárenia v poľnohospodárskej krajine v procese tzv. kolektivizácie, ktorý prebehol od začiatku 50. rokov do polovice 60. rokov minulého storočia, v ojedinelých prípadoch aj neskôr. V podmienkach Slovenska ide v podstate o porovnanie spôsobu využitia zeme formou prevládajúceho súkromného vlastníctva s patternom malých políčok s kolektívnou (prevažne družstevnou) formou vlastníctva, prejavujúcou sa patternom veľkých blokov poľnohospodárskej pôdy.

V príspevku sa pokúšame poukázať na potrebu prehodnotiť niektoré zjednodušujúce pohľady na vplyv kolektivizácie na odnosové procesy v poľnohospodárskej krajine, ktoré paušálne predpokladajú nárast intenzity takýchto procesov po kolektivizácii. Objektívnym nedostatkom je absencia dát, ktoré by umožnili, hoci aj nepriamo, no vo väčšom rozsahu stanoviť veľkosť a intenzitu odtokových, resp. odnosových procesov v predkolektivizačnom období.

Detailnejšie analyzujeme jednotlivé, človekom kontrolované parametre odnosu zodpovedajúce spôsobu využitia krajiny v pred- a pokolektivizačnom období na základe hodnotenia dvoch modelových území (časť Myjavskej pahorkatiny a juhovýchodná časť Levočských vrchov), a to:

- podiel ekostabilizačných foriem využitia krajiny,
- usporiadanie líniových prvkov,
- spôsob agrotechniky.

Výsledky analýzy ukázali, že v mnohých parametroch nastali po kolektivizácii také zmeny, ktoré napriek prevládajúcim predstavám podmienili pokles intenzity odnosových procesov po kolektivizácii. V mnohých prípadoch vzrástol podiel ekostabilizačných foriem (lesy, trvalé trávnaté porasty), ktoré znižujú intenzitu odnosových procesov.

Rozsah líniových prvkov (medziblokové brázdy, poľné cesty) bol v predkolektivizačnom období výrazne vyšší. Z veľkej časti prepojený a hustý systém brázd medzi jednotlivými poľami spolu so staršími výmoľmi vytváral efemérny efektívny systém odnosu pôdnych častíc, účinnosť ktorého bola naviac znásobená hustou sieťou poľných ciest. Priemerná dráha, ktorú musela absolvovať potenciálna pôdna častica, aby dosiahla niektorú z týchto husto sa vyskytujúcich líniových foriem a následne bola odnesená mimo svah, bola podstatne kratšia ako priemerná dráha, ktorú musí prekonať potenciálna častica po dlhom svahu, typickom pre pattern využitia kolektivizovanej krajiny.

Hodnotením spôsobu agrotechniky z hľadiska náchylnosti na odnos sa v prípade časti Myjavskej pahorkatiny ukázalo, že smer orby (po vrstevnici alebo po spádnici) závisel v predkolektivizačnom období od orientácie poľa. Nepodarilo sa preukázať jednoznačnú závislosť medzi týmto parametrom a spôsobom hospodárenia. Na druhej strane nástup a používanie ťažkých poľnohospodárskych mechanizmov po kolektivizácii spôsobil zhutnenie podorničia, súčasne sa však zväčšila hĺbka orby. Takto sa zväčšila retenčná kapacita orničnej vrstvy pôdy, ktorá je schopná zadržať viac zrážok a redukovať intenzitu odnosu, ale len do úrovne naplnenia retenčnej kapacity zoranej vrstvy, po ktorom sa negatívne prejavuje vplyv zhutnenej a menej priepustnej vrstvy.

Vyhodnotením získaných výsledkov sme dospeli k záveru, že proces kolektivizácie, resp. spôsob hospodárenia v kolektivizovanej krajine s typickým patternom, nemožno v žiadnom prípade hodnotiť jednostranne a paušálne ako proces, resp. spôsob hospodárenia podmieňujúci zvýšenú intenzitu odnosových procesov v porovnaní s predkolektivizačným obdobím. Zdôrazňujeme, že cieľom štúdie nebolo dokázať opak, t. j., že v predkolektivizačnom období bola všeobecne vyššia náchylnosť poľnohospodárskej krajiny na odnos. Chceli sme len poukázať na skutočnosť, že na hodnotenie vplyvu zmien vo využití krajiny na odnosové procesy je potrebný individuálny prístup so zohľadnením konkrétnych krajinnoekologických podmienok.