


# “Land fragmentation in Ukraine: agricultural land-use management and jurisprudence issues”

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# LAND FRAGMENTATION IN UKRAINE: AGRICULTURAL LAND-USE MANAGEMENT AND JURISPRUDENCE ISSUES

## Abstract

Land parcels fragmentation problem in different agriclimatic zones of Ukraine is reviewed; general pattern, as well as regional specific is outlined. Land management of fragmented parcels in agricultural use is discussed, including land ownership and jurisprudence issues of land consolidation. Three key plots were chosen to analyze issues of land fragmentation, geospatial data shown demonstrate need for land consolidation to optimize agricultural land-use of such territories. Specificity fragmentation of land for agricultural companies, located in the mountainous regions of Ukraine, is noted. Gaps in the legal regulation of relation connected with land fragmentation were disclosed. Problems of land inheritance in the context of fragmentation, exchange of land resources as a tool for effective functioning of land market, the small and medium producers, economic development and agriculture in general; the creation of a land bank is regarded as a factor in reducing fragmentation of land were examined.

## Keywords

environmental law, land fragmentation, land parcels,  
landowners, legislation on land consolidation

JEL Classification K32

## INTRODUCTION

Fragmentation of land occurred in many post-communist states of Eastern and Central Europe; it is considered that small areas of land parcels reduce agricultural productivity and sustainable development of agricultural landscapes. This is a constant subject for scientific research all over the world, especially in post-Soviet and post socialist countries, such as Ukraine.

It is necessary to overcome "land fragmentation" – the fragmented nature of land ownership and land use observed across much of Central and Eastern Europe (FAO, 2002, 2003).

T. Cikor et al. (2009) mentioned that in Albania, a post-socialist country, national experts and foreign advisors alike have described fragmentation of land ownership and land-use as a key problem in Albania's agriculture, connecting it with the egalitarian distribution of parcels mandated by the state (Sikor, Muller, Stahl, 2009, p. 1411).

Land for agriculture in Ukraine covers more than 40 mln. ha from 60.3 mln. ha of country's total area, and about 75% of these agricultural land are in private property.

According to Ukrainian scientist in agricultural economy A. S. Popov (2012, p. 100), land fragmentation has some advantages – increase of local biodiversity, restoring natural flora and fauna, decreasing risk of diseases and pests in agriculture.

Main problem of land management includes substantiation of an optimal area of land parcel for agricultural purpose for conditions of land-use efficiency. According to Ukrainian scientists in agricultural economy (L. Melnik, 2008, p. 157) optimal area for field crops in steppe zone is 300-400 ha, small parcels do not allow using modern machinery and maintain crop rotation. Thus, typical agriculture enterprise area should be not less than 5000 ha.

Constant efforts to overcome fragmentation require renewed intervention by the state in the form of state-led land consolidation (FAO, 2002).

Aim of the article – to define general pattern as well as regional specific of land fragmentation in Ukraine, and to analyze land management and jurisprudence issues of land use and land consolidation.

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## 1. MATERIALS AND METHODS

To outline general pattern and regional-specific characteristics of land fragmentation, three key areas were chosen in each of agriclimatic zones of Ukraine: forest zone in the North, forest-steppe in the middle of the country, and steppe zone on the South. Each key plot considered to be typical for each zone based on landscape, land-use and social factors.

Public cadastral map of Ukraine was the main source of information on geospatial data, land use and land ownership. All images from its geportal are courtesy of the State Service on Geodesy, Cartography and Cadastre of Ukraine.

## 2. RESULTS AND DISCUSSION

Problem of land fragmentation in Ukraine is deeply linked with issues on effective agricultural production organization after reforming of big collective farms in 1990s, logistics, state and private ownership on land, balanced land-use, and, last but not the least, social parameters, including aging of local people in rural areas and their health support, etc.

The land fragmentation phenomenon is a typical feature for a lot of world countries since XVII century (Binns, 1950, p. 14), which has become a typical problem for husbandry of the Central Europe at the beginning of 1990.

Studying of land fragmentation problem is not investigated enough.

Fragmentation is plotting, parceling or separation (dispersion, scattering) of land plots (Popov, 2015, p. 52).

The institution of land plots fragmentation is an object of research for different foreign and Ukrainian scientists. According to O. Binns, land plots fragmentation is a stage in the evolution of legal forms of husbandry management organization, the presence of separate land plots usually scattered across vast territory being a distinctive feature of it (Binns, 1950, p. 14). Unlike Binns, T. Schultz defines fragmentation as irrational separation of farming land of an existing agricultural entity (Schultz, 1953, p. 145).

R. King and S. Barton (1982, p. 477) consider fragmentation as a situation, when an individual farm enterprise or a landownership consists of several spatially separated land plots, which can be small in size or of irregular shape.

In J. Dorosh's (2011) opinion, fragmentation is the separation of land into smaller parts in order to manage it more rationally, mainly as the result of inheriting it or other transactions, including those at the land market.

R. King and S. Barton (1982, p. 477) point at the presence of the following factors, which are typical for land fragmentation, namely land

size, land plots amount, shape, spatial distribution. At the same time, the land fragmentation phenomenon is characterized by other factors: number of land users, the distance between land plots, property right to land and land use right.

So, F. Douring and E. Papaheorhiu (1956, p. 545), studying land fragmentation pay special attention to the role of distance between land plots.

Thus, land fragmentation is a phenomenon that negatively influences efficient usage of land resources and activity of farming industry.

It is worth noting that land fragmentation has not always been a hindrance to the farming industry.

In this context, we should mention that land fragmentation once was one of the factors of farming industry reforming. Establishing of individual farming, i.e., farmsteads and "otrubnych khozyaystv" (a farmstead located at some distance from the main land plot) was one of the components of Stolypin reform 1906-1911 (Ukase of November 9, 1906) (Stolypin, 2003, p. 235).

Stolypin reform 1906-1911 corresponded to the traditional Ukrainian forms of land ownership, which contributed to the successful development of farmsteads and "otrubnych khozyaystv" in Right-Bank Ukraine. Despite fragmented location of farmsteads and "otrubnych khozyaystv", during the reform 434 736 of individual farms had been created (TsGIA, p. 226).

As may be seen from the above, the institute of land fragmentation was the basis for establishing of farmsteads and "otrubnych khozyaystv".

As of today, the land fragmentation phenomenon is typical for regions situated in mountainous areas and farm enterprises. In this case, landowners use the same ways of protection and land usage.

The land fragmentation phenomenon is typical for European countries, as well as for Ukraine, both having certain features at the same time.

Van Dijk (2003, p. 126) defined four kinds of land fragmentation: land ownership fragmentation, land

use fragmentation, inner agricultural entity fragmentation, separation of ownership from land use.

Western European countries have a problem concerning two kinds of fragmentation: land use related to farm size and inner fragmentation (Van Dijk, 2003, p. 126). However, the biggest problem for Ukraine is land ownership fragmentation and land use fragmentation.

Land ownership fragmentation and land use fragmentation substantially hinders promotion of long-term investments in husbandry and infrastructure development, because land masses belonging to dozens or hundreds of landowners who are independent in making decisions concerning purpose of their land plot. The problem is particularly acute for farms with reclamation systems (irrigation and draining), the legal status of which has not been defined yet. In Ukraine, there are 2.1 millions of ha irrigated and 3.3 millions ha of drained land, 26% of irrigation systems are in balance of agricultural producers, 71% – in community ownership, 3% in state ownership (Didkovska, 2015, p. 76).

We focused on three concrete cases of agricultural landscapes, that may characterize the general situation on land fragmentation in Ukraine, and the following considerations are based on current land-use by the chosen key plots.

The first key plot was chosen near Grozyne town of Korosten district of Zhytomyr region in forest zone (Figures 1, 2).

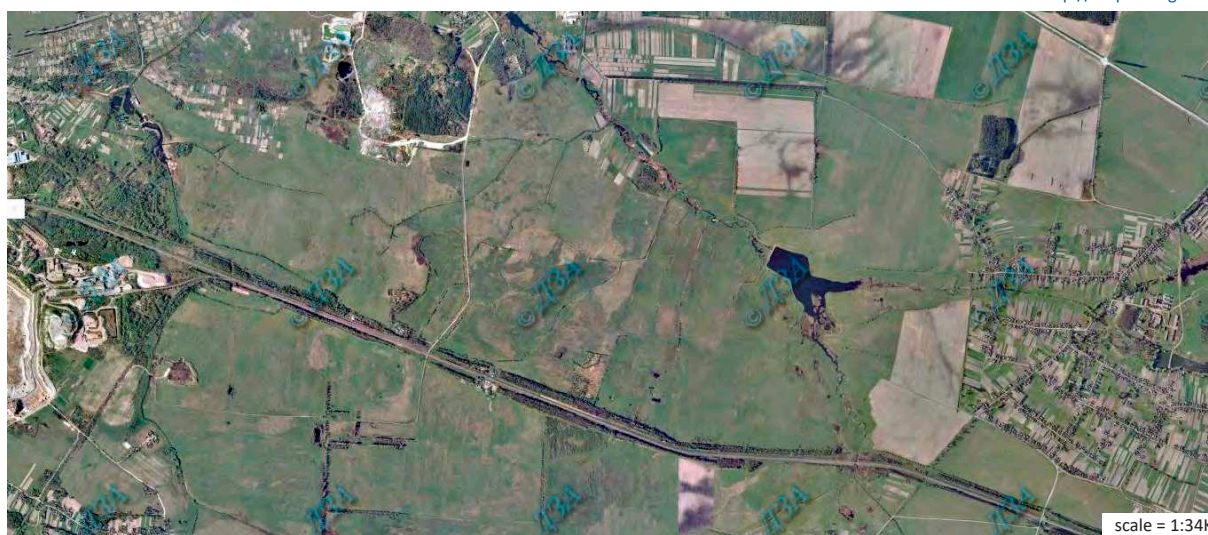
As a typical agricultural landscape for this zone, analyzed territory is forested about 25-45%, small towns and villages are often surrounded by small fields, where people grow mostly potato, wheat, and vegetables. There is also a part of abandoned lands, i.e. non-cultivated, which were left after restructuration of big collective farms of the soviet period. They appeared to be a big reserve for planning sustainable land use in the nearest future.

Cadastral land parcels of this territory are shown on Figure 1. Small individual parcels were obtained by division fields of big collective farms of the soviet time for local people in 1990-2000s, after land reform in Ukraine had started. The biggest land plots usually belong to state





**Figure 1.** Cadastral map of key plot 1



**Figure 2.** Orthophoto image of key plot 1



**Figure 3.** Cadastral map of key plot 2





**Figure 4.** Orthophoto image of key plot 2

ownership, it may contain not only agricultural lands, but also forestry or mining.

Orthophoto images, made for Ukrainian State Service for Geodesy, Cartography and Cadastre, are available free charge via StateGeoService as a part of the national public cadastral map. As shown on Figure 2, the landscape contains agricultural fields of different size, forested regions, watersheds (in the center to the right), mining (at left corner), as well as transport routes – roads and railways. It is a typical landscape for this zone.

The second key plot was chosen near Lebedivka village of Kamianka district of Cherkasy region in forest-steppe zone (Figures 3-4).

e can easily compare images on Figure 3 and Figure 4, because it is the same territory with the same scale, but different thematic layers from Public cadastral map are displayed. As it can be seen from cadastral division (Figure 3), big areas of fields of former collective farms were divided on small parcels of land, some of them are already involved to consolidation here – local people rent their land to agricultural companies or farmers, growing mainly so-called ‘cash crops’ – sunflower, canola (rapeseed), corn, barley, soybeans, etc. They often do not take care of soil properly, exhausting natural soil productivity.

The third key plot was chosen near Vysoke village of Melitopol district of Zaporizhia region in steppe zone (Figures 5, 6).



**Figure 5.** Cadastral map of key plot 3





**Figure 6.** Orthophoto image of key plot 3

On Figure 6, typical pattern of surge irrigation – green circles – can be seen easily. Some of these circles are very contrast, thus owners of small land parcels manage irrigation together or rent their land to a single farmer. Some of these circles on the right side of the image are hardly noticeable, then, irrigation was interrupted, but physical properties of cultivated soil were changed already.

The irrigation infrastructure is partly ruined, and on the one hand it is a catastrophe, on the other – it is a way to implement modern (highly effective, but costs-demanding at start) technologies, such as automated drip irrigation. Land use should be based on balanced influence of state authorities and legislation encouragement to maintain soil natural productivity. Current land ownership in many cases is an obstacle for sustainable landscape development, natural resources' conservation, effective management of resources, and, as a result, rising people's life quality.

The problems concerning land fragmentation are not sufficiently regulated by law. The solution of this spatial problem needs profound researching and applying a range measures contributing to the decrease of land fragmentation.

Due to the prolonging of the moratorium on selling of agricultural lands, agricultural lands may be obtained only by inheriting. Inheriting by several inheritors is especially negative an occurrence that causes the fragmentation of land plots. As the result, the amount of land plots in size of 1-4 ha

numbers more than 6 millions. Also, inherited land plots are not always used according to its intended purpose.

In this context, it is worth to mention Germany's experience, where there is a limitation to the number of inheritors in term of legislation and a simplified inheritance transfer procedure to a single inheritor and established minimal land plot size that may not be divided (Popov, 2016, p. 96).

Also, one may deal with the problem of inherited land plots fragmentation by introducing the voluntary land plots exchange. The voluntary land plots exchange is a voluntary exchange of land plots between three or more owners in order to spatial conditions of land usage (Popov, 2016, p. 96). Van Dijk T. (2003, p. 52) points out that such an exchange does not change land plots configuration or size, unlike the land consolidation.

The voluntary land plots exchange as a measure to overcoming land fragmentation is interrelated with the presence of a reserve (exchange) land fund.

The exchange land fund may be an instrument for implementing of agricultural policy in respect of the state influence on criteria concerning the allocation of land plots from the exchange land fund, structure of agricultural entities, functioning of the land market, support of small and medium commodity producers, development of the economy and agriculture in general.

Another measure to reducing the land fragmentation level is to create a land bank. During the land reform in Ukraine, the Land bank should be an instrument of improving the land turnover process, ensure the land consolidation process, become an integrate part of the reform.

In this context, it is worth to mention the historical experience of the Peasants' land bank during the Stolypin reform. The Peasants' land bank became one of the most important implementation mechanisms of the agrarian policy (Complete Collection of Laws of the Russian Empire, 1911, p. 989). 2 597 farmsteads had been created on the land bought with the help of banking credits in five provinces of Ukraine during the reform (Report of the Peasant Land Bank for the year 1905, 1915, p. 88).

According to Van Dijk T. (2003, p. 48), the land bank is used as a buffer that allows improving the conditions for agricultural entities without interfering with interests of landowners and land users.

The land bank has two functions in overcoming land fragmentation: increasing area of land use for agricultural entities and restoring the connection between owning a land plot and its usage by an owner personally.

Thus, the creation of the land bank is an important step for the state in finishing the land reform, which would have a positive influence in decreasing land fragmentation, land fragmentation, offering mortgage services and financial support to agricultural commodity producers.

In the conditions of formation of small agricultural land plots, consolidation of agricultural lands is the legal form of land reconstruction.

Land consolidation is an integrated system of measures in organization of territories of land use by consolidating of divided land plots in compact blocks, creating of legal and institutional mechanisms concerning avoiding land fragmentation and nature protection measures, carrying out the necessary improvements of agricultural entities, in particular, an irrigation infrastructure, road networks, measures to prevent erosion and improvement of natural landscape that are based on rationality and economic efficiency (Tkachuk, 2009, p. 12).

According to V. Nosik, dealing with the problem of agricultural lands consolidation is an objective necessity, from it depends whether husbandry and the social sphere of rural areas and state economy will develop or decline (Nosik, 2006, p. 228).

It is land consolidation which will allow creating proper conditions for introducing of the agrolandscape approach in land ownership when a single agricultural land user supports afforestation belts, irrigation systems, water bodies constitute a single nature and economic complex (Lisova, p. 228).

Land consolidation relations are substantially new kind of land relations in Ukraine, which do not have an effective enough facilitating mechanism and needs further improvement (Kulinich, 2011, p. 188).

In order to facilitate land consolidation, it is necessary to elaborate and pass the "Agricultural lands consolidation" Act of Ukraine that will fully regulate the above-mentioned relations (Kulinich, 2011, p. 188).

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## CONCLUSION

Land fragmentation has a great impact on land-use in all agriclimatic zones of Ukraine. Issues of small areas of land parcels comprise in less effective and less profitable management of land, negative effect on life quality of local people.

Consolidation of fragmented land parcels looks like the only chance to optimize land use of such territories. For sure, authors are not calling to cancel private property on small land parcels, shown in the article, and join it in ownership by state or private authorities, but land management and land policy, provided by central and local government authorities should consider issues outlined.



During the land reform in Ukraine, land fragmentation is one of the issues that negatively influence the efficient land resources usage, husbandry activity and land protection. The land fragmentation phenomenon is a typical feature for a lot of world countries, as well as for Ukraine. Land ownership fragmentation and land use fragmentation are the biggest problems.

The following factors are typical for land fragmentation, namely land size, land plots amount, shape, spatial distribution.

To solve the land fragmentation problem one needs to a range of measures, namely improvement of legal regulation of land law on land fragmentation; limit a number of inheritors; introduce a mechanism for simplification of legacy transfer to one inheritor and determine a minimal land plot size that may not be divided; establish voluntary land exchange; land exchange land fund; establish the land bank, introduce land consolidation institute; pass the "Consolidation of agricultural land" Act of Ukraine.

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