

# The Improvement of the Existing Land Ownerships and Land Tenures by Land Exchange in Ukraine

Olena Bugaienko

Land Management and Cadastre Department, Kyiv National University of Construction and Architecture, UKRAINE, Kyiv, Povitroflotsky Avenue 31, E-mail: lena\_bugaenko@mail.ua

*Abstract – The research is aimed at substantiation of the existing land tenures and land ownerships improvement in Ukraine based on the development of the approaches to land exchange. International experience of land exchange at land consolidation and land reallocation projects has been considered. The expediency of taking into consideration the qualitative, spatial and technological factors at removing general land tenure drawbacks in Ukraine have been substantiated.*

Key words – land exchange, agricultural land, land reallocation, land consolidation, land fragmentation.

## I. Introduction

At the current stage, the challenge of land tenure system improvement by spatial territory optimization is urgent in Ukraine. Cases of strip farming, far-away placement, erosion threatening land plot limits, cutting-in, land fragmentation, need for land regrouping aiming at nature conservation measures, etc. are wide spread.

In most cases, the existing situation is tied to land reforming including land parcelling. The agricultural land selling moratorium should be taken into consideration. In general, the effectiveness of measures on the existing land tenure improvement influenced by a set of social and political factors can be defined as low, consideration of the possibility of land reallocation mechanisms improvement at the current stage in Ukraine is an important issue.

## II. Peer land exchange as land reallocation mechanism

Land exchange is traditionally defined as one of the most common land reallocation mechanisms aiming at the removal of spatial land tenure drawbacks like strip farming (including the topographic strip farming), interspersion, far-away placement, folding, cutting-in, erosion threatening land plot limits. In the foreign practice land exchange is considered as a part of land reallocation [1] and land consolidation projects [2], [3], [4]. Using it, the issues of fragmentation, land allocation for nature conservation, infrastructural objects, squatting, etc., are resolved [2], [5], [6]. It is worth mentioning, there is a separate land consolidation type – consolidation through land exchange.

Peer land exchange is widely spread. Avoiding the land owner's losses in the process of its realization is the general principle. Respectively, the effectiveness of the exchange greatly depends on the land plots equal value substantiation.

Researches of UN Food and Agriculture Organization (FAO) [2] point out the equal value of land to be exchanged at land consolidation projects is predefined by soil quality and other factors sufficiently affecting the land use. The necessity for taking into consideration the land plots placement towards other land plots, roads, farmsteads and farm facilities.

Defining land plots as the peer ones in the process of land exchange in Ukraine should be relevant to the Civil Code of Ukraine in terms of the exchange agreement and the Tax Code of Ukraine which defines the notion of identical goods [7]. The value of land as the goods is defined in accordance with the existing value theories [8].

Considering the above mentioned facts it is desirable to scrutinize the exchange as the peer one in case land plots to be exchanged are of equal value according to a set of main natural and acquired properties from the point of view of its general functional role [7], [9].

## III. The core factors influencing the peer agricultural land exchange

Considering the above mentioned facts, characteristics of agricultural land plots as the production factor should be considered at their exchange [7]. Useful properties of the land plot like soil quality in accordance to demands on cultivation of crops and existence of improvements should be taken into consideration. Technological processing conditions predefine the production capability in case of the equal fertility. The placement of the land plot predefines the profit from land usage in case of equal production capability. The existence of easements or servitudes can cause agricultural production losses (Fig. 1).

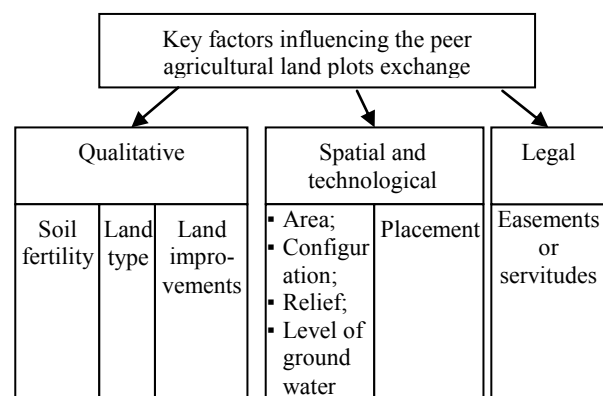


Fig. 1. The peer agricultural land exchange factors classification

## IV. The improvement of peer agricultural land exchange calculation

In the Ukrainian practice peer land exchange is calculated by Eq. (1):

$$S_k B_k = S_j B_j, \quad (1)$$

where S is the area of land plots i and k; B is the ball-bonitet of the corresponding land plot soil (specifies the soil quality by the core natural and acquired properties from the point of view of growing basic crops by 100-point scale) [10].

It is offered to take the specified influence factors into consideration by the equation:

$$K_1 \sum_{k=1}^n S_k B_k = K_2 \sum_{j=1}^m S_j B_j, \quad (2)$$

where S is the area occupied by the soil suitability group within the limits of land plots to be exchanged;

B – soil ball of the respective soil suitability group;

n, m – the quantity of soil suitability groups within the limits of the first and second land plots to be exchanged [11].

Value K is calculated as the product of separate factors depending on the presence of the corresponding factors by the equation:

$$K_i = K_{qi} \times K_{li} \times K_{imi} \times K_{fi} \times K_{ri} \times K_{gi} \times K_{mi} \times K_{oi}, \quad (3)$$

where K<sub>q</sub> is the factor characterizing the lowering of the soil quality as the result of contamination, erosion, etc.;

K<sub>l</sub> is the factor characterizing the type of agricultural land; K<sub>im</sub> is the factor characterizing the land improvements; K<sub>f</sub> is the factor characterizes configuration; K<sub>r</sub> is the factor characterizing relief; K<sub>g</sub> is the factor of the hydrographic characteristics of land plot; K<sub>m</sub> is the correction factor for land plot placement; K<sub>o</sub> is the factor characterizing the existence of easements or servitudes.

For valuation of the land plot configuration the alignment index which can be found by the equation is suggested:

$$K_f = \sqrt{2} \frac{\sum_{i=1}^n r_{\min}^i}{r_{\max}^i} \quad (4)$$

where r<sub>i</sub> - maximum and minimum distance from the centre of the land plot to side i; n - quantity of sides.

Maximal and minimal distance is defined for each side and can be distances to the turning points r<sub>m</sub> or perpendiculars to the sides r<sub>h</sub> (Fig.2).

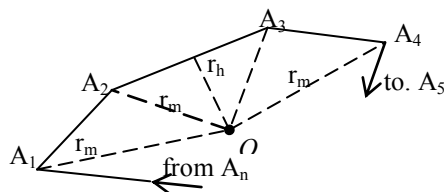


Fig. 2. Minimum and maximum distances from centre to irregular polygon sides

For the side A<sub>1</sub>A<sub>2</sub> (рис. 1) r<sub>m</sub>(max)=A<sub>1</sub>O, r<sub>m</sub>(min)=A<sub>2</sub>O, for the side A<sub>2</sub>A<sub>3</sub> – r<sub>m</sub>(max)=A<sub>2</sub>O, r<sub>m</sub>(min)= r<sub>h</sub>.

### Conclusion

Based on the analysis of the international experience, the perspective of peer exchange in Ukraine has been defined. With this aim, the notion of equality has been substantiated.

Accordingly, the key factors influencing the peer exchange of agricultural land plots have been singled out and substantiated.

The improved formula for calculating the area of agricultural land plots to be exchanged, considering the

quality of soil in accordance to the relative quality, the lowering of their quality in case of contamination, erosion, damage, agricultural land type, land improvements, configuration, folding, relief, ground water level, placement, land plot usage limitations and restrictions have been suggested.

### References

- [1] A. De Moor, “Urban Land Reallotment” presented at Geodesign Summit Europe, Salzburg, Austria, 27-28 January, 2015.
- [2] FAO, The design of land consolidation pilot projects in Central and Eastern Europe. FAO Land Tenure Studies no. 6. Rome, 2003.
- [3] M. Hartvigsen, “Land Mobility in a Central and Eastern European Land Consolidation Context,” Nordic Journal of Surveying and Real Estate Research vol.10, no. 1, pp. 23–46. Jan. 2014.
- [4] A. Van den Brink and M. Molema, “The origins of Dutch rural planning: a study of the early history of land consolidation in the Netherlands,” / Planning Perspectives, vol. 23, no. 4. – pp. 427–453, October 2008.
- [5] R. Giovarelli and D. Bledsoe, Land Reform in Eastern Europe - Western CIS, Transcaucuses, Balkans, and EU Accession Countries. [Online] Available: <http://www.fao.org/3/a-ad878e.pdf>. [Accessed 01 October 2001].
- [6] A. Hendricks and A. Liseč, “Land consolidation for large-scale infrastructure projects in Germany,” Geodetski Vestnik, vol. 58, no. 1, pp. 46–68, March 2014.
- [7] O. Bugaienko, “Doslidzhennia faktoriv, shcho vplyvaiut na provedennia rivnotsinnoho obminu zemelnykh dilianok silskohospodarskoho pryznachennia” [“The research of factors affecting the peer agricultural land plots exchange”], Mistobuduvannia ta terytorialne planuvannia - Urban construction and territory planning, vol.57, pp. 48-54, June 2015 (in Ukrainian).
- [8] L. N. Semerkova and N. Yu. Ulytskaia “Aksyolohyja marketynha sel'skoho zjajstvennykh zemel',” [“Axiology of agricultural land marketing”] Yzvestyia visshykh uchebnukh zavedenyi, Povolzhskiy rehyon. Obshchestvennye nauky - Higher educational establishment proceedings. Povolzhskiy region. Social sciences, vol. 1, no. 25, pp. 104-116, 2013 (in Russian).
- [9] M. Malashevskiy and O. Bugaienko, “The substantiation of urban habitats peer land exchange in Ukraine,” Geodesy and Cartography, vol.42, no. 2, pp. 53–57, June 2016.
- [10] M. A. Hendelman, et al., (1986). Zemleustroitelnoe proektirovanie [Land Surveying Design]. Moscow: Agropromizdat Publ., 1986 (in Russian).
- [11] V. K. Chibiriakov et al., “Vdoskonalennia metodyky rozrakhunku rivnotsinnykh zemelnykh dilianok silskohospodarskoho pryznachennia pry provedenni obminu” [“The development of peer agricultural land plots calculation methodology at the exchange process”], Inzhenerna geodezija - Engineering geodesy, no. 62, pp. 85-94, Dec. 2015 (in Ukrainian).