METHODOLOGICAL PARTICULARITIES OF AGRICULTURAL LAND CONSOLIDATION

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***Abstract**: Alongside other issues in contemporary agriculture, one of the most significant is the consolidation of agricultural land. The importance of land consolidation lies in creating optimal plot sizes, which enables the use of modern machinery and technologies and contributes to the overall development of rural areas. Land consolidation is not just a problem specific to the Republic of Moldova; it is a global issue. Most European countries have already addressed the challenges of fragmentation and land resizing. Currently, they are focusing on ecological and sustainability-related problems. In this context, agricultural land consolidation must be seen as an objective necessity — a continuation of land reform — and should be implemented based on a long-term national policy. The conceptual foundation of land consolidation lies in its role as a key link in the chain of land relations reform. This paper analyzes the methodology of the land consolidation process in the Republic of Moldova.*

***Keywords:** agricultural land consolidation; reorganization; subsidies; GIS; sustainable agriculture*

1. Introduction

Following the agrarian reform in the Republic of Moldova, which took place during the 90s, agricultural land was fragmented into small areas with an area between 0.10 ha and 3.00 ha, which led to the degradation of agriculture,

Research purpose: Investigation, streamlining and implementation of effective techniques, methods for the development of agriculture, by optimizing agricultural production, maintaining or increasing soil fertility, to improve living conditions, by applying agricultural land consolidation projects.

Research objectives: analysis of the existing situation in agriculture, establishing forms and methods of consolidation, application of GIS in consolidation projects.

Analyzing the experience of countries in the European Union,

According to experimental studies of land consolidation in Eastern Europe conducted by the Food and Agriculture Organization of the United Nations, the consolidation of agricultural land includes solving a variety of problems, starting with the rational and sustainable use of land, up to the revitalization of villages.

Land consolidation is applied not only in the field of agriculture, but according to international practices, analogous situations of excessive fragmentation are also found in other categories of land use such as: forestry, land for construction, etc.

Internationally, there is no consensus on the concept of land consolidation, but it is based on the exchange of land rights between holders, with the aim of rational and efficient use of land.

Land consolidation reduces or eliminates the unfavorable consequences influenced by fragmentation, with the aim of creating more extensive agricultural holdings.

2. Analysis of the existing situation in agriculture

The agrarian reform of the 1990s had a significant influence on the agricultural sector, through the fragmentation of agricultural land, through the implementation of the national program "Land". As a result of these processes, it has worsened considerably: soil fertility has decreased, harvests have decreased, agricultural land degradation processes have intensified, these unfavorable processes have generated and are generating negative consequences, to this day. The objectives of the agrarian reform have influenced and increased the economic crisis, including in the agricultural sphere. In order to develop agriculture, a solution to the problem would be to implement land consolidation projects.

Land consolidation is a process by which the negative effects of land parceling are reduced and eliminated, with the aim of forming larger and more productive agricultural households, which involves the reorganization of agricultural land, in order to manage it more economically efficiently.

To ensure a viable and sustainable agricultural sector, the implementation of agricultural land consolidation projects is crucial, which involves:

- protecting soils against erosion;
- increasing agricultural production capacity;
- improving or maintaining long-term fertility;
- sustainability of agriculture and protection of natural resources;
- subsidizing agriculture.

3. Forms and methods of agricultural land consolidation

Land consolidation stages	
applied in the European Union [1]	applied in the Republic of Moldova [2]
1. preparation phase (which may include feasibility) 2. reparcelling phase 3. registration and implementation phase	1. initiation stage 2. proposal development stage 3. proposal implementation stage

In the practice of European countries, two major forms of agricultural land consolidation are encountered: [1]:

1. voluntary consolidation
2. compulsory consolidation

The forms of land consolidation are described and characterized in Fig. 1:

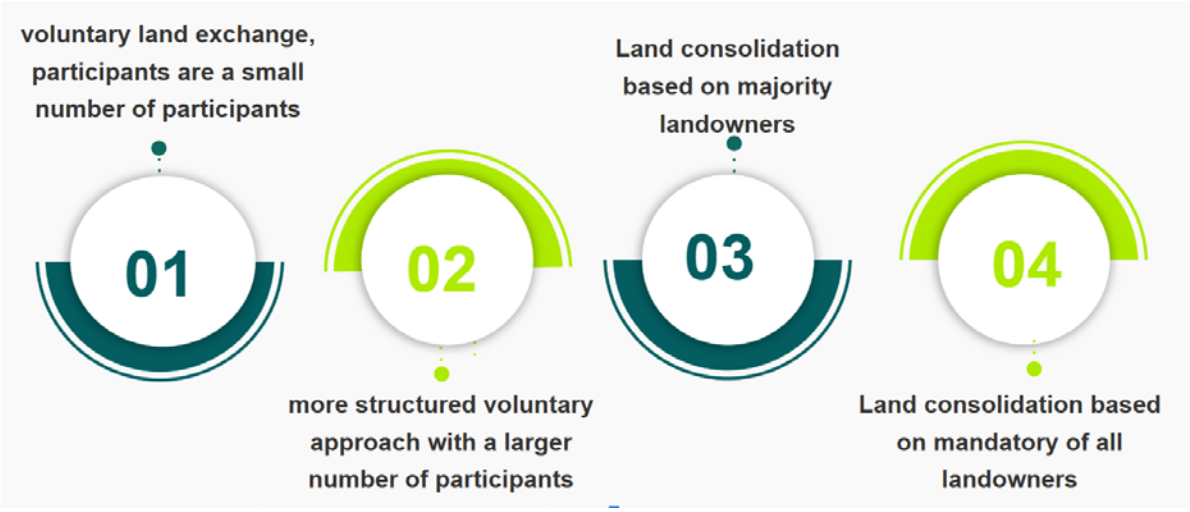

Fig.1. Description of forms of land consolidation

In the Republic of Moldova, only one form of land consolidation is applied - VOLUNTARY. This involves the voluntary participation of landowners, by signing an agreement, based on the free decision chosen by the landowner (holder), on the cooperation of all three, with the aim of forming larger areas of land, located more compactly, to be processed more efficiently and rationally.

Land consolidation methods that can be applied in the Republic of Moldova [2]:

1. Sale purchase - is one of the most commonly used methods by which landowners can buy or sell land owned by them. Land exchange - is an action by which two or more parties transfer their ownership rights over land plots, in order to obtain a larger lot.
2. Land exchange - is an action by which two or more parties transfer their ownership rights over land plots, in order to obtain a larger lot.

Fig.2. Reprezentarea consolidării terenului prin metoda de schimb [4]

a) până la efectuarea schimbului de teren b) după efectuarea schimbului de teren

3. Formation of immovable property

a) by merger - an owner owns several adjacent plots of land (with a common border), which can be united and transformed into a single plot of land.

b) by combination:

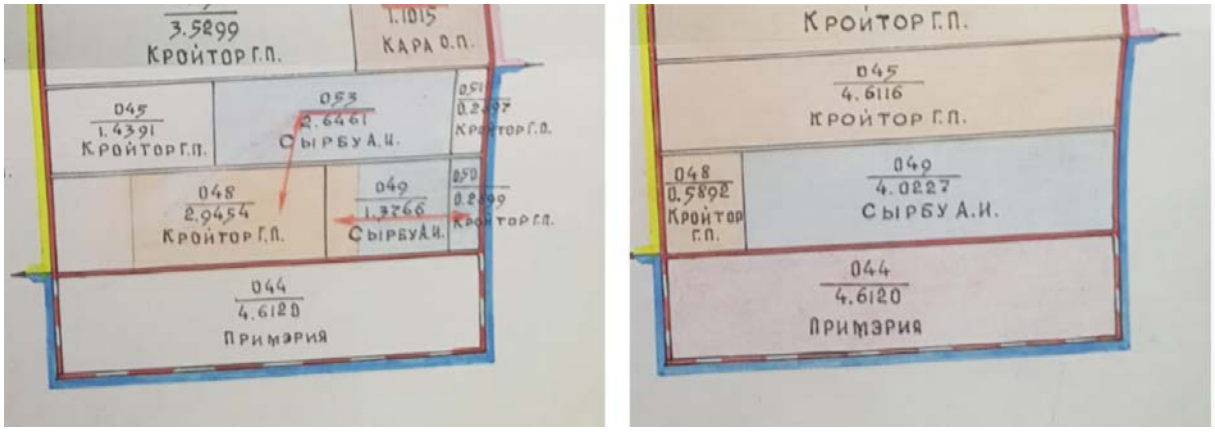

Fig. 3. Representation of land consolidation by the method of forming the immovable property [4]

4. *Through shared use of land* - signing agreements or association contracts with other agricultural households or owners, for the integration and efficient and rational use of small-scale land.

4. Applying GIS in land consolidation projects

The implementation of a land consolidation project requires the secure management of both administrative data (e.g. land rights) and geospatial data (e.g. cadastral map, cartographic map, etc.).

The use of GIS or other digital tools for the implementation of land consolidation allows:

- ❖ to automate processes;
- ❖ to reduce the risk of human error

Most European countries use country-specific GIS tools due to the lack of a standardized system.

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The use of GIS technologies for administrative authorities and agricultural households is an important tool in decision-making, namely:

1. Allow for detailed geospatial analysis of land (identification of land fragmentation);
    a) GIS can create detailed maps that show how agricultural land is distributed, making it easier to identify areas of fragmented land.
    b) Through GIS, it is possible to analyze the size and shape of parcels to detect land fragmentation and which areas are most affected.
2. They allow identifying the best solutions for consolidation and planning their use in a more efficient way.
    a) Using information about soil typology and relief;
3. It helps integrate, analyze, and visualize geographic data.
    a) can identify land available for exchange, sale-purchase, lease, etc.
    b) Use of GIS by Authorities to develop appropriate policies for the implementation of land consolidation projects
    c) GIS helps identify regions where investment in land consolidation is needed, having a direct impact on the distribution of funds or subsidies.

5. Conclusions

A solution to overcome the agricultural crisis, caused by excessive land fragmentation and irrational use of resources, would be the implementation of agricultural land consolidation projects, the application of GIS technologies.

As a result of land consolidation, subsidizing the agricultural sector will be more accessible, investments will be more efficient to apply. The variety of applicable forms and methods, such as sale-purchase, land exchange, long-term lease, provides more possibilities for coherent land management.

In the efficient and sustainable management of agricultural resources, an essential role is given to modern technologies such as GIS. By assimilating geographic and geospatial data,

it is possible to automate processes, reduce the risk of human error, create detailed maps that show how agricultural land is distributed, facilitating the identification of fragmented land areas, it is possible to analyze the size and shape of plots, to detect land fragmentation and which areas are most affected.

6. References

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