VILNIUS TECH
Vilnius Gediminas Technical University

Geodesy and Cartography
ISSN 2029-6991 / eISSN 2029-7009
2021 Volume 47 Issue 3: 131–138
https://doi.org/10.3846/gac.2021.12791

UDC 528.931

THE AIMS AND TRENDS OF THE SUSTAINABLE LAND TENURE FORMATION IN UKRAINE: THE SPATIAL ASPECT

Mykola MALASHEVSKYI[1*], Olena MALASHEVSKA[2]

[1]*Problems of Land Development and Land Cadastre Department, The Institute of Land Management of National Academy of Agrarian Sciences of Ukraine, Kyiv, Ukraine*
[2]*Geodesy and Cartography Department, National University of Life and Environmental Sciences of Ukraine, Kyiv, Ukraine*

Received 22 May 2020; accepted 17 August 2021

Abstract. The spatial aspect of the challenge of the sustainable land tenure formation has been scrutinized in the article. There is a set of unresolved issues at the point where interests of land owners, land users and the government clash, that witnesses the absence of effective mechanisms of the formed land tenure system improvement. At the transition to the market relations, with the private land property environment, new effective approaches to land redistribution and rational land use support are necessary. The research objective is the development of a complex approach to the land tenure spatial improvement for the sustainable development. Substantiation is carried out for the transition economy with Ukraine as an example. Land redistribution aiming at urban settlement area optimization and agricultural land tenure in the context of the social environment and economic benefit has been substantiated. The effectiveness of the spatial land improvement in the context of the national and local budget land fee revenues has been substantiated.

Keywords: land tenure, sustainable development, land improvement, land reallotment, land reform, land taxation, land consolidation.

Introduction

The formation of the sustainable land tenure depends to a great extent on the changeable social and economic conditions. After Ukraine and many Eastern European countries have gained independence and launched market-oriented reforms, new forms of ownership right came into being. The land tenure system was reorganized including in particular the spatial aspect. Due to the changing business environment, the challenge of an ineffective inhabited localities land tenure and agricultural land use outside the inhabited localities has arisen. Generally, an important constituent of the sustainable land tenure are spatial conditions for environmentally safe and cost effective land tenure. Under existing conditions, there is a natural need for the spatial land improvement.

The issue of spatial land organization improvement is scrutinized as an integral constituent of the sustainable development measures (Giovarelli & Bledsoe, 2001; Food and Agriculture Organization of the United Nations [FAO], 2003). especially in the context of the production enhancement, job preservation and creation (especially in rural areas), improvement of working and living conditions, land use improvement, conservation and protection of natural and cultural heritage (Thomas, 2006). The social, economic and environmental aspects of land use are also scrutinized (Attenberger, 2002).

The need for the search of effective land redistribution mechanisms at the final stage of land reforming as a constituent of the economic reform is represented in researches and developments on the sustainable land tenure in Eastern Europe (Hartvigsen, 2015; FAO, 2004). The recommendations (FAO, 2003; Gedefaw et al., 2019) on the considering the land owners' and land users' interests at land management were developed in such conditions. Resolving and prevention of land conflicts combined with the creation of a responsible land resources management institution is considered to be the foundation stone of the sustainable development (Wehrmann, 2017).

Considerable attention is paid to the issues of developing of approaches to the optimization of the fragmented agricultural land (Attenberger, 2002; FAO, 2003, 2004), as well as the inhabited localities land with the existing housing (De Moor, 2015). Land consolidation and reallotment

*Corresponding author. E-mail: *mykola.malashevskyi@gmail.com*

mechanisms designed for the resolving of such issues and the related issues of taxation have been addressed (Rheinfeld, 2016).

Thus, some single spatial improvement measures and some individual economic and tax instruments are explored in the existing researches. The spatial aspect of the sustainable development is multifaceted, the existing challenges are interdependent, it is reasonable to solve them based on the solid complex approach.

The research objective is the formation of a complex approach to the spatial land tenure improvement for the sustainable development. Substantiation is carried out for the transition economy with Ukraine as an example.

1. The challenges of the spatial land tenure according to the aims of the sustainable development

Land tenure rationalization should meet the interests of private owners, local communities and the government. In the present context, land tenure challenges are very diverse and one of the most important issues of the sustainable territory development is the challenge of the spatial land tenure. With the existing private land property development, this issue generates a challenge of the spatial improvement of the existing land ownerships and land tenures.

Although the spatial improvement is a multifaceted challenge for land plots of various designated and actual usage types, it should be pointed out that land as the spatial basis is limited. This fact predefines the task definition and the search of the sustainable land tenure mechanisms based on the analysis of demands and problems of various land tenure types. As the result of the research, key tasks of the spatial land tenure improvement in Ukraine have been singled out (Figure 1):

- Existing land tenure area and placement optimization;
- Land allocation within the existing land tenure system;
- Existing land tenure regulation in accordance with its actual use.

Addressing of these tasks is a necessary constituent of the land tenure rationalization measures. These three groups of the spatial improvement tasks will be carefully examined below.

1.1. Land allocation for environmental and infrastructural facilities

The urgent challenges are: the environmental facilities usage type developing and retaining and the national ecological network developing (which includes water conservation zones, shelter forests, recreational land used for mass recreation, tourism and sporting events, valuable wildlife species habitats, etc.). The hydraulic facilities and amelioration and irrigation systems erection and operation is an important issue. The placement of cemeteries, sports grounds, pre-school facilities, parks, etc. is not envisaged in human settlements. It is necessary to state that the placement or improvement of the engineering and transport infrastructure facilities, especially highways, bridges, crossovers is of special difficulty. These issues (defined by legislation as social necessity or public need) envisage land reallocation in the environment of the established land tenure and, with rare exceptions, are not resolved on the agreement stage with land plots owners.

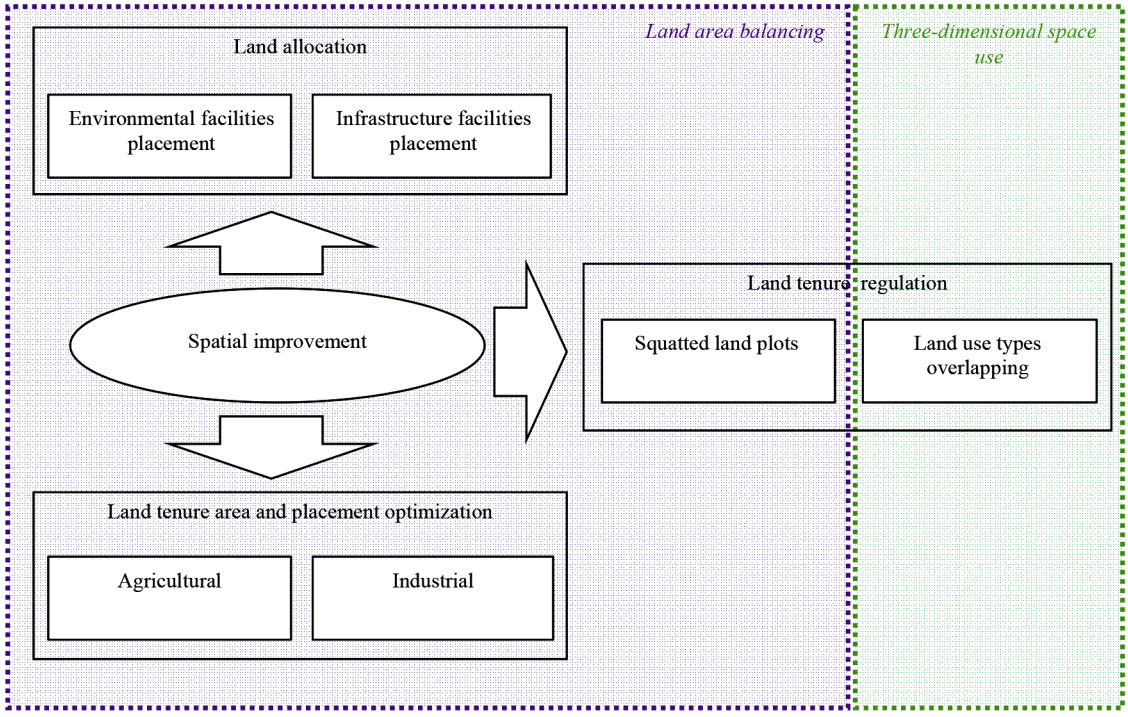

Figure 1. Key tasks of the spatial land tenure improvement in Ukraine

1.2. Land tenure area and placement optimization

Lack of unoccupied land needed for the most major cities appropriate development is an urgent concern. A tendency to the green spaces reduction, housing densification, etc. is observed. According to State Statistical Reporting, the biggest of the intensively used areas within the inhabited locality are occupied by built-up areas and industrial land. Regulatory requirements for the required housing land plot area are predefined by legislation of Ukraine in effect, in contrast to land plots occupied by production enterprises.

When Ukraine gained its independence, many industrial enterprises within the inhabited localities reduced their capacity or closed down operation, however, they retained their excessive land plots (Malashevskyi et al., 2018). The important issue of shifting the industrial enterprises out of the inhabited areas aiming at the available land increase and the urban environment pollution reduction is not resolved. The withdrawn Law of Ukraine on Land Fee (Verkhovna Rada of Ukraine, 1992), preconditioned five-fold taxation of the land allocation limit exceeding share of land occupied by enterprises, establishments and organizations (excluding agricultural land). This provision is not present in the Tax Code of Ukraine (Verkhovna Rada of Ukraine, 2010), which has replaced the abovementioned law. Return of this provision, provided there is a substantiated approach to the calculation of oversize area of enterprises with reduced capacity, can make it possible to increase land fee revenues. In case the enterprise makes a decision to disclaim the excessive land, it offers an opportunity to use it for needs of the local community.

Agricultural and industrial enterprise land tenure placement and area significantly impact the resulting profitability, environment, comfort and living standards. Ukraine is one of the countries having the urgent need for agricultural land consolidation (Hartvigsen, 2016; Sabates-Wheeler, 2002; Malashevskyi et al., 2018). Average area of land plots formed as the result of privatization of land owned by government and collective farms is 40,000 sq.m. As the result, agricultural enterprise land tenure consists of a number of land plots often having no shared boundaries. Due to the absence of effective land management mechanisms, the challenge of the formation of unified land masses is not resolved despite of some legislative initiatives.

1.3. Land tenure regulation at land usage types overlapping and squatted land plots

At considering the spatial urban land tenure system, the tendency for active development of the underground and overground space and not only the ground space is observed. Limited supply and value of urban land predefine an extensive placement of commercial facilities like retail businesses, food outlets and billboards on public land. The need for land tenure regulation is predefined by the situation when land plots formed for a certain usage type (usually, free of tax or with a minimal tax rate – public land) are used commercially, thus impeding the original designated use. The use of the transport infrastructure underground space (Figure 2), ground space (Figure 3) and overground space (Figure 4) is widespread.

In case a commercial facility is placed over, under or on the public land, land tax is not paid by the owner of such objects.

It is worth mentioning that the land plot has been utilized aiming at a particular function and has improvements with respective spatial and technical characteristics, for example, the width of bridges, underground passages, sidewalks and communication lines or utilities available. In case the designated use the land plot has been designed for is overlapped by a commercial use, an additional load on the improvement is developed and operating conditions are infringed. As the result, costs are increased and covered by the government or local community.

The lack of proper regulation of this issue is a factor of the impaired comfort and safety for inhabitants and land fee revenues reduction.

At the formation of land fee, land plot as a part of land surface with a certain location, set boundaries and defined rights (Verkhovna Rada of Ukraine, 2010) acts as the object of taxation (Verkhovna Rada of Ukraine, 2001) (Figure 5).

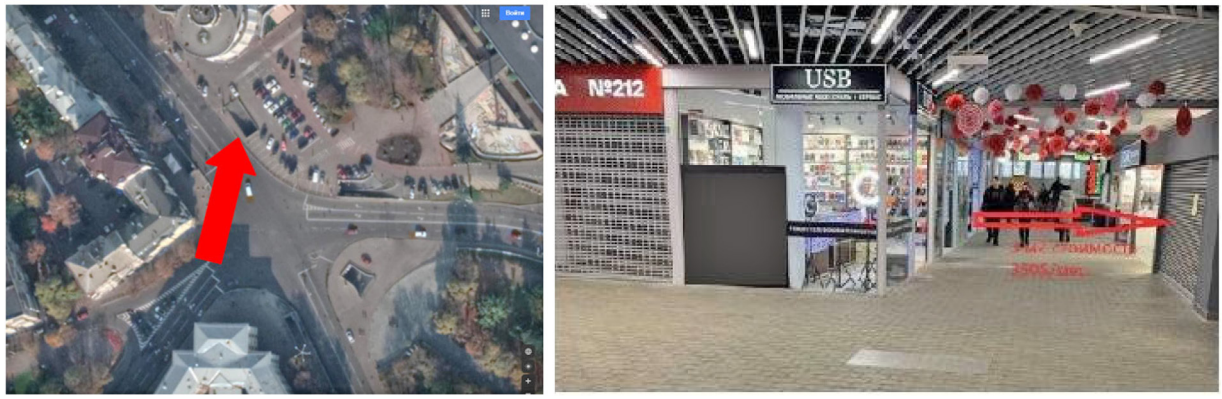

Figure 2. Retail business in the underground passage (Kyiv) (source: Google Maps 50.440881, 30.550080; OLX, 2021)

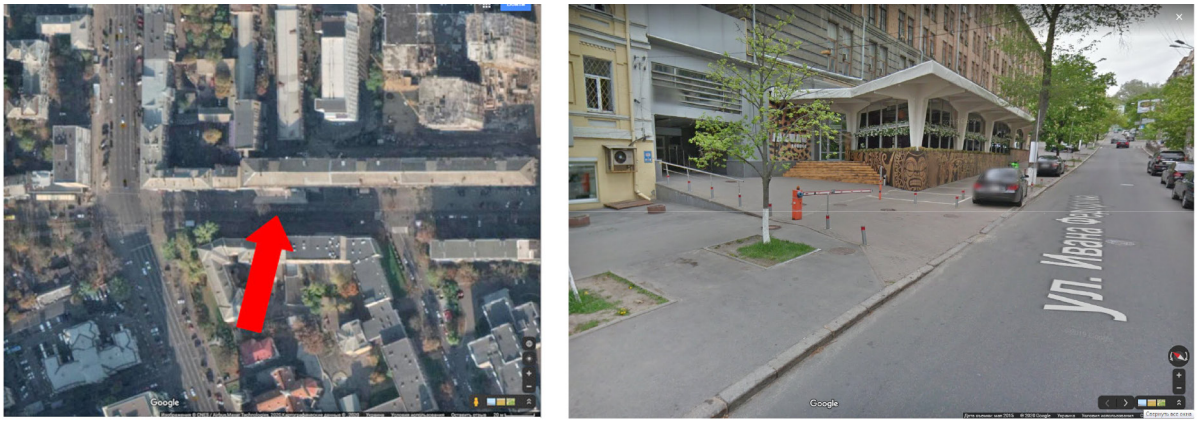

Figure 3. Food outlet summer area on the sidewalk (Kyiv) (source: Google Maps 50.428154, 30.517687)

Figure 4. Retail facility in the overpass clearance on the sidewalk (Kyiv) (source: Google Maps 50.428154, 30.517687)

The notions of joint ownership and combined functional use are defined by legislation, however, they do not reflect the situation when usage types overlap. Land plot under a building jointly owned by a number of individuals is subject to taxation together with the building surrounding grounds. At the mixed usage, for instance, when a part of a residential building is used for commercial purpose (retail store, hairdressing salon, etc.), land tax is collected proportionally to the occupied area of the building (Figure 6):

$$T = 2.5 \times T_{lp} \frac{S_c}{S_t}, \quad (1)$$

where T – is land tax for the commercial use of the building; 2.5 – is tax rate for the commercial use; T_{lp} – is tax for the land plot calculated with the tax rate equal to 1 for residential areas; S_t – is the area of the building; S_c – is the area occupied by the commercial facility.

There are no land tenure regulation norms for land use types overlapping. At the same time, commercial facilities

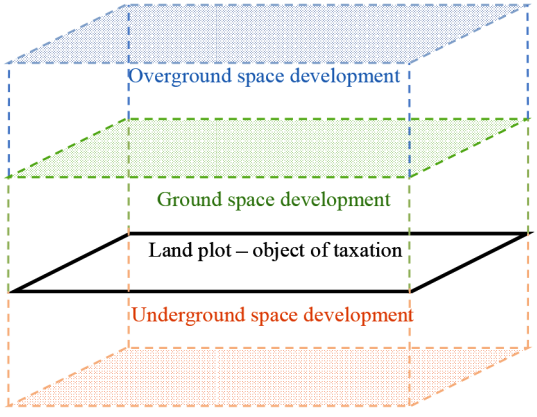

Figure 5. Land plot as the spatial basis and the object of taxation

Figure 6. Commercial use of a part of a residential building

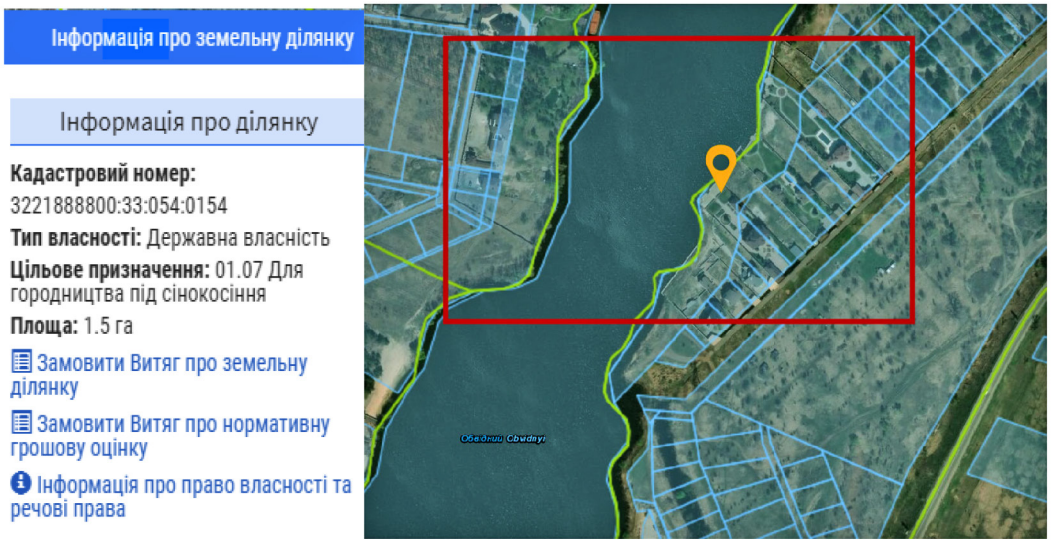

Figure 7. Land tenure within a water body buffer zone in accordance to the national public register (Public Cadastral Map of Ukraine)

placement and operation on the urban public land is extensive and tends to grow. Violation of the specified land tenure terms and conditions is one more important issue. Squatted land plots and the violation of land tenure terms and conditions should be addressed in the economic and environmental aspects. Water body buffer zones development and non-purpose use of allotment gardens are the most widespread cases of the violation of land tenure terms and conditions. For example, land plots allotted for vegetable gardening and hay harvesting within the water body buffer zone are actually used for residential development (Figures 7, 8). It leads to alteration of the hydrological regime of rivers, their pollution, poses a threat of waterflooding and obstructs access to water bodies.

Taking into consideration the abovementioned facts, the development of strategy and multifaceted approach to the use regulation of public land and land with special usage types and rationalization of land tenure which demands the alteration of spatial characteristics of land plots is reasonable.

Figure 8. Actual land tenure within a water body buffer zone

2. Mechanisms and perspectives of spatial improvement

It is reasonable to solve the challenges arising in the context of the spatial improvement using the economic, legal and land management mechanisms. At the current stage, the basis of their effectiveness is their alignment with market relations and private property and the tendencies of the three-dimensional space development.

Aiming at the spatial improvement of land tenure, the improvement of measures on land reallotment and land taxation approaches as the economic incentive mechanism of the effective land use is suggested (Figure 9).

Land reallotment and taxation instruments are suggested to be used for the tasks of the spatial land tenure improvement (see Figure 1). Considering land plots with overlapping land use types, taxation by each land use type is suggested. Considering production enterprise areas and squatted land plots, it is suggested to combine taxation and land reallocation. In the industrial areas, production enterprise oversize area is singled out.

Production enterprise oversize area is supposed to be taxed with an increased rate or expropriated and involved in the process of reallotment as land reserves aiming at the optimization of the urban spatial organization. In case squatted land plots are discovered, it is suggested that they are returned to the government or local community in the original condition according to their designated use. Where permitted, land users ought to legally register their ownership or use right and pay land fee.

For agricultural land, redistribution of land plots aiming at land consolidation is suggested. It is necessary to single out the process of the field roads network optimization, which facilitates a more effective use of fertile land in the future.

The tasks considering land allocation within the existing land tenure system are resolved in the course of reallotment at the expense of land reserves.

Land reserves are formed from the squatted land plots, production enterprise oversize areas, through the excessive field roads optimization and land plots sold by private owners based on the mutual consent of parties. As the source of formation of financial reserves, taxation of land plots with overlapping usage types, taxation of the limit-exceeding land areas by a special tax rate and legalization of squats is suggested. These tax revenues are supposed to make up a significant part of the local government's revenue in the future, thus providing financing for the economic and social measures in the community.

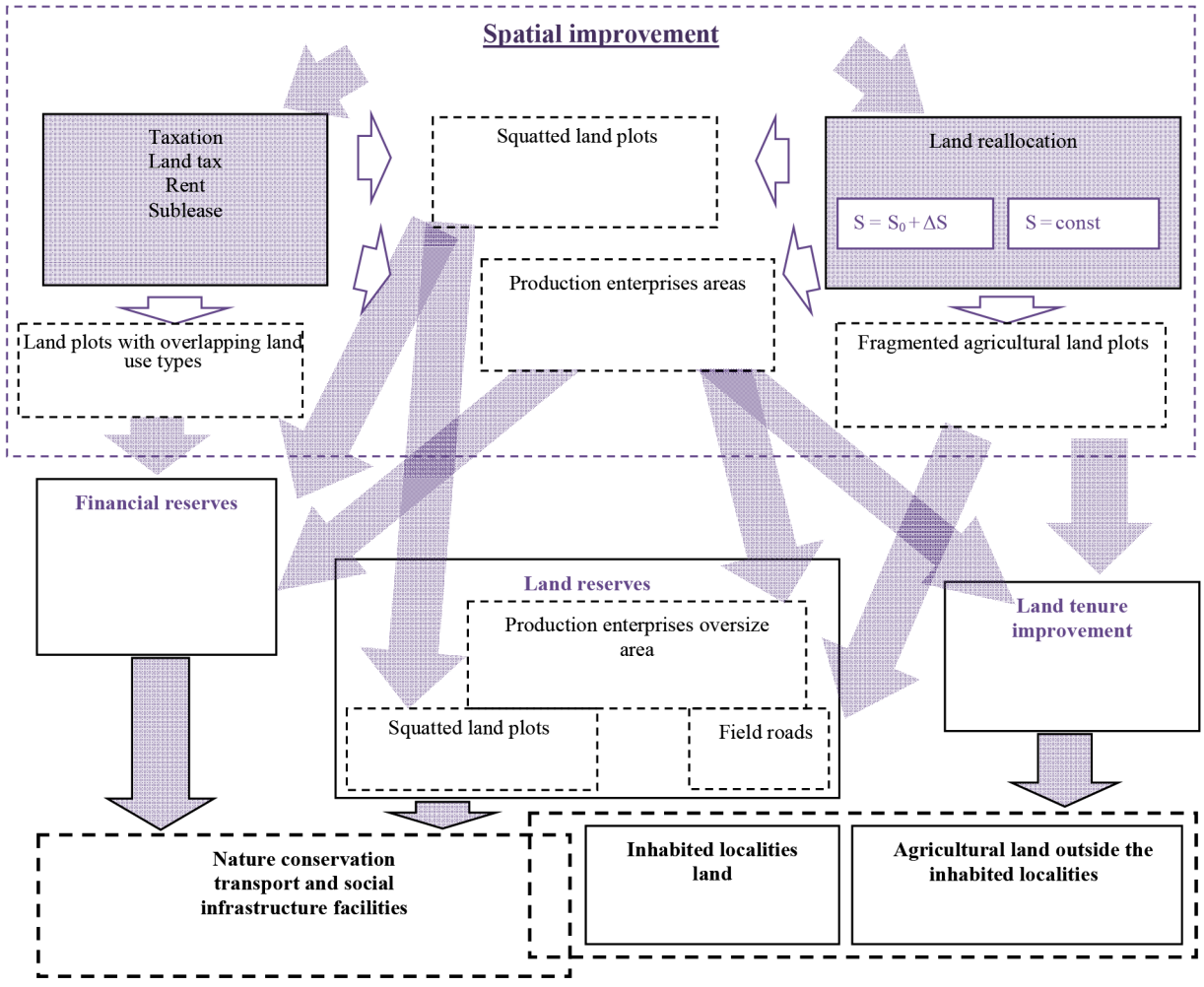

Figure 9. Spatial improvement measures

In the process of the implementation of the abovementioned measures the following is envisaged: a) the formation of financial reserves and land reserves for nature conservation, transport and social infrastructure; b) the improvement of structure of the inhabited localities land and agricultural land outside the inhabited localities.

At the current stage, it is suggested to single out the notion of Three-dimensional Improvement from Urban Land Consolidation (Louwsma et al., 2014), (Land Reallotment (De Moor, 2015) / Land Re-Adjustment (Lemmen et al., 2012)).

Respective measures are supposed to be carried out on the complex multifaceted approach basis. It is suggested to make respective corrections to the land, tax and environmental regulations in order to legislatively support these measures. It is suggested to implement the multifaceted approach to the spatial improvement in the sample standards of land management projects and land relations development strategies.

3. Discussion

Approaches to land tenure spatial improvement are present in spatial planning (Pezzagno et al., 2020; Tobias & Price, 2020), land consolidation (Lerman & Cimpoies, 2006; Pašakarnis & Maliene, 2010; Yimer, 2014), and land reallotment (De Moor, 2015; Home, 2007; Viitanen, 2000) theories. At the moment, researches considering approaches to urban settlement 3D model development and use (Biljecki et al., 2015; Coors & Ewald, 2005; Sumrada, 2009) are widespread. However, researches in this area have a great number of optional methods which do not provide the unambiguous solution of the specified spatial improvement challenges.

According to the existing practice, land improvement issues lead to the clash of interests of land owners, land users and the government. They are not being resolved, that witnesses the need for the substantiation of new approaches and technical solutions concerning land management and at the current stage of land relations reforming and in the future. At the spatial improvement, it is often impossible to align monetary compensation with land owners (in case of land alienation) and set land use conditions for land owners. The examination has revealed the impossibility to align such issues which is predefined by that the only substantiated compensation can be the provision of an optional land plot. Therefore, the provided concept is based on land reallotment. At the same time, it is suggested to complete land reallotment with taxation instruments.

Taxation as the promotion of effective land use is specified by the suggested approach. This instrument is applied to production enterprise oversize area and squatted land plots in combination with land reallotment, i.e. land owner (user) must pay land fees on special deals, otherwise, land plots will be alienated and included in the process of reallotment. It is suggested to improve land plots with overlapping land use types by supplementary taxation whereas agricultural land should be reallotted in case the need for improvement arises. The supplementary taxation is unjustified because there is a special taxation rate for commercial agriculture and supplementary taxation of individuals growing crops for their own needs will deteriorate the well-being of the population.

Conclusions

At the evaluation of the environmental condition and land use effectiveness, the need for the resolving of the urgent issue of the spatial improvement has been substantiated. A set of the main challenges of the spatial territory organization has been singled out, the resolving of which predefines the development of the sustainable land tenure in Ukraine. Three key tasks of the spatial land tenure improvement in Ukraine have been singled out: 1. Existing land tenure area and placement optimization (agricultural and industrial land); 2. Land allocation within the existing land tenure system (environmental and infrastructure facilities placement); 3. Existing land tenure regulation in accordance with its actual use (Squatted land plots and Land use types overlapping).

The principle of land balance and the integrity of the three-dimensional space usage is the gist of the methodology. It is suggested to remove the spatial land organization drawbacks based on the multifaceted approach using land reallocation and taxation mechanisms. Possibilities of forming the land reserves and financial reserves are provided in the approach.

It is suggested to develop "rules of the game" at the land tenure spatial drawbacks removal based on land reallotment and differential taxation. The implementation of such approach helps to minimize the "unmanageability" of the spatial improvement issues. The research has revealed the "unmanageable" issues of the improvement alignment arise in cases the only substantiated compensation is an optional land plot (the land balance is retained), and the improvement of land plot characteristics is the incentive for the spatial improvement. In case the land use is violated, differential taxation is the most effective instrument.

Suggested tasks and course of the spatial improvement form the basis of land management measures. Depending on the legal regulation, they can be a constituent of land management projects or land consolidation strategies. It has been suggested for the first time to supplement general approaches to the improvement (consolidation) of agricultural land (land consolidation) and improvement (reallotment/consolidation) of built-up areas with approaches to the improvement (consolidation) of three-dimensional space.

Funding

This work wasn't supported by any funding or grant-awarding body.

Author contributions

Mykola Malashevskyi was responsible for the design and development of the data analysis. Olena Malashevska was responsible for data collection, analysis and interpretation.

Disclosure statement

The authors have no competing financial, professional, or personal interests from other parties.

References

Attenberger, J. (2002). *The right mix of instruments – land consolidation, land management and land banking in Bavaria*. http://www.fao.org/fileadmin/user_upload/reu/europe/documents/LANDNET/2002/Germany_bavaria_paper.pdf

Biljecki, F., Stoter, J., Ledoux, H., Zlatanova, S., & Coltekin, A. (2015). Applications of 3D city models: State of the art review. *ISPRS International Journal of Geo-Information*, *4*(4), 2842–2889. https://doi.org/10.3390/ijgi4042842

Coors, V., & Ewald, K. (2005). Compressed 3D urban models for internet-based e-planning. In *Proceeding of the 1st International Workshop on Next Generation 3D City Models*, (pp. 89–93). EuroSDR Publication. https://www.researchgate.net/publication/228941550

De Moor, A. (2015, January 27–28). Urban land reallotment. In *GeoDesign Summit Europe*. Salzburg, Austria. https://proceedings.esri.com/library/userconf/geodesign-euro15/papers/geoeuro_10.pdf

Food and Agriculture Organization of the United Nations. (2003). *The design of land consolidation pilot projects in Central and Eastern Europe*. FAO Land Tenure Studies, 6. Rome. http://www.fao.org/docrep/006/Y4954E/y4954e00.htm

Food and Agriculture Organization of the United Nations. (2004). *Operations manual for land consolidation pilot projects in Central and Eastern Europe*. http://www.fao.org/publications/card/en/c/7de3d510-1765-58aa-9713-7789f4c1c621/

Gedefaw, A. A., Atzberger, C., Seher, W., & Mansberger, R. (2019). Farmers willingness to participate in voluntary land consolidation in Gozamin District, Ethiopia. *Land*, *8*(10), 148. https://doi.org/10.3390/land8100148

Giovarelli, R., & Bledsoe, D. (2001). *Land reform in Eastern Europe – Western CIS, Transcaucuses, Balkans, and EU accession countries*. http://www.fao.org/3/ad878e/AD878E00.htm

Hartvigsen, M. (2015). *Experiences with land consolidation and land banking in Central and Eastern Europe after 1989*. Rome. http://www.fao.org/3/a-i4352e.pdf

Hartvigsen, M. (2016). Land consolidation in Central and Eastern Europe – Integration with local rural development needs. In *2016 World Bank Conference on Land and Poverty*. Washington. https://www.academia.edu/24237881/LAND_CONSOLIDATION_IN_CENTRAL_AND_EASTERN_EUROPE_INTEGRATION_WITH_LOCAL_RURAL_DEVELOPMENT_NEEDS

Home, R. (2007). Land readjustment as a method of development land assembly: A comparative overview. *Town Planning Review*, *78*(4), 459–483. http://www.jstor.org/stable/40112733

Lemmen, C., Jansen, L. J. M., & Rosman, F. (2012). *Informational and computational approaches to land consolidation*. https://www.researchgate.net/publication/257313849_Informational_and_computational_approaches_to_land_ consolidation

Lerman, Z., & Cimpoies, D. (2006). Land consolidation as a factor for rural development in Moldova. *Europe Asia Studies*, *58*(3), 439–455. https://doi.org/10.1080/09668130600601933

Louwsma, M., Van Beek, M., & Hoeve, B. (2014). *A new approach: Participatory land consolidation*. https://www.fig.net/resources/proceedings/fig_proceedings/fig2014/papers/ts02d/TS02D_louwsma_van_beek_et_al_7020.pdf

Malashevskyi, M., Kuzin, N., Bugaenko, E., Palamar, A., & Malanchuk, M. (2018). Algorithm for calculating the normative area of an industrial enterprise land plot. *Geodesy and Cartography*, *42*(2), 63–70. https://doi.org/10.3846/gac.2018.2001

Malashevskyi, M., Palamar, A., Malanchuk, M., Bugaienko, O., & Tarnopolsky, E. (2018). The opportunities for use the peer land exchange during land management in Ukraine. *Geodesy and Cartography*, *42*(4), 129–133. https://doi.org/10.3846/gac.2018.5405

OLX. (2021). *Rent 23.83 sq.m. Arsenal shopping center, Pecherskyi district (center) near Novus*. https://www.olx.ua/d/obyavlenie/arenda-23-83-kv-m-tts-arsenal-pecherskiy-r-n-tsentr-vozle-novusa-IDMm6fa.html?reason=ip%7Ccf

Pašakarnis, G., & Maliene, V. (2010). Towards sustainable rural development in Central and Eastern Europe: Applying land consolidation. *Land Use Policy*, *27*(2), 545–549. https://doi.org/10.1016/j.landusepol.2009.07.008

Pezzagno, M., Richiedei, A., & Maurizio, T. (2020). Spatial planning policy for sustainability: Analysis connecting land use and GHG emission in rural areas. *Sustainability*, *12*(3), 947. https://doi.org/10.3390/su12030947

Rheinfeld, J. W. A. (2016). *Plot exchange, civil and tax aspects: Where are the limits*? Apeldoorn. https://www.oicrf.org/-/plot-exchange-civil-and-tax-aspects-where-are-the-limit-1

Sabates-Wheeler, R. (2002). Consolidation initiatives after land reform: Responses to multiple dimensions of land fragmentation in Eastern European agriculture. *Journal of International Development*, *14*(7), 1005–1018. https://doi.org/10.1002/jid.905

Sumrada, R. (2009). Three-dimensional approaches for modelling buildings, cities and landscapes. *Geodetski Vestnik*, *53*, 695–713. http://geodetski-vestnik.com/53/4/gv53-4_695-713.pdf

Thomas, J. (2006). Attempt on systematization of land consolidation approaches in Europe. *Fachbeitrag*, *3*, 156–161.

Tobias, S., & Price, B. (2020). How effective is spatial planning for cropland protection? An assessment based on land-use scenarios. *Land*, *9*(2), 43. https://doi.org/10.3390/land9020043

Verkhovna Rada of Ukraine. (1992). *Law on land tax*. https://zakon.rada.gov.ua/laws/show/2535-12

Verkhovna Rada of Ukraine. (2001). *The land code of Ukraine*. https://zakon.rada.gov.ua/laws/show/2768-14

Verkhovna Rada of Ukraine. (2010). *Tax code of Ukraine*. https://zakon.rada.gov.ua/laws/show/2755-17

Viitanen, K. (2000). *The finnish urban land readjustment procedure in an international context*. https://www.fig.net/pub/proceedings/korea/full-papers/pdf/session20/viitanen.pdf

Wehrmann, B. (2017). *Understanding, preventing and solving land conflicts*. Eschborn: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. https://www.escr-net.org/sites/default/files/landconflictsguide-web-20170413.pdf

Yimer, F. A. (2014). *Fit-for-purpose Land Consolidation: An innovative tool for re-allotment in rural Ethiopia*. Enschede. https://www.semanticscholar.org/paper/FIT-FOR-PURPOSE-LAND-CONSOLIDATION-%3A-AN-INNOVATIVE-Yimer/2280fd470a3a2e26553eef9279aeb1bfd252c72e