

Peculiarities of Capitalization of Land Resources of Ukraine: Research Methodology

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Abstract

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The issues of capitalization of Ukrainian land are studied in this work. The evaluation of technique approaches has been done to investigate the capitalization level. The parameters of land resources capitalization have been calculated according to the index system. The special features of parameters have been investigated. As the analysis shows, the land capitalization isn't satisfactory. According to the coefficient of capital formation, which shows the system of prerequisites of this process, the state level in 2020 was 0.1604. Taking this into account, the possibilities of capitalization processes in the field of land use of the state and regions are not satisfactory. This is also confirmed by the calculation of the potential capitalization index, which for the state was 14.6% at a threshold value of 15%. The values of the real capitalization are even lower. For the potential capitalization on the regional level, there are some definite variations, but they are balanced. Maximal indexes are in and around the Ukrainian capital, as well as they are available in the regions of high economical level. Single regions' (10 regions) indexes exceed the state level. These regions are leading as for their indexes of land capitalization. Minimal values are fixed in the north and west regions. The difference between maximal and minimal indexes of regions is varied up to ten times. When we take a look at the regions with low indexes, the problem lies in the fact that the values of costs and profitability (rent) of land correlate mutually very little. The system of improving the capitalization level has been formed. Building up the institutional environment, which would be able to provide the gradual economization of soil and its opportunity for capitalization, is very important.

Keywords: capitalization; land resources; regions; economic development; methodology; economic parameters

Introduction

As the evaluation of current processes shows, the basic trend to global development is information processes spreading and new technological solutions implementation. The success of some companies (like Microsoft, Amazon) in this area is realistic and instructive, because they have found necessary techniques and instruments to organize their business. A very important precondition thereof is using integral approaches, which consist in considering the opportunities of several areas of development and the activity at the conjunction state.

Nowadays, the integral principle like that is actual and popular, because it forms the premises for new solutions. It also concerns the environmental management that is being transformed right now. The natural resources, used to meet mostly the demand for raw materials at the times of industrial economy – the demand for water and supply were important. But now, under the condition of post – industrial development, the natural resource is gradually moving towards the market orbit of influence. Now, the processes of coordination between natural resources and business, as well as investing in the natural resources are quite normal and usual.

Owing to those processes, the natural resource is gradually being economized and this resulted from the fact how the integral principle of using the common potential of several areas of development has manifested itself.

The natural resource movement towards the market is going along with strong accent on market processes, among which the capitalization is one of the most important. The same situation is related to land resources. Capitalization is a usual phenomenon for powerful companies and industrial giants, but simultaneously it is a new feature for land resource, which predetermines the actuality of this research. Considering the actuality of these issues, the objective of the said research is forming the methodical bases (and their approbation) to investigate the land resource capitalization, which will contribute to more balanced policy in the industry.

Urgency of the task reveals shortcomings of the institutional environment and consequent poverty of the rural economy and low standard of living of the villagers in all the regions. It proves the necessity to reform current system of public administration and introduce new concept of rural development, involving the variety of administrative tools and financial sources in order to renovate enterprises (Ilina & Shpylova, 2020).

During the last ten years in Ukraine, the fundamental provisions of capitalization have been revealed in the scientific works of scientists: B. Andrushkiv, I. Bystryakov, I. Buleev, N. Bryukhovetska, V. Geets, A. Hrytsenko, O. Kendyukhov, M. Kozoriz, O. Kuzmina, A. Mogylova, V. Pylypiv, M. Khvesyk. Let's study some of them, which consider the issue

of the cooperation of the land resource and the economy and the purely capitalization of natural resources.

The first group of works includes some researches of resources cost evaluation, which is the precondition of their integrating into the market zone (PyrozHKov et al., 2015). It is necessary to notice that this work contains a number of innovative elements (including the costs paid for ecosystem services). Problems of the cost of natural resources are also raised in the work of other authors (Jowsey, 2006). The issues of accounting for natural resources are studied, which is also important for the study of possible processes between resources and the economy (Sadoff, 1992).

A very necessary aspect in using the natural resources is application of different regulation leverages, which can provide resources systemized using. The issues like those are investigated in the work “Financial and Economical Principles to Regulate the Environmental Management”, with the basic characteristics of regulation instruments being evaluated. The monograph determines indexes and investigates basic characteristics how to use the regulation instruments, (through calculation of the regulatory activity concentration coefficient, evaluation of system for real and potential rent indexes, investment profiles and ways to provide the modernization of environmental management, financial and economical parameters for activating the ecosystem services instrument). The research showed the necessity of transforming the current ways of regulation, as well as of implementing new instruments (Khvesyk et al., 2019). It is also possible to select the works that show how under the condition of gradual movement towards the market, the natural resource is changing its formations (Bystryakov, 2018; Khvesyk et al., 2018). The issues of resource assets formation and the processes specialties are studied. A very important feature of natural resource assets is that they can generate cash flows and form economical advantages (revenues). The research “Natural Resources and Capital Flight” is very interesting (Arezki et al., 2014). The works on natural resources development and possible relations of these resources to business are actual (WEF, (2020a); WEF, (2020b)).

Regarding the works of the second group on the capitalization of natural resources, these questions are raised. It is important the research of current issues of ecosystem services and their role in modern economic processes through the prism of capitalization. As noted in the introduction to the book, the capitalization of natural resources shows that modeling ecosystem services as natural capital can help when analyzing economic behavior (Barbier, 2011). The issues of natural capital are also being investigated by other scientists (Arezki & Nabli, 2012; Khvesyk, 2014; Holt & Hattam, 2009; Pylypiv, 2011).

It should be noted that the capitalization of land resources in Ukraine necessitates further research aimed at substantiating the methodological foundations of the mechanism for capitalization of land resources. The purpose of the study is to form methodological bases for the capitalization of land resources and its approbation, with the aim of forming an effective mechanism for managing regions in the context of ensuring their sustainable growing.

Material and Methods

The methodological basis of this research is general theoretical methods of scientific knowledge, fundamental provisions and principles of the economy of nature use, sustainable growing of regions. To achieve the goal, a number of modern general scientific and economic methods were used: abstract and logical, including methods of analysis and synthesis, induction and deduction, generalization – for reviewing information sources, clarifying the essence of concepts, study of inland and foreign experience on the researched topic, substantiation and control of working hypotheses, regarding the prospects for the use of the method in different types of regions; system analysis – for a holistic perception of the research object, in particular capitalization and a comprehensive analysis of the connections between its elements; correlation-regression analysis – to define the influence of various factors (outside and inland) on the research methodology.

Results and Discussion

In the regulatory and legislative framework of Ukraine, in Article 1 of the Law of Ukraine “On Land valuation”, “capitalization” means the valuation of the object of assessment based on the net operating, or rental income from its use (The Verkhovna Rada of Ukraine, 2003). In the practical aspect, in the National Standard No. 1 “General Principles of Valuation of Property and Property Rights”, capitalization is the valuation object based on the expected income from its use. Capitalization can be carried out using a capitalization rate (direct capitalization), or a discount rate (indirect capitalization or discounting) (Cabinet of Ministers of Ukraine, 2012).

In scientific research, there are a variety of approaches to the reading of capitalization of land resources, in particular, “capitalization of land resources – the growth of the total value of assets, related to them and capable of generating income, or the use of resources for the production of assets and services invested in the business and functioning as sources of means of production” (Bystryakov, 2011); capitalization (of land resources) – the process of gradually increasing the

value of land resources as the main component of capital, as a result of the action of objective laws of spatial functioning of the corresponding area and targeted influence of the system of measures (Khvesyuk et al., 2014).

Investigating the level of capitalization, in our opinion, it is worth introducing an exponent – the coefficient of capitalization formation (C_{cp}), which shows the presence of prerequisites and readiness for conducting such research, since one of the principles of capitalization of land resources is the functioning of economy. To calculate the C_{cp} it is necessary to take into account the metrics of the socio-economic effects of the regions in order to substantiate the mutuality of capitalization and further economic transformations. Among the metrics that will have an impact on the capitalization of land resources are: gross regional product (million UAH); capital investments (million UAH); foreign direct investment (million US dollars); revenues of local budgets (including transfers from the state budget); (million UAH); export of goods (million US dollars); number of firms; agricultural products (million UAH).

In particular, it was used to establish the quantitative features of the manifestation of capitalization (its prerequisites) calculation method of C_{cp} , according to which the normalization of index during the year is important (Stepanenko & Herasymov, 2002). It is possible to use stages of research: standardization of the metrics; calculation of integral quantities for the regions of the state; calculation of the coefficients of the regions of Ukraine as a whole.

After the standardization, the calculation of integral quantities is carried out according to formula 1 (Korenyuk et al., 2021):

$$Z_i^* = \frac{Z_{i1} + Z_{i2} + \dots + Z_{ij} + \dots Z}{n}, i = 1 \dots m \quad (2)$$

where Z_i^* – integrated assessment of regional metrics;

$Z_{i1}, Z_{i2}, Z_{ij}, Z$ – standardized metrics of regions;

n – the number of incomparable metrics;

i – comparable value;

m – the number of regions ($i = 1 \dots m$).

The coefficient of capital formation Y_i for any region can be calculated on the basis of formula 2 (Korenyuk et al., 2021):

$$Y_i = \frac{Z_i^*}{Z_0^*} - i = 1 \dots m \quad (2)$$

where $Y_i - C_{cp}$ land resources of the region;

Z_i^* – integrated assessment of regional metrics;

Z_0^* – integrated assessment of the upper pole of the state;

m – the number of regions ($i = 1 \dots m$).

Using the economical techniques is important while establishing the quantitative characteristics of land recourse capitalization. In particular, the adjusted technique to calculate the capitalization level of land recourse was used through applying the formula 3 (CFI, 2022):

$$\text{Capitalization Rate} = \frac{\text{OI}}{\text{VA}} \times 100 \quad (3)$$

where: Capitalization Rate – is the rate (percentage) of land recourse capitalization;

OI – operation income (profitableness from using the land resource);

VA – value of asset.

Therefore, two elements are bound in the formula – the profitability of using the land and the value of the asset. The former is possible to represent through the rent, which is available in the plan of land resources accountability. As for the rent, it may be both rated and calculated (as the remained costs). The second element is calculated mostly in the ordinary way (the conservatory features of land resources are considered).

Considering all above said, the research shows that there are several possible variations for single indexes to calculate (the rated rent and the calculated rent). The variations like those are formed with the objective to calculating the capitalization in two ways – real and potential. But the evaluation shows that the real capitalization does not represent the real state, therefore the potential capitalization will be used in the research. To calculate it, we will use two components – the rent calculated from remained costs and the conservative value of the resource.

The second stage is comparison of the land resource capitalization (in %) with the threshold one. The threshold index is the interest rate of the National Bank of Ukraine for the definite year (National Bank of Ukraine, 2023). The evalua-

tion of dynamics shows that the interest rate of the National Bank of Ukraine was varying quite essentially. After 2016, the interest rate started growing significantly up to 18% in 2018, and after that it decreased to 6%.

In general and theoretically, if the capitalization makes less than 15%, the resource is considered to be undercapitalized. Though, it is necessary to accentuate that under such conditions the land resources domain should have lower indexes, because it is not localized and is not inside the market orbit like e.g. the banking or commodity exchange.

Based on the proposed methodology, the authors conducted a study of the level of capitalization of land resources for 2020, where metrics were calculated for the state and regions, which made it possible to establish spatial differentiation according to the specified metrics, taking into account the political situation in the state, landscape metrics and sustainability of regional functioning.

As mentioned above, the methodology of the coefficients involves a number of stages, in particular, after the formation of the initial tables, the places of the regions are determined according to each of the metrics (Table 1).

The maximum value (1.0) is specific to the state. A variation in the weight of metrics is inherent in the regions.

In particular, it is already possible to single out a group of regions with maximum metrics. It is possible to include regions with a high level of economic development in their list (Dnipropetrovsk region, Donetsk region, Kyiv region).

An important stage is the standardization (normalization) of metrics in order to bring their quantitative parameters to a single statistical base, which is related to the number of regions (Table 2). Basically, taking into account the positions from the table 1, rationing is strongly, correlated with the place of the region by weight.

After normalization, the maximum value is established for each metric of capitalization formation – its upper pole.

Table 1. Weights of regions in relation to the state level according to the system of metrics (fragment)

Ukraine	1.00	1.00	1.00	1.00	1.00	1.00	1.00
<i>regions</i>							
Vinnitsia	0.0322	0.0268	0.0111	0.0280	0.0382	0.0264	0.0618
Volyn	0.0183	0.0179	0.0071	0.0131	0.0248	0.0162	0.0193
Dnipropetrovsk	0.0944	0.1153	0.1342	0.1545	0.0923	0.0825	0.0519
Donetsk	0.0489	0.0523	0.0503	0.0801	0.0474	0.0253	0.0277
Zhytomyr	0.0216	0.0183	0.0092	0.0139	0.0294	0.0189	0.0314
Transcarpatian	0.0147	0.0100	0.0070	0.0275	0.0275	0.0178	0.0021
Zaporizhia	0.0396	0.0305	0.0411	0.0595	0.0438	0.0411	0.0412
Ivano-Frankivsk	0.0214	0.0124	0.0158	0.0154	0.0295	0.0217	0.0166
Kyiv	0.0574	0.0645	0.0378	0.0401	0.0550	0.0544	0.0785
Kirovograd	0.0178	0.0132	0.0050	0.0186	0.0231	0.0229	0.0473

Source: author's elaboration

Table 2. Stage of standardization (normalization) of metrics (fragment) (calculation of the authors)

	n1	n2	n3	n4	n5	n6	n7
Ukraine	25	25	25	25	25	25	25
<i>regions</i>							
Vinnitsia	0.8045	0.6690	0.2766	0.7012	0.9557	0.6595	1.5446
Volyn	0.4583	0.4477	0.1785	0.3272	0.6203	0.4044	0.4825
Dnipropetrovsk	2.3610	2.8827	3.3559	3.8636	2.3075	2.0616	1.2964
Donetsk	1.2216	1.3085	1.2564	2.0026	1.1850	0.6335	0.6933
Zhytomyr	0.5410	0.4575	0.2307	0.3466	0.7339	0.4721	0.7847
Transcarpatian	0.3673	0.2509	0.1742	0.6868	0.6885	0.4451	0.0536
Zaporizhia	0.9904	0.7625	1.0280	1.4878	1.0957	1.0278	1.0293
Ivano-Frankivsk	0.5353	0.3099	0.3950	0.3856	0.7378	0.5433	0.4161
Kyiv	1.4354	1.6135	0.9456	1.0014	1.3742	1.3589	1.9614
Kirovograd	0.4453	0.3296	0.1257	0.4645	0.5764	0.5720	1.1822
.....
The upper pole	6.0083	8.0185	11.4648	6.3248	3.0819	6.7714	1.9614

Source: author's elaboration

Table 3. Integral values and coefficients of the formation of capitalization of land resources for the state and regions, 2020

	integral quantities	C_{cf}	$C_{cf,Reg/Ukr}$
Ukraine	–	0.1604	–
<i>regions</i>			
Vinnitsia	0.8016	0.1286	- 0.0318
Volyn	0.4170	0.0660	- 0.0944
Dnipropetrovsk	2.5898	0.4155	+ 0.2551
Donetsk	1.1859	0.1903	+ 0.0298
Zhytomyr	0.5086	0.0816	- 0.0788
Transcarpatian	0.3714	0.0596	- 0.1008
Zaporizhia	1.0602	0.1701	+ 0.0097
Ivano-Frankivsk	0.4747	0.0762	- 0.0843
Kyiv	1.3843	0.2221	+ 0.0617
Kirovograd	0.5280	0.0847	- 0.0757
Lugansk	0.2554	0.0410	- 0.1195
Lviv	1.2181	0.1954	+ 0.0350
Mykolaiv	0.6657	0.1068	- 0.0536
Odessa	1.1006	0.1766	+ 0.0161
Poltava	1.2183	0.1955	+ 0.0350
Rivne	0.3682	0.0591	- 0.1014
Sumy	0.5886	0.0944	- 0.0660
Ternopil	0.4021	0.0645	- 0.0959
Kharkiv	1.2645	0.2029	+ 0.0424
Kherson	0.4283	0.0687	- 0.0917
Khmelnitsky	0.5870	0.0942	- 0.0663
Cherkasy	0.6414	0.1029	- 0.0575
Chernivtsi	0.2138	0.0343	- 0.1261
Chernigov	0.6509	0.1044	- 0.0560
<i>city</i>			
Kyiv	6.0651	0.9731	+ 0.8126

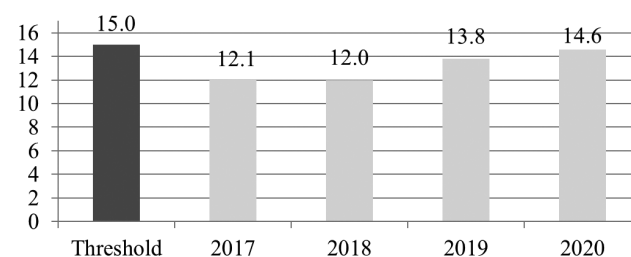
Source: author's elaboration

The calculation of integral values for the regions of the state is important. Integral values are the average level of metric values for individual regions. If the normalization metrics are high for the region, then this leads to the formation of significant integral values of this region.

The calculation of capital formation coefficients is account according to formulas 1-2. The calculations showed that in the national dimension, the coefficient for 2020 was 0.1604 (Table 3). Taking this into account, the possibilities for the manifestation of capitalization processes in the field of land use of the state and regions are not satisfactory.

Regions of the state are significantly differentiated by the metric of capitalization formation. Only 9 regions exceed the state. The metrics of the rest of the regions are lower. The maximum metrics are in city of Kyiv (0.9371) and the Dnipropetrovsk region (0.4155).

The other pole of coefficients is mainly formed by the southern and western regions. Due to the influence of various processes, they do not show high metrics of economic development, which form low coefficients of the possibility of capitalization.

**Fig. 1. Potential level of capitalization of land resources for 2017-2020, %**

Source: author's elaboration

This is confirmed by the calculations, within the second stage, according to which the index of real capitalization of land resources is low. Potential capitalization is higher and makes for the land: 2017 – 12.1%; 2018 – 12.0%; 2019 – 13.8%; 2020 – 14.6% (Fig. 1). But these figures do not correlate with the threshold level (except for the data of 2020), however, capitalization of land resources grew during 2017–2020.

As for the regional aspect, the capitalization of land resources varies. Though, in the general trend every index of regions forms the nationwide level. High percentage of capitalization of land resources in 2020, are mostly in the capital and in economically well-developed regions group I (Dnipropetrovsk, Zaporizhzhia and Kirovograd). Besides, Cher-

Table 4. Index of potential capitalization of land resources in 2020

Region	Capitalization, %	Ratio to the nationwide level (1.00)	A single region's rating	The place of the region in the group
Ukraine	14.6	–	–	–
<i>regions</i>				
Vinnitsia	11.0	0.76	15	III
Volyn	11.3	0.77	14	III
Dnipropetrovsk	25.8	1.77	3	I
Donetsk	7.1	0.48	22	IV
Zhytomyr	9.2	0.63	19	IV
Transcarpatian	8.0	0.55	21	IV
Zaporizhzhia	23.6	1.61	5	I
Ivano-Frankivsk	11.7	0.80	13	III
Kyiv	10.5	0.72	16	III
Kirovograd	24.3	1.67	4	I
Lugansk	3.5	0.24	25	IV
Lviv	9.0	0.62	20	IV
Mykolaiv	16.6	1.14	10	II
Odessa	19.8	1.36	6	II
Poltava	10.0	0.68	17	III
Rivne	9.3	0.64	18	IV
Sumy	14.3	0.98	11	III
Ternopil	6.1	0.42	24	IV
Kharkiv	17.3	1.19	9	II
Kherson	19.0	1.30	8	II
Khmelnysky	13.8	0.94	12	III
Cherkasy	27.7	1.90	2	I
Chernivtsi	6.3	0.43	23	IV
Chernigov	19.1	1.31	7	II
<i>city</i>				
Kyiv (city)	30.5	2.09	1	I

Source: authors' elaboration

kasy region also has a very high capitalization level. The indexes of these regions exceed significantly the nationwide level. For the land resources, in the same year, 10 regions exceed this index (Table 4).

Minimal values are concentrated mainly, within the northern and western regions. In particular, low indexes are fixated in Chernivetska and Rivnenska regions (group IV). The reasons for that are low value indexes of land resources, as well as low rent value, which is paid for using those land resources. It is important to notice that the reason for low rent is the unbalance between those indexes.

It is also interesting to compare these indexes of regions. As the example, there may be taken the difference between the maximal (Kyiv) and minimal (Luhanska region) indexes. The question is: which are the reasons for such index in the capital, still there is no agricultural activity in Kyiv and there aren't big fields. The reason is that, there is a significant concentration of solution centers for agriculture in Kyiv – agro-holding headquarters, managing companies etc. It resulted in finance flows passing also through the capital. As for Luhanska region, the similar values are stipulated by low rent value, as well as by the war influence, which has been fought there since 2014.

In order to have these values comparable, let's compare the second big value with the minimal one in the list of regions (Cherkaska region – Luhanska region) rather than compare the value of the upper pole with the minimal one. The difference between them makes 8.0 times. It is not an essential disperse for the financial plane.

If we compare the region with a big capitalization level (Dnipropetrovska region), with Luhanska region, the difference will be adequate (7,4 times).

Therefore, very little variations between the maximal and the minimal values of capitalization are fixed. It shows the balanced regional policy in forming the potential capitalization of land resources. The key role in these processes is played by the capital; though, the regions with good economical potential have good positions in the rating. Under definite conditions, it is possible to improve the positions of the regions, which are outsiders (if reforming the soil management).

Regarding the possible connection between C_{cf} and the potential capitalization and analyzing the values of these two metrics, it is possible to use the following conclusions.

First, regions with maximum capitalization metrics. For certain regions, a direct relationship between the C_{cf} and the capitalization is recorded the highest formation metrics result in similar levels of capitalization. It is the capital of Dnipropetrovsk and Zaporizhzhia regions. In addition, such a phenomenon has also been recorded for the Kharkiv region.

Secondly, for other regions with maximum metrics, this dependence is not direct. As an example, for the Cherkasy region with a formation coefficient of 0.1029, the capitalization rate was 27.7%. As we can see, there are cases that even the average formation metrics can lead to the generation of high capitalization (albeit probable). A possible reason for this is the high level of agricultural activity in the region, which, regardless of economic conditions, finds opportunities for its manifestation and development. The same is recorded for the Kirovohrad region, when average conditions were not an obstacle to the manifestation of a high level of capitalization.

Perhaps, for these regions, this situation is explained by the fact that within their borders, the favorable agrarian environment and the level of its development is the key reason for high capitalization metrics, and the parameters of economic development are already secondary. If the region is agrarian, then this leads to good capitalization metrics.

At the same time, for a high level of capitalization, a well-functioning economy is desirable – it increases the chances that this level has a basis, a basis for manifestation.

Thirdly, for a number of regions, the economic parameters are high, but this does not form the same levels of capitalization of land resources (Donetsk region).

Fourth, the regions with the lowest capitalization have the same economic prerequisites. Mostly these are separate western and eastern regions. For them, agricultural activity is not key, because they specialize in other fields.

Conclusion

The research shows that a very important role belongs to capitalization in modern conditions. Land resources are also being involved gradually in these processes of capitalization. With the purpose of developing the instruments of affecting these processes, the parameters of their development are very important.

Studies of the prerequisites for the manifestation of capitalization, specified by the formation of capitalization, showed that the level of the state is low. Taking this into account, the possibilities of manifestation of these processes are also similar for the regions.

This is confirmed by calculations, which showed that the real capitalization for land resources is low and potential capitalization ranges from 12.0 to 14.6%. The current indexes are considered to have reached the threshold only in 2020.

Evaluating the dimensional signs shows that there are fixed variations. Single regions can exceed the threshold of capitalization and the nationwide level. Maximal indexes of capitalization have been registered in the capital and in the

economically highly developed regions. Variations of capitalization index are low, so that manifests the balanced state policy in the industry.

The problem lies in the fact that the current values are lower than the threshold ones for some regions (and this is only for the potential capitalization). Considering that fact, land resources are hard to position in the market ambience and to provide the forming of market indexes.

This situation may be explained through two reasons: low (unbalanced) financial characteristics of land resources and insufficient level of development of the market and infrastructure, of necessary market lifts, which would enable the real capitalization of land resources. As the result of this, the situation is currently being formed, so that the market does not contribute to land resources capitalization and the capitalization even impedes the resources to enter the market ambience. Hence, there are land resources with unique features, they are used, there is a need to extend the regulation instruments and to integrate into the market, but the current conditions block these opportunities.

A way to improve the situation is to build up the institutions and important instruments, which will provide the opportunity for land resources to rise to a new level of functioning, within the market ambience. Under these conditions, the indexes of capitalization will get improved in particular, on agricultural lands. A very important precondition is forming the market lifts, which are able to provide the support to capitalization of the regions. Those may be special law regulations in the industry, regulatory documents enabling the capitalization, organizational structures, system of privileges and preferences.

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