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Risk management in the implementation of investment and construction projects

The developer is a professional figure in the real estate market, combining managerial and entrepreneurial functions in his activities. At the same time, there are features and tasks associated with the creation and implementation of development projects. Thus, in the process of selecting and implementing investment and construction projects, their responsibility, in addition to providing liquidity, includes taking into account social, aesthetic and environmental aspects.

Today, individuals engaged in investment and construction activities, including developers, cannot always spend their time in order to solve certain problems related to the transfer of land directly between different established categories. In this case, land transfer refers to the process associated with the transfer of lands with agricultural purposes to their combined development. To do this, an investment product is being created, i.e. a plot of land with which the necessary actions were carried out for the subsequent construction of necessary structures for various purposes on it [1].

Today, many developers indicate that the implementation of IDT projects (integrated development of territories) needs to be reimbursed from the local budget for a share of the costs associated with the implementation of the development of the relevant territories.

Different land plots have different investment potential, which creates the need for an assessment by its owner. With the participation of local authorities in the development of territories, they have the right to receive compensation.

Keywords: *land rent, land categories, land transfer from one category to another, land development risk management, economic efficiency of projects*

FORMATION OF RISK FACTOR SPACE FOR ESTIMATING THE VALUE OF LAND RESOURCES

Often, local authorities, when selling land, do not assess its actual value, as well as the future income that can be obtained with their participation.

Fig. 1 shows the factors that are used to determine the amount of land rent, these are:

- available natural features;
- standard of living;
- infrastructure development;
- results of the development of the site.

The municipality, acting as the owner of a piece of land, can lease it out, while receiving compensation for the above factors if they have a positive impact on this piece of land [2].

As the analysis of some European countries has shown, when compared with the situation on the Russian market (Fig. 2), it becomes obvious that today

Land rent		
Natural features	Standard of living: development of social, engineering, and transport infrastructure	The results of entrepreneurial activity in the development of residential and non-residential facilities

Fig. 1. Factors for determining land rent

the municipal authorities of our state do not pay due attention to the land resources available on its territory, from the point of view of studying the cost structure when implementing projects.

At the same time, there is the highest profitability of housing construction projects in the Russian Federation than is observed in statistics for European countries.

Economic theory is accompanied by a process of redistributing public rent to the developer directly from the value that certain plots of land possess [3].

Taking into account the existing schemes for paying for rights to purchase a plot of land, Russian developers have the lowest level of profitability than the accepted average indicators that can be obtained when implementing similar projects in European countries.

Thus, based on the information provided above, it can be argued that today there is a need to develop a nationwide methodology for an adequate assessment of the value of land resources [4].

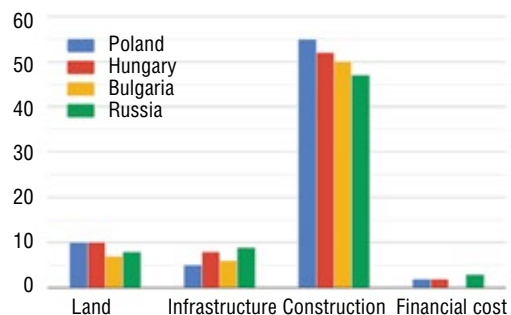


Fig. 2. Cost structure of mass housing construction by key expenditure items in Russia, Europe

ANALYSIS OF EXISTING LAND CATEGORIES

The inefficient use of various land resources on the territory of our state is caused by the presence of problems that are associated with the imperfection of the implemented land policy, and, of course, the accounting of land plots, which leads to a problem of national scale. We will analyze these circumstances in further research, but for now we need to understand what lands exist.

In accordance with Article 7 of the RF Land Code, Russian lands are divided into 7 categories for their intended purpose (Fig. 3):

1. Agricultural lands.
2. Settlements.
3. Industry.
4. Specially protected areas, facilities.
5. Forest fund.
6. Water fund.
7. Stocks.

These categories are used to identify opportunities associated with the use of land plots, i.e. they act as an important factor for investing in them.

The objectives of the agro-industrial complex of the Russian Federation:

- increase in the gross harvest of the entire crop;
- increase in acreage.

Our state has substantial land resources. According to the data provided by Rosreestr, on 01.01.2023, their area size is 1,712.5 million hectares, where agricultural land is 383.2 million hectares, which is 22.4 %.

According to the data provided by the Federal Register, in 2021 the size of the area of all farmland is 197.8 million hectares, where 58.8 % (116.3 million hectares) are arable land.

81.7 % of agricultural land in the Russian Federation is located in the following areas:

- 25.9 % — Volga;
- 25.0 % — Siberian;
- 15.9 % — Southern;
- 14.9 % — Central.

In 2017–2023, there was a reduction in farmland by 1.6 million hectares, which was observed in 2013–2016.

During the analyzed period, the reduction of agricultural land amounted to 3.64 million hectares due to the fact that the land was transferred to other categories. Whereas the reverse transfer from the reserve lands increased the indicator by 0.59 million hectares. While the increase in their area amounted to 1.45 million due to the fact that the administrative borders were changed due to the annexation of the Republic of Crimea [2].

Table 1. Change in agricultural land conversion

Transfer from agricultural lands to lands of	01.01.2017	01.01.2018	01.01.2019	01.01.2020	01.01.2021
Forest fund	554	261	3,307	163	197
Settlements	70.9	64.1	52.7	45.7	72.6
Territories under special protection	29.8	1.18	37.5	5.5	290
Industry, communications, transport, etc.	37.8	54.4	37.1	56	37
Stock	5.8	850	2.9	4.4	2.7
Water fund	–	–	0.9	–	0.3

Note: the presented figures do not include new territories (DPR, LPR, Zaporizhia and Kherson regions).

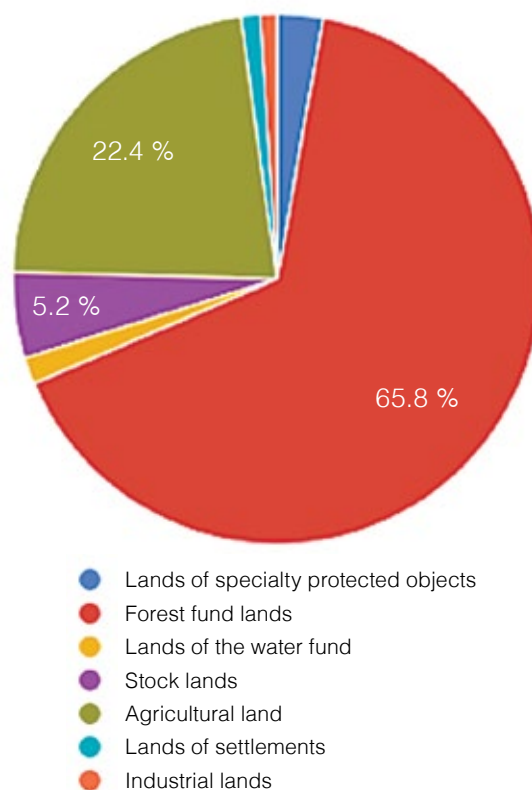


Fig. 3. The structure of the land fund of the Russian Federation in accordance with the categories of land on 01.01.2021

In the Russian Federation, according to Federal Law No. 172 dated 21.12.2004 "The transfer of lands or land plots from one category to another", this process is bilateral in nature and is carried out on an annual basis.

Let's display the dynamics of the translation in Table 1.

By 2021, the fall in farmland due to their transfer to other categories amounted to 599.7 thousand hectares, while their growth amounted to 215.4 thousand hectares as a result of the reverse transfer, including:

- reserve lands, where the Republic of Crimea has 72 thousand hectares (Rostov 34.2 thousand hectares Jewish Autonomous — 35 thousand hectares) — 208.1 thousand hectare;
- lands of settlements, mainly due to the Lipetsk region with an indicator of 1.6 thousand hectares — 4.1 thousand hectare;
- lands belonging to the water fund at the expense of the Republic of Tatarstan with an indicator of 2.2 thousand hectares — 0.2 thousand hectare;

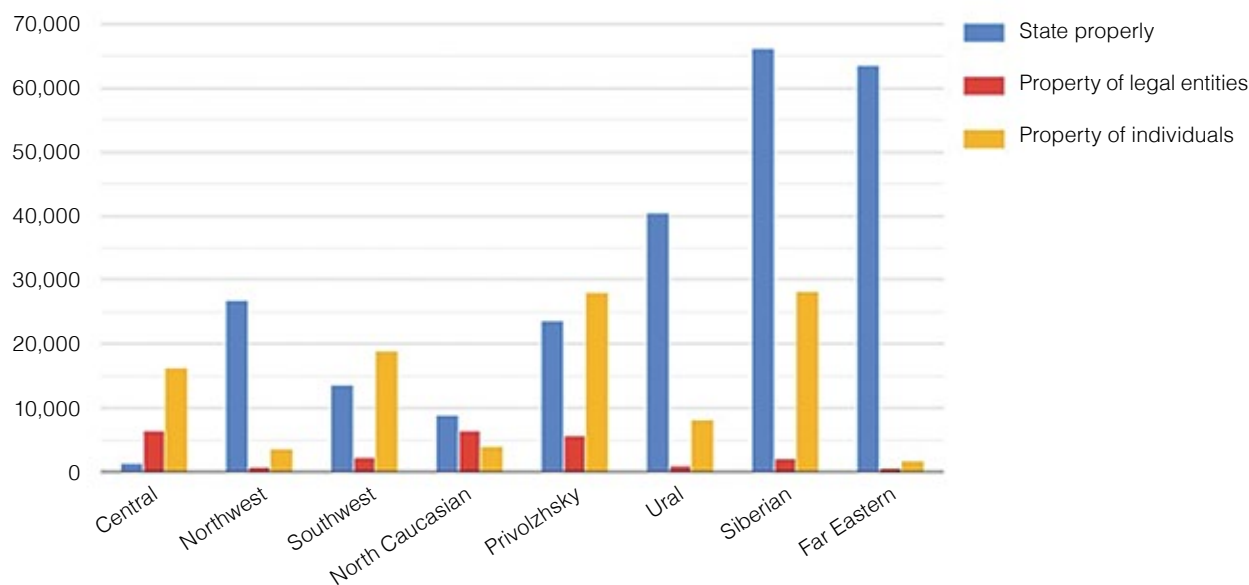


Fig. 4. Distribution of agricultural land in accordance with forms of ownership, which is observed in the federal districts of the Russian Federation on 01.01.2021, thousand hectares

- industrial lands at the expense of the Yamalo-Nenets Autonomous District with an indicator of 1.8 thousand hectares — 2.6 thousand hectare;
 - lands belonging to the forest fund at the expense of the Yaroslavl region with an indicator of 0.3 thousand hectares — 0.4 thousand hectares.
- Change from 2017–2021:
- lands of the forest fund: (19,700:554) – 100 = –64.4 %;
 - lands of settlements: (7,090:72.6) – 100 = 2.3 %;
 - territories under special protection: (29,000:29.8) – 100 = 873.1 %;
 - Industrial lands: (3,700:37.8) – 100 = –2.1 %;
 - reserve land: (270:5.8) – 100 = –53.45 %;
 - lands of the water fund: 100 %.

The federal districts where the largest number of decisions related to land transfer were made:

- 2,944 decisions — Volga;
- 1,777 — Ural;
- 1,376 — Central.

There was a decrease in the area of agricultural land owned by the population by 4.5 million hectares, while their increase by 4.1 million hectares owned by legal entities.

In Fig. 4, we will display the distribution of agricultural land in accordance with the forms of ownership according to the FD.

It turns out that many agricultural lands are owned by the state. Whereas some of them have no borders, which is a problem of inefficient management, which has a negative impact on the formation and development of the land market, the involvement of land in circulation as a means of production.

The share of land in private ownership is small. There are no significant changes in it recently.

Today, in the Russian Federation, many land users have lands that they do not use. In their total volume, they own a significant area of agricultural land in the Russian Federation.

For this reason, today it is necessary to identify and involve abandoned, unused agricultural land in agricultural turnover [3].

CONCEPTUAL FEATURES OF RISK MANAGEMENT AT THE MAIN STAGES OF LAND DEVELOPMENT

Development projects are investments with a long-term nature, generating income for a long period of time.

It should be noted that the beginning of the development cycle is the emergence of an idea. Whereas it ends with the sale, the completion of the project. The duration of the cycle is 3–5 years or more in accordance with the nature of the project [5].

The payback period in the Russian Federation is 3–4 years, whereas in some cases it can reach 10 years.

The goals of spending funds are determined at the beginning of the activity, which is not accompanied by final results.

The developer makes a decision, according to available information, that is, performs activities under conditions of uncertainty. Uncertainty is the lack of accuracy of data, which is accompanied by risks. The nature of development in the form of the formation of an object is based on the causes of uncertainty, which indicates a change in its connections. The nature of the changes, the results are not subject to accurate calculation, because there are factors affecting the environment, the object, and the inability to obtain data for decision-making.

In order to implement the concept of land development, the involvement of lawyers is required. This necessity is due to the fact that different issues that relate to the CC RF can be interpreted in different ways.

In addition, the services of a lawyer are necessary for the reason that there is a restriction in relation to the plot of land. For this reason, specialists will need to offer the most rational and easiest way to overcome them [6].

Uncertainty entails the occurrence of risk. For this reason, it is imperative to minimize it by increasing the reliability of the data.

It is possible to minimize uncertainty by obtaining more high-quality information.

One of the features of risk is the likelihood of conditions that can have negative consequences for someone. It can arise due to the probability of an occurrence of consequences, which is subject to one or another measurement. For this reason, risk acts as an uncertainty that cannot be calculated or foreseen [7].

To date, there is an alternative definition of risk, which consists in the presence of the probability of deviations in indicators.

Possible risk outcomes:

- 1) positive (availability of profit, income, etc.);
- 2) negative (presence of damage, loss, etc.);
- 3) zero (no changes).

Today, the effectiveness of investment and construction projects depends on changes in equipment, technology, productivity, cost, which entails the implementation of the project in the presence of different types of risks.

ALGORITHMS FOR MANAGING EXISTING RISKS

Initially, risk identification is performed in order to carry out its analysis, which will allow an adequate response to it (Table 2).

To date, ongoing projects have features that actualize the problem of risks:

1. Each project is an innovative, investment process, where a unique, new product enters the market, which indicates that it is not possible to predict the risk response to it.
2. Each project is a complex social, technical and economic system, where there are different participants, whose final result depends on the quality of their activities.
3. Each participant is a potential risk carrier. It turns out that when organizing the interaction of project participants, it is necessary to anticipate risks for a particular market participant in order to minimize them later.
4. The main source of financing is investor funds, which entails responsibility for reducing risks.

The basis for managing risks is identification, analysis, and identification [8].

The implementation of development projects is accompanied by the following risks:

1. Systematic — the risks that arise for each participant who carries out the implementation of economic activities. In the analyzed area, they are risks that cannot be excluded in project management. The following types of risks can be attributed to such risks:

- changes in the economic situation during the implementation of the project;
- low liquidity of real estate in the form of an asset, etc.

This list is updated with regional risks when considering the real estate market.

Regional risks include the following risks:

- decrease in business activity in the region;
- migration.

2. Non-systematic — the risks of the project, its features. It is possible to minimize them through management [9, 10].

Table 2. Possible combinations of probabilities and consequences of risks

Probability/ consequence level	High	Medium	Low
Minor	B	D	D
Medium	A	B	C
Catastrophic	A	A	B

Note: A — inability to transfer the risk to be excluded; B — presence of difficulties in transferring, subject to immediate disposal; C — a transferable risk to be eliminated if necessary; D — an acceptable level of risk.

This problem can be solved through the creation of a scheme for the execution of works on land development of a territory where effective interaction is required by development participants to achieve the desired result in the execution of works related to land development [11].

Example 1. “1st Nagatinsky” is a residential complex surrounded by existing buildings. This is a project for the integrated development of an area of 13 hectares. A new reading of the location with an emphasis on all its strengths: opens the entrance to the Nagatino-Sadovniki area. Nagatinskaya metro station is just a 3-minute walk away, Nagatinskaya MCC (Verkhnie kotly) is 4 minutes away, TTC — at 5 min. Nagatinskaya Embankment is a few minutes' walk away. A 10-minute drive by public transport is the “Island of Dreams”, where little Moscow residents like to spend time.

Variety of leisure activities:

- libraries;
- cinemas;
- Marc Chagall Embankment;
- Novodanilovskaya, Nagatinskaya embankments;
- urban landscape parks.

It should be noted that the internal territory of this complex is fenced. For this reason, outsiders cannot be on it. In addition, there are plans to implement a program called “yard without cars”.

An important element of the landscaping of this inner territory is the promenade, which connects various functional areas with a unique Japanese garden. Within the framework of the project, there are plans to build their own kindergarten, as well as a school.

In the process of executing commercial projects, land development consists in extracting income, making a profit from the sale of assets that have increased in value.

It turns out that the success of the land development project depends on such factors as:

1. Correct determination of the optimal use case for a plot of land.
2. Well-developed project concepts, a reasonable financial model.
3. Effective project execution [12].

Example 2. The methodology of the residential complex called “1st Nagatinsky” is based on such a concept as “effective profitability”. Its main difference directly from the general level of profitability lies in taking into account the current value of the land when calculating the project, that is, there is a deduction from the total profitability of the delta, which was formed when the market value of the land plot increased during the period of construction. This is essential in order to assess the effectiveness of the project being carried out for the reason that the increase in the cost of land plots during the pre-crisis period established errors, as well as miscalculations that were made by developers.

Dynamic assessment methods include the following models:

1. Net discounted income.
2. Investment return index.
3. Internal rate of return.
4. Discounted payback period of the investment.

Profit from sales and savings are calculated from total revenue and savings minus costs.

The simple rate of return (SRR) is calculated from the ratio of the profit of the investment project over a certain period to the cost of the investment project. The interpretative meaning of the simple norm established for profit is the assessment of the recoverable part of investment costs as profit during one planning interval.

Table 3. Outcome of the enterprise

Name of fixed assets	Price per unit, thousand rubles	Number of units	Total cost	Life period, years	Amortization per year, thousand rubles	Amortization per month, thousand rubles
Building	15,000,000	4	60,000,000	100	600,000	50,000
Security costs of the facility	750,000	1	750,000	35	21,429	1,786
Construction of playgrounds	225,000	2	450,000	15	30,000	2,500
Construction of a recreational area	2,250,000	1	2,250,000	50	45,000	3,750
Construction of leisure facilities	6,000,000	5	30,000,000	75	400,000	33,333
Total	24,225,000	13	93,450,000	–	1,096,429	91,369

In the process of performing a comparative analysis of the calculated SRR value with an average or minimum level of profitability, a potential investor is able to form a preliminary conclusion on the expediency of deepening and continuing the analysis of an investment project. According to this indicator, it becomes possible to estimate the approximate payback period of investments [13].

Example 3. Table 3 takes into account the necessary fixed assets for the construction of the residential complex “1st Nagatinsky”.

A recreational area is an area that is specially allocated in a city or in a suburban area in order to organize recreation areas, consisting of parks, gardens, urban forests, beaches and other facilities. Their main purpose is to restore the moral and physical strength of a person. They may include natural objects and territories under special protection [12].

Playgrounds are essential for the physical, social, emotional and cognitive development of children.

It is also necessary to build leisure facilities.

In accordance with established practice, in large cities of the Russian Federation, the problem associated with meeting the need for healthy leisure for young people is solved, which cannot be said about small urban formations due to various social, economic, and other reasons. Therefore, the formation of a network of different leisure facilities is subject to development in a small city.

This Table 4 takes into account the main income of the developer of the residential complex “1st Nagatinsky”.

This indicator is calculated using the following formula:

$$IRR = r_1 + \frac{NPV(r_1)}{NPV(r_1) - NPV(r_2)} (r_2 - r_1), \tag{1}$$

where r — percentage rate;
 NPV — net present value.

Table 5. Net present value, NPV

Period	Income, C	Outcome, f	Cashflow	Discount rate, r	Net present value, NPV
1st half of 2023	0	6,056,250	-6,056,250	0.075	-454,219
2nd half of 2023	0	6,056,250	-12,112,500	0.075	-908,438
1st half of 2024	4,136,718.75	6,056,250	-14,032,031.3	0.05	-701,602
2nd half of 2024	4,136,718.75	6,056,250	-15,951,562.5	0.05	-797,578
1st half of 2025	12,410,156.25	0	-3,541,406.25	0.045	-159,363
2nd half of 2025	12,410,156.25	0	8,868,750	0.045	399,093.8

Table 4. Income of the enterprise

Source of income	Average unit cost	Number of units	The total amount
Apartment sales	14,063	1,900	26,718,750
Leasing of space for the construction of leisure facilities	669,642.8571	7	4,687,500
State subsidy for the construction of a recreational area	8,437,500	1	1,687,500
Total	9,121,205	1,908	33,093,750

NPV is calculated using the following formula:

$$NPV = \sum_{t=0}^n \frac{CF_t}{(1+R)^t}, \tag{2}$$

where n, t — number of time periods;
 CF — Cash Flow;
 R — cost of capital (i.e. discount rate).

The results are presented in Table 5.

The internal rate of return (IRR) is a rate that ensures that there are no losses on different deposits, and that all income received from investing costs for a given project is identical. It turns out that this is the maximum percentage value, where the difference between the inflow and outflow of funds, i.e. the net present value (NPV) is 0 [14, 15].

CONCLUSIONS

As a result of the above calculations in Table 5, we see that in the first year of the enterprise there are no revenues, in the second

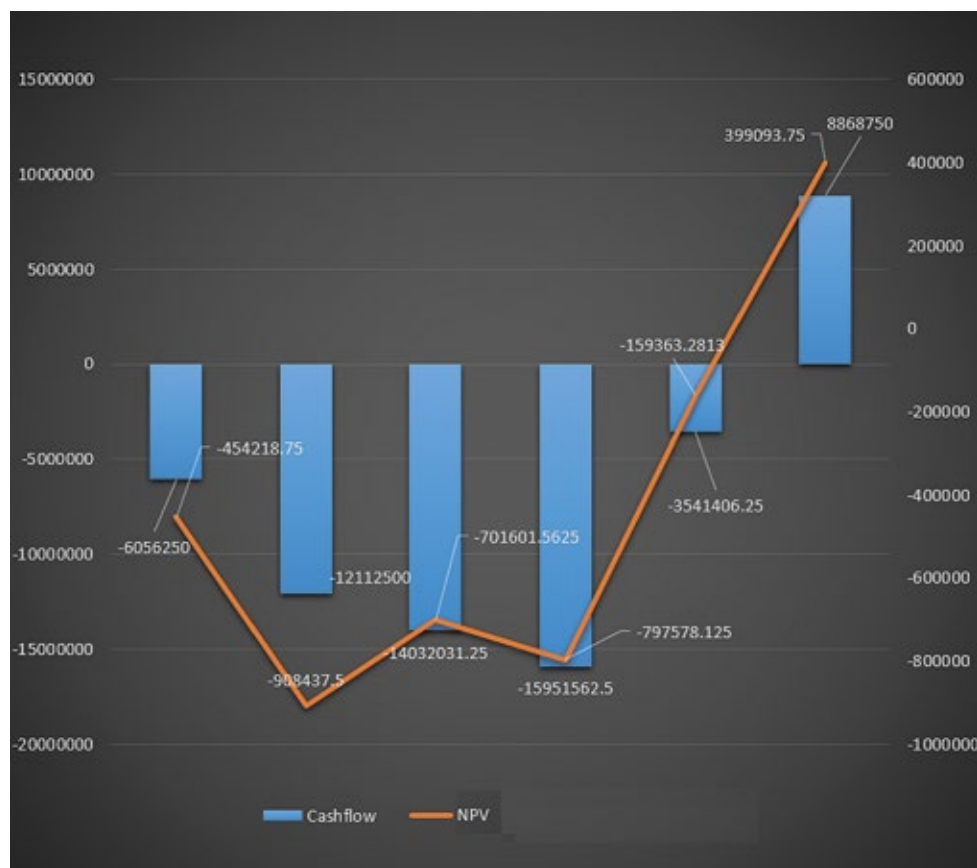


Fig. 5. Calculation of the profitability of a land development project using the NPV methodology (for half-years from 1st 2023 to 2nd 2025)

years sales partially begin in the residential complex under construction "1st Nagatinsky" in a mortgage with a discount for buyers. Sales peak is in the third year.

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Fig. 5 shows the ratio of Cashflow and net present income. As we can see, the payback period begins after the 1st half of 2025.

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Особенности управления рисками при реализации инвестиционно-строительных проектов

Девелопер — профессиональная фигура на рынке недвижимости, сочетающая в своей деятельности управленческие и предпринимательские функции. При этом имеются особенности и задачи, связанные с созданием и выполнением девелоперских проектов. Так, в процессе выбора и осуществления инвестиционно-строительных проектов в их обязанность, помимо обеспечения ликвидности, входит учет социальных, эстетических и экологических аспектов.

На сегодняшний день физические лица, осуществляющие инвестиционно-строительную деятельность, в том числе девелоперы, не всегда могут тратить свое время на то, чтобы решать те или иные проблемы, связанные с переводом земель непосредственно между разными установленными категориями. В данном случае под переводом земель подразумевается процесс, связанный с переводом земель, обладающих сельскохозяйственным назначением, к совокупному их развитию. Для этого происходит создание инвестиционного продукта, т.е. участка земли, с которым проводились необходимые действия для последующего строительства на нем необходимых сооружений различного назначения.

Сегодня многие девелоперы указывают, что осуществление проектов по КОТ (комплексное освоение территорий) нуждается в возмещении из местного бюджета доли расходов, связанных с выполнением развития соответствующих территорий.

Разные земельные участки обладают разным инвестиционным потенциалом, что формирует необходимость оценки его собственником. При участии местных властей в развитии территорий у них появляется право на получение компенсации.

Ключевые слова: земельная рента, категории земель, перевод земель из одной категории в другую, управление рисками ленд-девелопмента, экономическая эффективность проектов

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