Red deer breeding investment risks

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Abstract. The article deals with the analysis of risks of an investment project on the example of a project for breeding red deer in the Samara region. The purpose of the study is to determine the list and degree of risks of an investment project associated with the breeding of red deer in the Samara region. Tasks to be solved: - study of the features of the red deer as an investment object; - preparation of a feasibility study for an investment project for breeding red deer, taking into account the climatic, natural, economic and legal characteristics of the region; - determination of the qualitative and quantitative parameters of the risks of an investment project being implemented under these conditions. An investment project related to the breeding of red deer in the Samara region has a unique set of investment risks. A standard qualitative and quantitative methods for assessing the risks and sustainability of investment projects can be used to determine the structure and size. Under these conditions, the investment project has a low and medium level of investment risks, mainly due to the uniqueness of the manufactured product and significant budgetary support for the project. When determining a quantitative risk assessment, it can be seen that when the most significant parameters of the project change in the range from -20% to + 20%, its results remain positive, and the planned production volumes are significantly higher than the break-even point and exceed it by more than 10 times.

1. Introduction

Funding a project is one of the most important conditions for ensuring the effectiveness of its implementation. One of the problems that has to be solved when developing a project financing plan is an assessment of the danger that the goals set in the project can be partially achieved, that the real income will differ from the predicted one, that is, there are investment risks [1-6].

Investment risk is the likelihood of unforeseen financial losses in a situation of uncertain investment conditions [7-9].

According to the sources of occurrence, investment risks are divided into:
- Systematic (market, not diversified) risk arises for all participants in investment activities and all forms of investment. It is determined by the change in the stages of the economic cycle, the level of effective demand, changes in tax legislation and other factors that the investor cannot influence when choosing an investment object.

- Unsystematic (specific, diversified) risk, which is typical for a particular investment object or for the activities of a particular investor. It may be related to the competence of the personnel of the management of the enterprise; increased competition in this market segment; irrational capital structure, etc. Unsystematic risk can be prevented by diversifying projects, choosing an optimal investment portfolio or effective project management.

External circumstances and risks that may affect the difference between the actually achieved project results from the originally planned ones include [10-16]:

- Low level of funding, which will not allow modernization of the technical base of the applicant;
- Rise in prices for fuels and lubricants, feed, materials in excess of their expected growth due to inflation;
- Abnormal weather conditions and force majeure circumstances that may arise as a result of possible institutional transformations associated with the administrative reform.

These risks are force majeure or depend on the activities of the authorities, in this regard, they cannot be predicted.

Internal risks that a design company may face in the process of project implementation: commercial, financial, technical, technological, etc.:

- Risk associated with the degree of availability of raw materials and components - this type of risk for activities in the project under consideration can be considered insignificant, since there is already a preliminary agreement with the suppliers of raw materials and components.
- Risk of lack or decline in demand - this type of risk can be neglected due to the fact that the meat market in the study region has a significant capacity. The applicant company has few direct competitors in the regional market. The absence of such a risk confirms the readiness of ordinary consumers and enterprises to use the products of the enterprise being created in full, as well as the growing demand for these products in the regional market.
- Environmental risk. The technology offered by the company is waste-free and environmentally friendly, as a result of which it can be argued that the named risk is absent within the project.
- Technological risk. When investing in fixed assets of any industry, uncertainty arises due to the nature of the technological process. However, within the framework of this project, the technological risk is considered insignificant due to the fact that the production technology based on the selected equipment has been worked out by the manufacturer, so no operational difficulties are expected.
- Risk of non-compliance with the estimated time frame for the project [17].

The latter type of risks is minimized due to the following factors:

- A preliminary agreement was reached on the purchase of equipment, on the issue of its delivery, installation, warranty service, etc.;
- Production technology requires special knowledge, skills and work experience, it is supposed to staff the staff of the enterprise with appropriate specialists.
Agricultural production, on the basis of which a set of investment risks is considered, has a number of features that make the nature of these risks different from the risks of industry, trade in the services sector [18-20].

2. Materials and methods
The purpose of the study is to determine the list and degree of risks of an investment project associated with the breeding of red deer in the Samara region. Tasks to be solved: - study of the features of the red deer as an investment object; - preparation of a feasibility study for an investment project for breeding red deer, taking into account the climatic, natural, economic and legal characteristics of the region; - determination of the qualitative and quantitative parameters of the risks of an investment project being implemented under these conditions.

The method of adjusting the discount rate for risk is the simplest and therefore the most used in practice. The main idea of the method is to adjust some basic discount rate (in our case 8.25%), which is considered risk-free or minimally acceptable. The adjustment is carried out by adding the value of the required risk premium, after which the criteria for the effectiveness of the investment project are calculated according to the newly obtained rate [21].

The higher the investor estimates the risk of the project, the higher the requirements for its profitability. This is usually reflected in efficiency calculations by increasing the discount rate by the amount of the risk premium [22-24].

The calculations show that if the discount rate is increased by 1.5 times and is 12.5%, then the project will be economically feasible. This level of project sustainability also allows us to characterize it as medium-risk.

Quantitative risk analysis was carried out using the investment analysis program Project Expert Professional v. 7.19. It was carried out on the basis of two main methods - sensitivity analysis and break-even analysis. Sensitivity analysis is the study of the behavior of an investment project when the factors of the internal or external environment change. Evaluation of the results is carried out on the basis of investment efficiency indicators (net present value, NPV; internal rate of return - IRR, etc.). The main purpose of its implementation is to determine the boundaries of changes in the selected parameters, within which the project remains effective. The wider the obtained interval, the less risky the investment project is. The break-even analysis determines the maximum allowable volume of production for conducting efficient activities. In this case, the main assessment criterion is a comparison of the obtained values and the planned production volume. The greater the difference between them, the lower the risk of the investment project [25-31].

3. Results
Red deer - Cervus elaphus L. 1758. The largest species of the genus Deer. The body length of males is on average 208-243, up to 273 cm, height at the withers is 116-154, up to 168 cm, weight is 157-353, up to 416 kg. Females are usually 20 - 25% smaller than males. The tail is short; its length usually does not exceed the height of the ear. The neck is not long, thin in females and thickened in males. The head is elongated. The nasal mirror is large. The legs are relatively thin, the hooves are oval [32-36].

The color of adult animals depends on the geographic location of the area; usually monochromatic or somewhat darkening on the head, neck, lower body and limbs; very rarely, slightly spotted; the color of the spots is light reddish. The general color tone is brownish-brown in summer, grayish-brown in winter. The speculum is light reddish or yellowish with dark edging. The tail is the same color with a mirror.

The hairline consists of a coarse awn 3-4 cm long and a thin soft undercoat. On the neck there is a mane of coarse hair up to 10 cm long. There are sweat, sebaceous, preorbital, and interdigital glands. There are two molts per year - in spring and at the end of summer [37-40].

Inhabits all of Europe, the Baltics, Belarus, Ukraine, in the mountains of Kazakhstan, Central Asia. In Russia, it is distributed in the Caucasus, Altai, in the Sayan Mountains, Transbaikalia and in the Far
East. Acclimatized in many regions of the European part of Russia. Post-harvest number of red deer in Russia is 180-200 thousand individuals and was a collection of information obtained on the basis of winter route registration data, run, expert assessments of specialists from authorized bodies [41-43].

Venison is deer meat. Reindeer products in Europe are considered delicacies and, due to the small number of reindeer, are not a product of mass consumption.

Deer of two types are mainly raised for meat:

- Reindeer - the height of the deer at the withers is 1.4 m, length - 220 cm, live weight - up to 200 kg.
- Red deer - common in North America, Europe and Asia. The male red deer at the withers reaches 1.4 m.

Venison is a lean dietary meat that has beneficial properties for the body and excellent taste. The amount of protein in venison is 2.7 - 7.6% higher than that of beef [44-46].

It should be noted that the current number of red deer in the Central, North-West and Volga Federal Districts is the result of many years of work by hunting experts on its acclimatization (re-acclimatization). The limiting factor for the settlement of deer is the height of the snow cover. The focal nature of the distribution is considered as the main reason for the low accuracy of estimates of the number of reindeer obtained during winter route counting. In the regions of these federal districts, more reliable results on the number of reindeer should be provided by on-farm accounting methods - counting by run and counting at feeding grounds (table 1).

| Denomination | 2008 | 2010 | 2013 | 2018 | 2019 |
|--------------|------|------|------|------|------|
| Red deer     | 700  | 600  | 532  | 1034 | 945  |
| Prey, head   |      |      |      |      |      |
| Red deer     | 21   | 25   | 15   | 49   | 47   |

In the Samara region, an investment project was implemented to increase the number of red deer. The basis of this project was the funds of the regional grant for the support of farms. When purchasing 100 heads of reindeer, the farm must reach a livestock of 210 heads within 5 years. Every year half a row of 60 heads are supposed to be used for the purpose of replenishing the wild herd of the region, transferring it to hunting farms and other purposes [47-56].

Assessment of project risks.

The farm considers the following methods of risk (tables 2 and 3) reduction:

- The presence of long-term contracts with suppliers of raw materials, materials, components;
- Availability of long-term contracts with equipment suppliers;
- Availability of long-term contracts for the sale of finished products;
- Creation of stocks of raw materials, materials, components and finished products;
- Use of property insurance.

Quantitatively, the degree of investment risks was assessed using sensitivity analysis (figure 1) and break-even analysis (table 4).
Table 2. Assessment of risks arising at the stage of capital investments.

| Risk type                                           | Probability of occurrence |
|-----------------------------------------------------|---------------------------|
| Supplier default                                    | low                       |
| Late delivery and installation of equipment         | low                       |
| Failure to meet construction deadlines              | low                       |
| Exceeding the estimated cost of the project        | low                       |
| Force majeure, property damage                      | low                       |

Table 3. Assessment of the risks associated with the operation of the enterprise.

| Risk type                                           | Probability of occurrence |
|-----------------------------------------------------|---------------------------|
| Failure to reach design capacity                    | low                       |
| Release of products of inappropriate quality        | low                       |
| Products do not find sale in the desired expression and within the estimated time frame | low |
| Late supply of raw materials                        | low                       |
| Cost inflation                                      | average                   |
| Force majeure, property damage                      | low                       |

Figure 1. Sensitivity analysis, NPV (thousand rubles).

The sensitivity analysis was carried out in terms of net present value (NPV) in the range from -20% to + 20% of the change in the studied indicators. This interval is considered sufficient to draw conclusions about the stability of the investment project [57-68].

During the sensitivity analysis, it was revealed that the main risk factors for the implementation of this investment project are sales volume and sales price. If these factors decrease by 20%, the value of net present value decreases by 65% from the baseline scenario. The main tools for reducing this risk are - the conclusion of agreements with the Ministry of Forestry and Environmental Protection and Nature Management of the Samara Region for release into the wild and increasing the population of red deer in the region; - conclusion of long-term agreements with hunting farms of the region to provide them with hunting objects and thus preserve wild animals.
**Table 4.** Break-even analysis.

| Product      | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|--------------|------|------|------|------|------|------|------|------|------|
| Deer noble   | 2.28 | 4.84 | 4.91 | 5.07 | 5.09 | 2.37 | 2.80 | 2.56 | 2.56 |
| Horns        | 19.08| 18.49| 23.41| 11.64| 11.49| 5.60 | 5.89 | 5.38 | 5.38 |

The break-even analysis shows that with the implementation of 2.5 to 5.0 quintals of reindeer in live weight, the project becomes effective. When compared with the planned volume of sales, the break-even point is only 7-10%, which indicates the sustainability of this investment project.

**4. Conclusion**

An investment project related to the breeding of red deer in the Samara region has a unique set of investment risks. A standard set of qualitative and quantitative methods for assessing the risks and sustainability of investment projects can be used to determine the structure and size. Under these conditions, the investment project has a low and medium level of investment risks, mainly due to the uniqueness of the manufactured product and significant budgetary support for the project. When determining a quantitative risk assessment, it can be seen that when the most significant parameters of the project change in the range from -20% to +20%, its results remain positive, and the planned production volumes are significantly higher than the break-even point and exceed it by more than 10 times.

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