Formation of Reserves of Natural and Environmental Risks in the Accounting of Agricultural Organizations

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Abstract. The article is devoted to the study of environmental and natural risks of the production activities of agricultural organizations arising from interaction with the natural environment, as well as the problem of accounting for these risks. The authors note that agricultural organizations in the course of their activities face both environmental risks, that is, risks, the implementation of which can lead to a violation of the natural balance, and natural risks, which are expressed in changes in weather and climate conditions that are unfavorable for agriculture. In order to reflect the balance sheet value of work in progress in the accounting statements of agricultural organizations in an assessment corresponding to the real state of affairs in the organization, taking into account the above risks, the authors propose to form reserves of natural and environmental risks in accounting, which are estimated values, according to the methods developed by the authors.

1 Introduction

Recently, the concept of sustainable development of the region, which is based on the synthesis of three groups of development factors: economic, social and environmental, has gained wide popularity. In 2015, the UN General Assembly approved 17 sustainable development goals, 6 of which are aimed at improving the state of the environment [1]. Environmental pollution as a factor influencing human health is in second place after lifestyle, the degree of influence of this factor is 25% [2]. Therefore, it can be said that the achievement of another sustainable development goal - good health and well-being - is not fully possible without addressing environmental problems.

Based on the sustainable development goals approved by the UN in 2018, the Decree of the President of the Russian Federation established national development goals and approved national projects, one of which is the Ecology project. The national project “Ecology” served as a guideline for the development of regional programs aimed at solving environmental problems.

The environmental sustainability of the region is largely determined by the intensity of human economic activity. Not the last place in the process of influencing the environment

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is occupied by agriculture, especially crop production [3-5]. This type of activity carries the following environmental risks: impoverishment (depletion) of the soil, clogging of the soil with chemicals, as a result of which crop products grown on these soil resources cannot be considered environmentally friendly and can have a negative impact on human health when consumed.

According to the Federal State Statistics Service of Russia, in 2020, the share of agricultural land treated with pesticides in the total area of agricultural land in the country amounted to 45.7%, the area of disturbed land during reclamation work was 626 hectares [6].

It is important to understand that the natural environment and agribusiness enterprises are in constant interaction with each other (Fig. 1).

![Fig. 1 Mutual influence of the natural environment and agribusiness enterprises](image)

If agricultural organizations engaged in crop production are a source of environmental risks, the implementation of which causes a violation of the natural balance, primarily of the soil ecosystem, then the environment carries certain natural risks for agribusiness organizations. Natural risks are expressed in changes in climatic (weather) conditions that are unfavorable for agriculture, for example: insufficient rainfall (drought), too high or too low air temperature (including its sharp fluctuations), unfavorable level of air humidity, strong wind. The realization of natural risks can lead to both a reduction and a complete absence of agricultural crops, which is accompanied by large losses for agribusiness organizations.

Note that both environmental and natural risks are production risks due to the fact that they are directly related to the course of the production process. In this regard, according to the authors, it is advisable for plant growing enterprises to form reserves of these risks in accounting in order to reflect the cost of work in progress in the accounting statements in a “cautious” assessment, thereby observing the principle of prudence.

The purpose of the study is to develop a methodology for the formation of reserves of environmental and natural risks in accounting.
2 Research Methodology

The theoretical and methodological basis of the study was the scientific works of scientists dealing with the problems of accounting for estimated reserves and estimated liabilities, including those in agro-industrial complex organizations [7-10], as well as regulatory documents on accounting.

The value of the reserve of natural risks, in our opinion, should be determined as the sum of the production costs of the enterprise for the reporting period, adjusted for the probability of crop failure. In accordance with Russian accounting standards, production costs are direct material, direct labor and general production costs collected on the debit of account 20 “Main production”. For example, the cost of seeds and planting material, mineral fertilizers, fuels and lubricants, wages, along with deductions for social needs of production workers, depreciation of agricultural machinery. Determining the probability of crop failure is possible both by an accountant of an organization with his professional judgment, and by an expert. When calculating this indicator, it is advisable to take into account the statistics of past crop failures in the organization that occurred as a result of adverse natural and climatic conditions, as well as the forecasts of scientists and the level of readiness of the organization to withstand adverse weather conditions through the implementation of measures to completely or partially level natural risks. The formula for calculating the amount of the natural risk reserve is as follows:

\[
R_{pr} = PZ \times V_n
\]

\( P_{pr} \) - reserve of natural risks;
\( PZ \) - production costs;
\( B_n \) is the probability of crop failure.

For the purposes of accounting for the reserve of natural risks, we suggest using the account number, which is currently not intended to account for any object. For example, account 30. It can be called like this: “Reserve of natural risks”. This reserve, like any other estimated reserve, will be created at the expense of other expenses of the organization. Accordingly, we can define account 30 as a passive account. The credit of this account will reflect the creation of a reserve of natural risks, and the debit - its write-off. Until the release of finished products (harvesting), the balance sheet value of work in progress in the financial statements will be adjusted by the amount of the natural risk reserve. The list of possible entries on account 30 “Reserve of natural risks” is presented in table 1.

<table>
<thead>
<tr>
<th>Debit</th>
<th>Credit</th>
<th>Content of a business transaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>91.2</td>
<td>thirty</td>
<td>Creation of a reserve of natural risks</td>
</tr>
<tr>
<td>thirty</td>
<td>20</td>
<td>The reserve of natural risks was written off for the amount of crop failure resulting from the adverse impact of natural factors</td>
</tr>
<tr>
<td>thirty</td>
<td>91.1</td>
<td>Recovery of the unused natural risk reserve</td>
</tr>
</tbody>
</table>

Table 1 Accounting entries for account 30 “Reserve of natural risks”

If the reserve of natural risks is an estimated reserve, which is aimed at adjusting the book value of an organization’s asset, namely work in progress, then the reserve of environmental risks is an estimated obligation, which ultimately, when it is realized, entails the emergence of an organization’s accounts payable to the budget for payment penalties. In the Russian Federation, penalties for damage to fertile land as a result of agricultural
activities are enshrined in the Code of Administrative Offenses of the Russian Federation, as well as in the Criminal Code of the Russian Federation.

The methodology for forming a reserve of environmental risks seems to us as follows: the amount of fines for environmental offenses that the organization had in the last reporting period must be adjusted for the likelihood of these fines occurring in this reporting period. The likelihood of fines largely depends on the measures taken by the organization to prevent damage to fertile lands. The calculation of the amount of the reserve of environmental risks must be carried out according to the following formula:

\[ R_{er} = W_e \times H_w \] (2)

\( R_{er} \) - reserve of environmental risks;
\( Sh_e \) - fines for environmental offenses;
\( W \) is the probability of fines.

Accounting for the reserve of environmental risks is proposed to be carried out on account 96 “Reserves for future expenses”, which takes into account all types of estimated liabilities. Since the environmental risks we are considering are associated with the production activities of agricultural organizations, it is advisable to include the amount of the created reserve of environmental risks in the composition of production costs. Note that the agricultural organization is obliged to form this estimated obligation if there is a high probability that environmental risks will be realized. The list of possible entries on account 96, sub-account “Reserve of environmental risks” is presented in table 2.

### Table 2

<table>
<thead>
<tr>
<th>Debit</th>
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</thead>
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<td>20</td>
<td>96</td>
<td>Creation of a reserve of environmental risks</td>
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<tr>
<td>96</td>
<td>76</td>
<td>The reserve of environmental risks was written off for the amount of environmental sanctions imposed on the organization</td>
</tr>
<tr>
<td>96</td>
<td>20</td>
<td>Recovery of the unused amount of the environmental risk reserve</td>
</tr>
</tbody>
</table>

### 3 Results and Discussions

Let’s consider the order of formation and use of the reserve of natural risks on a specific example. Suppose that an agricultural organization (LLC Alfa), engaged in crop production, incurred production costs in the amount of 3,000,000 rubles in the reporting period. In accordance with the expert assessment, the probability of crop failure in the reporting period as a result of the impact of natural factors is defined as 2.7%. Consequently, the amount of the reserve of natural risks, calculated according to formula 1, will be 81,000 rubles. Due to severe frosts, the losses of the organization amounted to 76,400 rubles. Table 3 presents the accounting records in Alpha LLC for the formation and use of the reserve of natural risks.

### Table 3

<table>
<thead>
<tr>
<th>Debit</th>
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<th>Amount, rub.</th>
<th>Content of a business transaction</th>
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</thead>
<tbody>
<tr>
<td>91.2</td>
<td>thirty</td>
<td>81,000</td>
<td>Creation of a reserve of natural risks</td>
</tr>
</tbody>
</table>
Table 3. Continuance

| thirty | 20  | 76 400 | The reserve of natural risks was written off for the amount of crop failure resulting from the adverse impact of natural factors |
| thirty | 91.1| 4600   | Recovery of the unused natural risk reserve |

In the financial statements of Alpha LLC, until the harvest, the value of work in progress will be reflected in the adjusted estimate in the amount of 2,919,000 rubles, that is, minus the amount of the natural risk reserve.

Now let’s consider an example of the formation and use of a reserve of environmental risks. Suppose that an agricultural organization (LLC Alfa), engaged in crop production, last year paid a fine for damage to fertile land due to violation of the rules for handling agrochemicals and pesticides in the amount of 70,000 rubles. In the reporting year, Alfa LLC took measures to prevent violations of environmental standards and estimated the probability of environmental risks materialization at 60%. Accordingly, the amount of the environmental risk reserve of Alpha LLC will be 42,000 rubles. In the reporting period, the organization was charged with environmental sanctions in the amount of 40,000 rubles. Table 4 presents the accounting records in Alpha LLC for the formation and use of the environmental risk reserve.

Table 4 Accounting records in Alpha LLC on the formation and use of the environmental risk reserve

<table>
<thead>
<tr>
<th>Debit</th>
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<th>Amount, rub.</th>
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<tr>
<td>96</td>
<td>76</td>
<td>40 000</td>
<td>The reserve of environmental risks was written off for the amount of environmental sanctions imposed on the organization</td>
</tr>
<tr>
<td>96</td>
<td>20</td>
<td>2000</td>
<td>Recovery of the unused amount of the environmental risk reserve</td>
</tr>
</tbody>
</table>

4 Conclusions

The formation of reserves of natural and environmental risks in the accounting of agricultural organizations allows not only to take into account, assess and control these risks, but also to ensure that work in progress is reflected in the accounting statements in a real, “cautious” assessment, thereby observing the principle of prudence. Compliance with the principle of prudence can ensure a trusting attitude towards an agricultural organization on the part of its counterparties, creditors and investors.

References


10. L.N. Gerasimov, Estimated reserves in international practice, 2, 57 (2013)