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ИНОВАЦИИ В СЕЛСКОТО СТОПАНСТВО
INNOVATIONS IN AGRICULTURE

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Abstract

In this article the goal is to clarify the basic methodological and practical issues of investment in innovative projects, and also offer a system of indicators for practical use in the analysis and evaluation of these projects. Attached is an example of an investment project for the implementation of innovative equipment and technologies for the production of elite and super-elite varieties of dessert grapes.

The volume of revenues, expenses, taxes, interest, and net profit from realization of this investment project show that the estimated amount of net cash flow in the condition to restore requests cash loan still in the middle of the third resources of the production program of the investment project.

INTRODUCTION

The agricultural eenterprises focus their efforts on searching and application of innovations in the overall production and technical, administrative and scientific-research activities to identify additional reserves and increase their productivity and efficiency.

This article aims to offer innovative methodological and practical solutions to the issues of investment in innovative projects, and also to present the system of methods and indicators for practical use in the analysis and evaluation of these projects.

MATERIALS AND METHODS

According to I. Cook and P. Mayers [1996] innovation is a complete process from the idea to the specific realized product on the market. Such a statement is shared by V. Twiss [1989] and K. Nedeva [2013], where innovation is defined as a process in which the invention or idea receive economic content.

According to Dodgson M. [2000] "Innovations include scientific, technological, organizational and financial activities that lead to the commercial introduction of

new (or improved) product or new (or improved) manufacturing process or equipment."

Evaluation of efficiency of innovative solutions in agriculture is multifacetedand involves the assessment of the economic, social, ecological, scientific - technical and other kinds of efficiency.

Economic efficiency of innovative projects is estimated by using a system of indicators that reflect the ratio of „result - expenses". Two groups of parameters, are used in the economic evaluation of innovative solutions - static and dynamic.

Static methods are practically oriented approximate methods. They cover one year of the investment period and, therefore, the biggest problem in the data used is the establishment of typical, average values. This is a significant weakness, as the investment projects, as a rule, cover periods of several years, and static methods cannot evaluate the income and expenses of investments for the entire duration of the period of its implementation. Relatively widespread application of static methods is due to the fact that they are not connected with numerous calculations. Static methods can be applied with success at relatively small and short-lived investment projects, as well as methods for initial stages of project development. The most frequently used indicators are: the ratio of profit to sales;the ratio of profit to capital investments, payback period of capital investments.

Dynamic methods are based on data for the whole period of use of an object of innovation or investment. By these methods is made a comparison of investment income and expenses for various periods.

The net present value (NPV) is the primary method of dynamic methods in the evaluation of investment projects. When this all caused by the investment's receipts and payments are accumulated at interest with a specific interest rate (discount rate) on the date immediately before the investment. To simplify the calculations instead of individual annual income and expenses consists of the balance of each year (net financial result or profit). The initial investment includes both values at the beginning of the period, i.e., it has a negative balance discount rate of 1.0. Income surpluses in the years are accumulated at interest with the discount rate at the beginning and recorded with the appropriate symbol.

The amount of initial investment with the sign "minus" and the discounted net cash flows for all the years in the period of operation represents the net present value (NPV).

$$NPV = -K_0 + \frac{NPV_1}{a_1} + \frac{NPV_2}{a_2} + ... + \frac{NPV_n}{a_n}$$

where: NPV - net present value;

K_0 - initial includes;

$i = 1, 2, 3, \ldots, n$

NPV_i - net cash flows in the first, second, ..., last year during operation;

a_t - discount rate in the first, second, ..., last year.

When NPV is a positive number that indicates that discounted, compared the starting point, (t_o) cumulative amounts of income are positive. When it is negative, it means that the investment does not generate income. As a result, at the same other conditions, without doubt, we adopt the first option.

The size of the NPV depends on the exact calculative interest rate. As a rule, the net present value decreases, when calculative interest rate increases. When the NPV is zero, the invested capital is accrued (generate income) with the size of calculative interest rate (the discount factor).

One investment in principle is useful when there is positive NPV . Frequently establishment of income surplus for each year is problematic. To simplify the calculations, it is accepted that the annual surplus are constant values. If the income surplus at the beginning of the use of investment are high, and over time decreases, then the discount make stronger impact on NPV than if they are equally distributed for the all period of use.

When choosing between two or more investment decisions prefer that the *NPV* is above. The method of NPV is limitly applicable when choosing alternatives. The costs of initial investment and annual surpluses are required to be comparable for a period of use. For not comparative alternatives, the method is not used, or to use it are applied the so-called additional investment of savings in the initial investmen-ts than large annual surpluses or shorter period of payback of the initial investment. NPV of these additional investments must be added to the NPV of the basic investment.

The inclusion of additional investments is not required in cases, where the invested capital is accumulated at interest exactly by calculative interest rate, because then the NPV of the additional investments will be equal to zero. Therefore, the method of NPV is suitable for comparing investment alternatives only when you can assume that the released funds will be reinvested exactly when calculative interest rate (the factor), that too conventionally. Often the definition of the net present values of specific additional investment is a complex process.

The method for estimating future value (FV) is complementary to NPV . In this case the receipts and payments from the investment are accumulated at interest to the end of the (future) time period of use of investments. The result is determined by the excess of (or lack of) for the final moment of the investment period.

Positive final value of investments shows that the project to generate more income compared with this calculative interest rate and, therefore, this option is more profitable. Among several projects should be preferably the one with the highest value of the FV.

Formally the method for the evaluation of FV corresponds to the method of capital values, because the ultimate values and the capital values can always be transformed one into another by calculating compound interest. FV corresponds to the accumulating interest of the NPV .

$$FV = NPV.a_t \text{ или } NPV = \frac{1}{a_t}$$

From this it follows that the cases of use and possibilities of the method for estimation of FV same as in the method of the NPV [1].

To show that the method FV and the method of the NPV are equal, should the specified value of the FV to be discount and to be transformed into NPV .

The main disadvantage of the NPV , as the estimation method, is that it is defined as the absolute amount of and, therefore, does not show the degree of efficiency of the project. Therefore, the assessment in this method is complements necessarily with the assessment by the **method of internal IRR (internal rate of efficiency or internal rate of return)**, which is determined in percentage.

This method, is an alternative method to the NPV . The task is how to determine the rate of rentability of the return of the invested capital, during the term of use of investments. In this case the domestic interest rate is that interest rate, which accumulate interest of receipts and payments, so that the NPV is a null-value.

$$IRR = l_1 + (l_2 - l_1).\frac{NPV_1}{NPV_{l_1} + \left(-NPV_{l_2}\right)^{(-1)}}$$

where:

NPV_{l_1} - the smallest positive net present value;

NPV_{l_2} - the most close to zero negative net present value;

l_1 - discount norma, which gives the smallest positive net present value;

l_2 - discount norma, which gives the most close to zero negative net present value.

Investments can be seen as favourable when their internal interest rate is higher, or at least equal to one, who is real, oriented to the costs and is able to ensure capital calculative interest rate. To calculate the internal rate of interest at forward is established the net present values for some of the exemplary interest rates.

The period of return on investment (PBP) is measured with the time required to align the accumulating in the years of the algebraic sums of the update value of net cash flows from capital investments.

The option with the shortest payback period is chosen.

[1] Typical for both these methods is that the first year or, respectively, the final year of the investment period, to which the annual surpluses are discounted, this year is denoted as t_0 and the payments during this year are discounted with a coefficient of 1.0, i.e. they didn't accumulated interest.

$$\sum_{i=1}^{Tomк} П^{/} = K^{/},$$

where:

$\sum_{i=1}^{Tomк} П^{/}$ - update value of net cash flows from capital investments in the years of the return on investment;

$Tomк$ - payback period of investment;

$K^{/}$ - **sum of the update value of investment**.

The effectiveness coefficient (with discount) is determined by the number of redemption for the entire economic life of the project. This is calculated by the formula:

$$E^{/} = \frac{\sum_{i=1}^{Tomк} П^{/}}{K^{/}} \geq 1,$$

where:

$E^{/}$ - effectiveness coefficient (with discount),

$\sum_{i=1}^{Tomк} П^{/}$ - the update valueof net cash flows, during the entire economic life of the project.

In the method of minimum alimony, were identified updated value of all costs of the entire economic life of the project, was selected with the minimal costs.

$$\sum_{t=1}^{n} C_t + \sum_{t=1}^{n} K_t \rightarrow \min,$$

where:

$\sum_{t=1}^{n} C_t$ - the update valueof operating costs for the entire economic life of the project at $t = 1, 2, 3, ..., n$

$\sum_{t=1}^{n} K_t$ - the update valueof operating costs for the entire economic life of the project at $t = 1, 2, 3, ..., n$

These methods, which are of particular importance for the evaluation of the projects, are the rates of return on investments and NPV. It is believed that the assessment criteria in the net present value is a necessary condition for the effectiveness of the project, how the estimation of the rate of profit is a sufficient condition for the effectiveness of the project.

The ratio of income - expenses" (*BCR*) is a modification of the previous methods and provides additional information for the index of return on an investment project.

The ratio of income - expenses is calculated by the following formula:

$$\frac{B}{CR} = \frac{\sum PVRF_{tn}}{\sum PVCF_{tn}} \geq 1,$$

where:

$\sum PVRF_{tn}$ - the present value of income;

$\sum PVCF_{tn}$ - the present value of income of costs.

RESULTS AND DISCUSSION

The proposed system of indicators is used in estimating the forecast of the results of the innovative project and its results received a confirmation from the Commission to the State Found Agriculture and SAPARD.

This article indicates the case of an investment project for the implementation of innovative equipment and technologies for the production of elite and super-elite varieties dessert grapes[2]. Primarily this involves the development and introduction of technology of production „eco" transplant planting material. Secondly, is the purpose of creation of specialized machine-tractor park for the pepiniera for the production of planting material.

By their nature, specialized machine-tractor park includes a unique technology with a high degree of innovation and efficiency. At the same time it is performed by external service providers in the region of Northwestern Bulgaria such as "MACHINARY RING".

Starting seed material from the variety structure of the company in this technology is produced by Agrobioinstitute - Agricultural academy, Kostinbrod . Established "in vitro " cultures are used for clonal micro-breeding. In vitro plants are grown in a growth-room. After a period of initial adaptation plants enter the premises of the company.

In its complete view the project includes activities in the following technological stage:

- Production, collection and storage of cuttings and graft nurseries;
- Preparation of graft source material;
- Planting stratified graft material;
- Growing vines;
- Removing, sorting and storage of transplanted rooted vines.

The investment required for the investment project provides for the acquisition of a system of innovative machines and units for the needs of pepiniera-company. The Expert evaluation is determined by the expected patterns

[2] This innovation project was prepared by V. Tzvetanov, N. Nanev, and Y. Todorov, and was implemented in the company "TZEKO-95, in the village of Byala, Ruse district, under program SAPARD.

of machine, model, firms, etc. as **appropriate innovation expert choice** for the needs of pepiniera. The main part of the production objects of the best companies in the EU. The majorities of them are high level of specialization and have a unique character. In the country now-a-days such a machine-tractor park with this class does not exist.

The total investment required is 228 210 LV.

The forecast budget investment project was prepared in accordance with the specific requirements of SAPARD, as total expenses was broken down into three groups: material costs, Fund of wages and depreciation.

Pursuant to part of the investment project is calculated per unit of cultivated area /ha/ at different stages of the production program.

The volume of revenues, expenses, taxes, interest, and net profit from realization of this investment project shows that the estimated amount of net cash flow able to return to requests for cash loan in the middle of the third year of the production program of the investment project.

CONCLUSION

In the present study is presented a methodological tool with which is assessed the investment project for the implementation of innovative equipment and technologies for the production of elite and super-elite verities of dessert grapes. This is one of the first experiments to obtain EU subsidies under the SAPARD program. On the basis of practical realization of the investment project currently produces luxury and super-elite planting material of varieties „Siana" and „Velika", which are among the most popular on the external market dessert grapes.

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