

## **ADMINISTRATION OF ADMINISTRATIVE DECISIONS BY USING METHODS OF ECONOMIC-MATHEMATICAL MODELING**

### **Smoliy L.V.**

PhD (Economics), Associate Professor,  
Uman National University of Horticulture

### **Zagorodniuk O.V.**

PhD (Economics), Associate Professor,  
Uman National University of Horticulture

### **Maliuga L.M.**

PhD (Economics), Associate Professor,  
Uman National University of Horticulture

In this research, the above economic and mathematical model allows individual agricultural enterprises to establish investment volumes needed for the purchase of any particular type of equipment for the agricultural production. The choice of the most appropriate source of investment minimises investment costs and establishes a rational investment portfolio under certain conditions and limitations. This will allow agricultural enterprises to plan investments in the renewal of their facilities with regard to the production by the best option, given the productivity of agricultural machinery and the planned sowing areas. Further studies may be aimed at developing a range of tools to identify and optimise risks that accompany the practical implementation of investment projects under the conditions of instability and uncertainty.

As a result of the modelling, variants of the implementation of the investment project are developed to purchase the relevant equipment by agricultural enterprises. These variants are evaluated based on different criteria of the optimisation.

The study was conducted in respect of investments in the purchase of beet harvesters that would be used in the area of 2,000 ha. Moreover, the possibility of buying the Ukrainian machinery, as well as the equipment of foreign production, has also

been considered. It has been found that, based on the criterion of minimising the cost of the investment project, purchasing of the Ukrainian machinery is preferred despite its lower productivity.

It has been determined that in case of investment financing exclusively from own sources, minimisation of costs for the project is provided due to purchasing 12 harvesters of the domestic production. Thus, the possibility of taking into account operating costs in cash flows does not change the final optimal structure of the planned number of machinery, affecting only the total cost of the investment project – UAH 8,160 thousand (USD 326.4 thousand) and UAH 15,503.3 thousand (USD 620.1 thousand). In the first case, the optimal investment plan provides for the purchase of all machinery during the first year of the project; the second case will cover a period of four years. The budget of capital investment reduces the implementation of the investment project due to the accumulation of resources from external sources – UAH 6,120 and UAH 13,463.5 thousand (USD 244.8 and USD 538.5 thousand) with or without operating costs, respectively.

For these two alternatives, a minimum value of the investment program is also achieved when buying machinery only of the Ukrainian production. Moreover,

the need to take borrowed funds occurs only during the first year of the project, in the amount of UAH 6,120 thousand (USD 244.8 thousand) in both cases. The remaining expenditures are planned to provide through the investment objectives of the depreciation charge of the cost of the harvesters.