Economic Efficiency of Cultivation of New Perspective Vegetable Soybean Crop for High Income in Uzbekistan

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Abstract—This article presents the results of assessing the economic efficiency of a new variety of vegetable soybean Universal when grown in Uzbekistan with different methods of pre-sowing seed treatment, spring and summer sowing periods, as well as with different seed sowing schemes. The most cost-effective elements of the technology of cultivation of vegetable soybeans, providing a high income, are recommended.

Keywords — Vegetable Soybeans, Yield, Economic Efficiency.

I. INTRODUCTION

Vegetable soybean (Glycine hispida Maxim., Ssp. Manshurica Enk.) is a popular and widespread crop in the world and is represented by many varieties [1].

The studies of many scientists are devoted to the improvement of the elements of the technology of cultivation of vegetable soybeans to increase its yield, and the effectiveness of the use of various methods of pre-sowing seed treatment [2], the optimal timing of sowing seeds [3; 4, 5; 6], sowing schemes [7, 8, 10, 11] to increase the economic efficiency of its cultivation [12].

II. METHODS

Soybean vegetable (Glycine hispida Maxim., ssp. Manshurica Enk.) is an unconventional crop in Uzbekistan, therefore, for its successful cultivation, a cultivation technology has been developed for the first time [9]. We carried out an analysis of economic efficiency and recommendations for the production of the most profitable elements of the technology for growing vegetable soybeans of the Universal variety.

We were determined economic efficiency by comparing the cost, costs of growing, harvesting and the cost of the resulting crop, as well as determining the amount of net income. At the same time, they used technological maps for the cultivation and harvesting of legumes.

III. FINDINGS

We have evaluated the economic efficiency of the methods of pre-sowing seed preparation. The costs of growing and purchasing seeds, fertilizers and fuel and lubricants in all variants of the experiment were the same, however, for the treatment of seeds with sodium humate, as well as when using mulch (at the rate of 5 tons of humus / ha at a price of 20 thousand sums per 1 ton). , as well as 2 tons of rotted sawdust / ha at the rate of 10 thousand sums per 1 ton with transportation to the field), there were additional costs (at the rate of 1 US dollar is equal to 1640.00 sums). Although the costs increased, the yield increased. The
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calculations showed that in all variants of the experiment the cost of the grown products exceeded the costs incurred, which ensured the receipt of a net income (Fig. 1).

![Figure 1](image_url)

**Figure: 1. Economic efficiency of using various methods of pre-sowing preparation of seeds of vegetable Universal soybean variety**

The amount of net income also changed depending on the method of pre-sowing seed preparation. The highest net income was obtained from the cultivation of vegetable soybeans using seeds soaked in sodium humate for 12 hours - 892.8 thousand sums / ha.

A slightly lower net income was obtained when growing vegetable soybeans using seeds soaked in water for 12 hours and then using mulch (humus + rotted sawdust) - 885.5 thousand sums / ha. The smallest net income was obtained when seeds were soaked only in water for 12 hours - 719.3 thousand sums / ha and sowing with dry seeds - 556.7 thousand sums / ha.

Indicators of production cost and production profitability changed similarly. The lowest cost price is 26.5 thousand sums / c. grown products and the highest level of profitability of 32.1% of production were when growing vegetable soybeans using seeds soaked in sodium humate for 12 hours. Similar indicators were when seeds were soaked in water for 12 hours using mulch (humus + rotted sawdust), where the cost was 26.9 thousand sums / c. and profitability - 30.2%.

When sowing with dry seeds (control) and soaking seeds in water for 12 hours, the cost significantly increased (29.1 and 27.8 thousand sums / c, respectively) and the profitability of production decreased (20.1 and 25.9%, respectively).

It was found that it is economically profitable to sow vegetable soybean seeds soaked for 12 hours in a solution of sodium humate, as well as seeds soaked in water for 12 hours using mulch (rotted manure + rotted sawdust) when sowing. Sowing seeds while soaking in water for 12 hours and sowing with dry seeds also pay off economically, but these methods are less cost effective.

**Economic efficiency of the spring sowing period.**

The timing of sowing vegetable soybean seeds should be considered not only from the standpoint of obtaining high yields of beans, but also with what kind of crop will be cultivated in the subsequent period and when the field should be cleared of soybeans for another crop.

When sowing from March 20 to April 1, the field is vacated in the first ten days of June, and as a re-crop, you can...
use the area for planting potatoes, cucumbers, carrots, radishes, watermelons, corn for green forage, onions and other crops. When sowing from April 10 to April 20, the field is vacated at the end of June, and potatoes and cucumbers can be planted as a re-crop.

We have carried out an economic assessment of the best spring sowing dates recommended by us. When determining the costs, it was considered that with each subsequent sowing period, the growing season was shortened, which reduced the number of irrigations, cultivation and cutting of furrows per operation.

For the sowing dates on April 1, the costs decreased by 13.4 thousand sums / ha due to the reduction of irrigation with furrow mandrel, cultivation and cutting of furrows, when sowing on April 10 - by 40 thousand sums / ha (one weeding), on April 20 - by 56.7 thousand sums / ha (one complex and one weeding) and on April 30 - by 76.6 thousand sums / ha (2 complexes and two weeding) (Figure 2).

It should be noted that the later the sowing was carried out, the lower the total costs. This is due to the fact that with late sowing dates, the number of weeding decreased and the amount of work was also reduced. At all five planting dates, the cost of the crop exceeded the total costs of growing and harvesting.

As a result, it was found that all sowing dates provided net income. The highest net income (935.8 thousand sums / ha and 862.4 thousand sums / ha, respectively.) Was obtained from sowing on April 20 and April 30, Average income (565.1 and 315.5 thousand sums / ha) was obtained at the sowing date of April 10 and April 1, and the smallest - at sowing on March 20 (68.7 thousand sums / ha).

The profitability of production at early sowing dates (March 20 - April 1) was lower (2.4-11.0%) and higher (20%) in the control variant at April 10 sowing.

The calculations of economic efficiency indicate that it is best to sow vegetable soybeans in the Central zone of Uzbekistan from April 10 to 30, when the highest profitability is achieved (31.4-33.3%). Sowing at a later date is economically impractical, since the ripening of the beans is delayed until August, which delays the release of land for re-crops.

![Fig 2. Economic efficiency of cultivation of the variety "Universal" in the spring sowing in technical ripeness](image_url)

Economic efficiency of the summer sowing period.

Cultivation of vegetable soybeans in re-cultivation after growing winter cereal crops and early vegetable crops will bring significant profits for obtaining valuable high-protein products and improving soil fertility.
It was found that the highest marketable yield was obtained with the sowing date on June 20 - 84.5 t / ha, and the smallest - on July 30 (67.2 t / ha). In the control variant (July 10), the yield was 80.7 t / ha. (fig. 3).

Net profit for different summer sowing periods slightly differed and ranged from 352.2-1059.4 soums per hectare, and in the control variant -921.8 sums / ha.

The most profitable (34-38.6%) were the sowing dates from June 20 to July 10, slightly less (23.7%) - the sowing period July 20. Sowing on July 30 significantly reduced profitability to 13.2%.

![Figure 3. Economic efficiency of growing vegetable soybean variety Universal at summer sowing in technical ripeness](image)

Cost-effectiveness of seeding patterns.

To substantiate the optimal schemes for the distribution of vegetable soybeans we have identified, we have carried out their economic assessment.

The amount of net income depends on the yield. The highest net income was obtained with a single-line sowing scheme 70x20 cm - 688.1 thousand soums / ha, and with a two-line scheme (50 + 20) x20 cm - 1046.6 thousand soums / ha. The smallest net income was obtained with a one-line sowing scheme 70x25 cm - 454.5 thousand soums / ha, and in the control variant 70x15 cm - 460.1 thousand soums / ha. (fig. 4).

The indicators of production cost and production profitability changed similarly. The prime cost significantly increased and the level of profitability of production decreased both with a more thickened and more sparse planting with single-line sowing schemes (70x15, 70x20 and 70x25 cm). The lowest cost price and the highest level of profitability were obtained with the seeding schemes and (50 + 20) x15 cm and (50 + 20) x20 cm, respectively, 31.1 and 33.2%.
Based on the research carried out, we have recommended the best methods for pre-sowing seed preparation, optimal spring and summer sowing periods, as well as sowing schemes that ensure high net profit and production profitability.

REFERENCES


