ECONOMIC EFFICIENCY OF STRENGTHENING THE FEED BASE OF SERICULTURE IN UZBEKISTAN

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Abstract. This article examines the economic significance of strengthening the feed base of sericulture in Uzbekistan. It considers how the availability of high-quality mulberry leaves influences cocoon-production costs, production continuity, processing-capacity utilisation and the stability of sector participants' incomes. The study highlights the value of coordinated development of new mulberry plantations, rehabilitation of existing stands, water-saving irrigation and digital land monitoring. Indicators are proposed for assessing the economic performance of measures aimed at strengthening the feed base.

Keywords: sericulture, feed base, mulberry plantations, production cost, economic efficiency, water saving, cooperation, digital monitoring

Sericulture is one of the sectors in which the stability of the final economic outcome is closely linked to the condition of the primary resource base. In silkworm rearing, this resource is the mulberry leaf. Its quantity, quality, territorial accessibility and timely harvesting influence cocoon output, labour requirements, transport costs and the technological continuity of production. The feed base should therefore be viewed not only as an agronomic component, but also as an independent economic factor in the development of the sector.

Where supplementary mulberry leaf supply is required, producers may incur additional procurement, transportation and storage costs. During the intensive feeding period, maintaining a stable delivery schedule supports the uniform development of silkworms and the production of high-quality cocoons. A reliable feed base enables farms and households to plan rearing volumes more accurately, allocate labour resources efficiently and improve the predictability of production costs [4], [5].

The economic role of mulberry plantations is reflected at several levels. For home-based producers and farms, they provide access to the principal feed resource and influence the return obtained from each box of silkworm eggs. For sericulture clusters, a stable feed base improves the predictability of cocoon procurement volumes. For processing enterprises, it supports more even utilisation of equipment, while at the national level it contributes to rural employment and value creation.

Resolution of the President of the Republic of Uzbekistan No. PP-87 of 6 March 2026 provides for an increase in live cocoon production from 30 thousand tonnes in 2026 to 36 thousand tonnes in 2030. It also sets the objective of planting 200 million mulberry seedlings and expanding the sector's feed base by 45 percent. These targets demonstrate an integrated approach in which the growth of raw-material production is coordinated with the resource requirements of silkworm rearing [1].

Earlier, Decree of the President of the Republic of Uzbekistan No. UP-85 of 1 June 2023 established measures for creating new mulberry plantations, allocating land plots through electronic auctions, organising sericulture and mulberry-growing farms, and assigning selected plantations to households under family-based contracting arrangements. The document approved forecast indicators for establishing 105 thousand hectares of new mulberry plantations during 2024–2027 [3].

Decree of the President of the Republic of Uzbekistan No. UP-72 of 3 May 2024 further identified the development of the feed base, the provision of high-quality silkworm eggs, the expansion of processing and the introduction of scientific developments among the priority areas of sericulture development. This approach allows mulberry cultivation to be considered as an integral part of the value chain rather than as an isolated area of agricultural production [2].

The economic efficiency of new mulberry plantations should be assessed not only by the planted area or the number of seedlings. More informative indicators include the cost of establishment and maintenance per hectare, the period required to reach productive capacity, leaf yield, water and labour inputs per unit of leaf mass, distance to silkworm-rearing locations, and the quantity of cocoons supported by the established feed base.

New plantations require initial investment, while their productive return develops over several years. Economic planning should therefore take into account the establishment period, irrigation expenses, plant protection, pruning and the replacement of lost seedlings. To maximise the expected production effect, planting programmes should be accompanied by regular maintenance and aligned with the actual demand for mulberry leaves. A phased financing approach linked to seedling survival and actual productivity can further improve the effectiveness of investment.

The rehabilitation of existing mulberry plantations may in many cases provide a cost-effective complement to the establishment of new plantations. Rejuvenation pruning, restoration of irrigation systems, replacement of low-productivity trees and improved inter-row management can increase the return from land already in use. Decisions between rehabilitation and new planting should be based on an inventory of plantation conditions and a comparative assessment of expected costs and results.

Single-row mulberry planting along the boundaries of agricultural fields also deserves attention. This approach can expand the feed base while preserving the main use of agricultural land. Its effectiveness is supported by organised maintenance, clearly assigned responsibility, access to water and timely leaf harvesting. It is therefore appropriate to reflect single-row plantations in agreements between land users and sericulture organisations, including provisions on maintenance and the distribution of harvested leaves [2].

Water management is an important component of the cost structure of the feed base. The expansion of mulberry plantations can be combined with water-saving methods, soil-moisture monitoring and irrigation regimes adapted to the age of the trees. The economic return from these technologies is reflected in more efficient water use, lower labour requirements and stable leaf productivity. Investments in irrigation systems should be assessed with due regard to equipment service life and the expected increase in plantation productivity.

The development of the feed base can also be supported through cooperation mechanisms. Households, farms and clusters may jointly use planting material, machinery, plant-protection products, pumping equipment and agronomic services. Cooperation is particularly useful for small plots, where individual acquisition of equipment may be less economical. Shared use of resources distributes fixed costs among several participants and improves access to specialised services.

Clear contractual arrangements can strengthen the distribution of responsibilities for establishing and maintaining plantations. Agreements may specify the source of financing, rights to use mulberry leaves, the schedule of agronomic operations, arrangements for cost compensation and responsibilities for plantation care. Such clarity supports coordinated long-term management and the mutual economic interest of the parties.

Digital registration of land and mulberry plantations can improve the evidence base for management decisions. A geographic information system may include data on the area, age, variety, condition, water availability and productivity of each plantation. Comparing these data with the quantity of distributed silkworm eggs and cocoon output can identify territories with different levels of feed-base provision and support more accurate planning of new plantations. The need for regular monitoring of allocated land use was established by Decree No. UP-85 [3].

The main directions for strengthening the feed base and possible indicators of their economic performance are presented in Table 1.

Table 1 – Directions for strengthening the feed base and indicators of economic performance

Direction	Expected economic result	Assessment indicators
Establishment of new mulberry plantations	Expansion of the available feed base and improved predictability of cocoon-rearing volumes	Establishment cost per hectare; seedling survival; leaf yield; time required to reach productive capacity
Rehabilitation of existing plantations	Higher return from land already in use with comparatively moderate capital expenditure	Increase in leaf yield; rehabilitation cost; payback period; share of restored trees
Single-row planting along field boundaries	Expansion of the feed base while preserving the area devoted to main crops	Number of productive trees; volume of harvested leaves; maintenance and transportation costs
Water-saving irrigation	More efficient water use and stable plantation productivity	Water use per tonne of leaves; cost savings; yield increase; equipment payback period
Cooperation and shared services	Lower unit fixed costs and improved access to machinery and agronomic services	Service cost per hectare; number of participants; equipment utilisation; reduction in production costs
Digital inventory of plantations	More accurate planning and better-targeted investment decisions	Share of registered plantations; data currency; alignment of the feed base with the volume of distributed silkworm eggs

The indicators presented in the table make it possible to move from evaluating activities solely by the number of planted trees to assessing their actual economic contribution. The same number of seedlings may generate different volumes of leaves depending on survival rates, variety, maintenance and water availability. Final performance should therefore be measured through the contribution of plantations to cocoon production and the reduction of unit costs for sector participants.

To evaluate the effect of the feed base on the income of cocoon producers, seasonal costs and results may be compared. Costs can include the purchase or delivery of leaves, labour for harvesting, transportation losses and plantation maintenance. Results can be assessed through cocoon quantity and quality, sales revenue, support payments and net income. Such comparison helps determine how plantation proximity and productivity influence household economics.

At the cluster level, feed availability can be assessed by comparing the forecast volume of mulberry leaves with the requirement determined by the quantity of distributed silkworm eggs. A balanced approach allows the timely coordination of egg distribution, inter-farm leaf supply and additional planting plans, thereby supporting stable compliance with rearing technology.

An important condition of sustainable development is the alignment of the feed base with processing capacity. The expansion of plantations and cocoon production is economically effective when facilities are available for timely acceptance, storage and processing of raw materials. Territorial programmes should therefore be developed through an integrated analysis of land resources, the number of producers, egg-distribution volumes, transport accessibility and processing capacity.

The economic effect of strengthening the feed base also has a social dimension. Establishing and maintaining mulberry plantations generates seasonal and permanent employment, while assigning small plots to households can create an additional source of income. The cultivation of selected agricultural crops between rows also supports efficient land use and may partly offset the establishment period before mulberry trees reach full productivity [3].

When providing public support, it is useful to distinguish among new plantations, rehabilitated stands and single-row plantings. Each direction requires appropriate cost standards and performance indicators. Support mechanisms may take into account not only the establishment of plantations, but also tree survival, the quality of maintenance and the confirmed use of leaves in cocoon production.

Professional training and advisory support also influence the return on investment. Appropriate selection of varieties, planting patterns, crown formation and irrigation methods can substantially improve plantation productivity. Regular agronomic services, demonstration plots and practical guidance contribute to the effective use of resources. The technological foundations of mulberry cultivation and the relationship between leaf quality and sericulture results are examined in specialised literature [4], [5].

Based on the analysis, the following measures are considered appropriate: first, to conduct an economic inventory of existing mulberry plantations; second, to select between rehabilitation and new planting through a comparative cost assessment; third, to coordinate the development of the feed base with the actual number of producers and the quantity of distributed silkworm eggs; fourth, to expand water-saving irrigation and shared service provision; fifth, to introduce digital monitoring of plantation condition and productivity; and sixth, to assess public support through verified increases in leaf output, cocoon production and producer income.

In conclusion, strengthening the feed base is one of the principal conditions for improving the economic sustainability of sericulture. Its effectiveness is determined not only by the scale of planting, but also by plantation survival, productivity, water availability, territorial accessibility and alignment with actual production needs. The coordinated application of investment, cooperation and digital mechanisms can contribute to lower cocoon-production costs, higher producer incomes and more stable utilisation of processing capacity.

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