



RESEARCH PAPER

Cost and return of cultivation of poplar in Saharanpur district, Uttar Pradesh (India)

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Abstract

The present study analyzes the cost and returns of poplar cultivation in Saharanpur district of Uttar Pradesh. Primary data were collected from selected poplar growers to evaluate the economic viability and profitability of poplar-based agroforestry systems. The study revealed that poplar cultivation requires substantial investment during the initial years due to expenses incurred on planting material, land preparation, irrigation, fertilizers, intercultural operations, and transportation. The total cost of poplar cultivation was estimated at Rs. 1,62,480 per hectare, of which variable costs constituted the major share, followed by fixed costs. Among variable costs, planting material, irrigation, and transportation emerged as the principal expenditure components.

The average gross return obtained from poplar cultivation was estimated at Rs. 4,75,000 per hectare at the time of harvesting. Consequently, the net return was calculated at Rs. 3,12,520 per hectare, reflecting the high economic potential of poplar cultivation in the study area. The input-output ratio was found to be 1:2.92, indicating that every rupee invested in poplar cultivation generated a return of Rs. 2.92. The findings suggest that poplar cultivation is a highly profitable agroforestry enterprise and can significantly enhance farm income and livelihood security in Saharanpur district.

KEYWORDS:

Poplar cultivation, Cost and returns, Agroforestry, Profitability analysis, Farm income, Input-output ratio, Commercial forestry, Saharanpur, Economic analysis, Rural livelihood.

ARTICLE HISTORY

Received: 12 January 2026

Revised: 05 February 2026

Accepted: 18 April 2026

Published: 30 June 2026

CITATION

Panwar, S., (2026). Cost and return of cultivation of poplar in Saharanpur district, Uttar Pradesh (India). *International Journal of Agro Frontier Research and Innovation (IJAFRI)*, 1(1), 01–04 <https://doi.org/xxxxx>

Introduction

Agroforestry has emerged as an important land-use system in India for enhancing farm income, ensuring environmental sustainability, and meeting the increasing demand for timber and industrial wood. Among various agroforestry species, Poplar has gained remarkable popularity in the north-western Indo-Gangetic plains due to its fast growth, high market demand, and compatibility with agricultural crops. India possesses about 28.4 million hectares area under agroforestry, contributing nearly 8.65

per cent to the country's total geographical area (FSI, 2021). Uttar Pradesh is one of the leading states in agroforestry adoption, particularly in western districts where poplar cultivation is widely practiced on farmers' fields.

Saharanpur district is considered an important belt for poplar cultivation because of its fertile alluvial soils, favourable climatic conditions, and assured irrigation facilities. The district receives an average annual rainfall of around 1,000–1,100 mm and supports diversified farming



systems. Poplar trees are generally planted on field boundaries or in block plantations along with crops such as wheat, sugarcane, fodder, and pulses. Due to its short rotation period of 6–8 years and increasing demand from plywood, paper, and match industries, poplar cultivation has become an attractive commercial enterprise for farmers in western Uttar Pradesh.

The economics of poplar cultivation indicate substantial profitability compared to traditional cropping systems. Studies have shown that the average cost of poplar cultivation ranges between Rs. 1.5 to 1.8 lakh per hectare, while gross returns may exceed Rs. 4.5 lakh per hectare at the time of harvesting. The input-output ratio in poplar-based agroforestry systems has been reported between 1:2.5 and 1:3.0, reflecting higher economic efficiency and better resource utilization. Besides economic benefits, poplar cultivation contributes to employment generation, carbon sequestration, soil fertility improvement, and diversification of farm income.

Despite these advantages, poplar growers face several challenges such as price fluctuations, lack of organized marketing facilities, labour shortages, pest and disease attacks, and damage caused by strong winds and storms. These constraints often reduce the profitability and sustainability of poplar cultivation. Therefore, an in-depth economic analysis of poplar cultivation is essential for understanding its viability and identifying the major problems faced by farmers.

Research Methodology

The study was conducted in Saharanpur district of western Uttar Pradesh, which is well known for poplar-based agroforestry practices due to its favourable climatic conditions, fertile alluvial soil, and availability of irrigation facilities. The district has significant adoption of Poplar cultivation among farmers, particularly for commercial timber production and agroforestry-based farming systems. Therefore, Saharanpur district was purposively selected for the study.

Selection of Blocks

Saharanpur district comprises 11 development blocks. Out of these, one block, namely Balia Kheri Block, was selected randomly for the present investigation. The regarding area, production, productivity, and agroforestry practices were collected from published reports, government publications, journals, and records of the Agriculture Department.

Analytical Tools and Techniques

The collected data were tabulated and analyzed using simple statistical tools such as averages, percentages, and tabular analysis. Cost and return analysis was carried out to estimate the profitability of poplar cultivation. The following measures were used:

- Cost of cultivation (Rs./hectare)
- Gross returns (Rs./hectare)
- Net returns (Rs./hectare)
- Input-output ratio

Result and Discussion

Cost and return

The cost and return have been summarized in this part on

selected block was chosen to obtain representative information regarding the economics of poplar cultivation in the district.

Selection of Villages

A comprehensive list of villages engaged in poplar cultivation was prepared with the assistance of officials from the Agriculture Department and local village authorities in the selected block. From this list, three villages namely Nalhera Gujjar, Redi Malakpur, and Manani were selected randomly for detailed investigation. These villages were found to have a considerable number of poplar growers and active agroforestry practices.

Selection of Poplar Growers

For the selection of respondents, a complete list of poplar growers was prepared for each selected village with the help of the Agriculture Department officials, village heads, and local extension workers. A total of 50 poplar growers were identified in the selected villages. Since the number of poplar growers was limited in the study area, all 50 growers were included in the sample to obtain reliable and comprehensive information regarding cost, returns, and constraints associated with poplar cultivation.

Classification of Farmers

The selected poplar growers were classified into different categories on the basis of operational landholding size. The categories were as follows:

1. Small farmers : Up to 2 hectares
2. Medium farmers : 2–4 hectares

This classification was adopted to analyze variations in resource use, cost structure, returns, and management practices among different categories of poplar growers.

Method of Data Collection

The study was based on primary data collected from the selected respondents through personal interviews using a pre-tested and structured schedule. Information related to socio-economic characteristics, input utilization, cost of cultivation, returns from poplar cultivation, and problems faced by growers was collected for the agricultural year under study. Secondary data

the sample poplar growers. Besides the estimates of total costs on the basics cost concept Fixed cost & Variable Cost have been worked out for estimation of cost. Similarly the various measures of farm profits such as net income gross income cost of production and input output ratio for poplar tree growers have been worked out.

1. Economics of Poplar tree Growers

The study revealed that the overall average fixed cost of Poplar cultivation was Rs. 79,660 per hectare, while the average variable cost was estimated at Rs. 82,820 per hectare. Planting material along with transportation formed the major component of fixed cost, whereas fertilizers and irrigation charges accounted for the highest share in variable cost. Medium farmers (2–4 hectares) incurred relatively higher fixed and variable costs compared to small farmers (0–2 hectares) due to greater use of inputs and labour. The findings indicate that establishment and maintenance of poplar plantation require considerable investment, with irrigation, fertilizers, and planting

material being the major cost components influencing the overall economics of poplar cultivation in the study area.

Table 1: Cost of cultivation of poplar tree growers
7 Fixed Cost (A) of selected poplar growers in the study area to establish a poplar farm Per hectare (In Rs.)

S.N.	Item	0-2 Hectares (20)	2-4 Hectares (30)	Average (50)
1.	Land Rent	7600 (9.93)	9800 (11.84)	8700 (10.92)
2.	Planting Material + Transport Cost	28500 (37.23)	30500 (36.85)	29500 (37.03)
3.	Fencing	16000 (20.90)	14000 (16.91)	15000 (18.83)
4.	Interest of Fix Investment	5900 (7.71)	6200 (7.49)	6050 (7.60)
5.	Deprecation	4550 (5.94)	4720 (5.70)	4635 (5.82)
6.	Fix Labour / Supervision	8000 (10.45)	12000 (14.50)	10000 (12.55)
7	Other cost	6000 (7.84)	5550 (6.71)	5775 (7.25)
	Overall average	76550 (100)	82770 (100)	79660 (100)

Table 2: Variable Cost (B) of selected poplar growers in the study area to establish a poplar farm
Per hectare (In Rs.)

S.N.	Item	0-2 hectares (20)	2-4 hectares (30)	Average (50)
1.	Land Preparation	9225 (11.44)	9450 (11.12)	9337.5 (11.27)
2.	Digging and Filling of Pits	8200 (10.17)	8400 (9.88)	8300 (10.02)
3.	Labor Charge of Plantation	5700 (7.07)	5900 (6.94)	5800 (7.01)
4.	Machine + Labor	6000 (7.44)	8000 (9.41)	7000 (8.45)
5.	Irrigation Charge	18000 (22.33)	17500 (20.58)	17750 (21.43)
6.	Plant Protection	7500 (9.30)	7350 (8.65)	7425 (8.97)
7.	Fertilizers	16500 (20.47)	19200 (22.58)	17850 (21.55)
8.	Pruning and cutting	5500 (6.82)	5350 (6.29)	5425 (6.55)
9.	Other Cost	4000 (4.96)	3865 (4.55)	3932.5 (4.75)
	Overall average	80625 (100.00)	85015 (100.00)	82820 (100.00)

Computation of cost and return for poplar tree on sample farm

The income and cost analysis of selected Poplar growers revealed that the overall average total cost of cultivation was Rs. 1,62,480 per hectare, including Rs. 79,660 as fixed cost and Rs. 82,820 as variable cost. The average gross return obtained from poplar cultivation was Rs. 4,75,000

per hectare, resulting in a net profit of Rs. 3,12,520 per hectare. Medium farmers (2–4 hectares) incurred higher production costs but also earned higher gross returns and net profits compared to small farmers (0–2 hectares). The input-output ratio was estimated at 1:2.92 for the overall sample, indicating that poplar cultivation is a highly profitable agroforestry enterprise in the study area.

Table 3: Cost and return of poplar tree growers (Rs. /ha)
12 Income and total cost of Selected Poplar Growers per hectare (In Rs.)

Sr. No.	item	0-2 hectare	2-4 hectare	Average
1.	Fixed Cost (A)	76550	82770	79660
2.	Variable Cost (B)	80625	85015	82820
3.	Total Cost (A+B)	157175	167785	162480
4.	Gross Return	450000	500000	475000
5.	Net Profit	292825	332215	312520
6.	Input-output Ratio	1:2.86	1:2.98	1:2.92

Conclusion

The study concluded that Poplar cultivation is a profitable agroforestry enterprise in Saharanpur district of western Uttar Pradesh. The average total cost of cultivation was estimated at Rs. 1,62,480 per hectare, while the gross return and net profit were recorded at Rs. 4,75,000 and Rs. 3,12,520 per hectare, respectively. The input-output ratio of 1:2.92 indicated high economic viability of poplar cultivation in the study area. Planting material, irrigation, and fertilizers were the major cost components influencing

the overall expenditure. Medium farmers earned comparatively higher returns than small farmers due to better resource utilization and larger plantation area. Overall, poplar cultivation significantly enhances farm income and provides economic stability to rural households. However, proper technical guidance, assured marketing facilities, and price stabilization measures are essential to further improve the profitability and sustainability of poplar cultivation.

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