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Economic evaluation of poplar nursery in Western Uttar Pradesh

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Abstract

The primary objective of this research paper is to conduct a thorough economic assessment of a poplar nursery situated in the Nanauta District of Saharanpur, located in the state of Uttar Pradesh, India. Poplar nurseries serve as critical components of the forestry sector, playing a pivotal role in the provision of high-quality planting material essential for various purposes such as afforestation, timber production, and environmental conservation. This study encompasses a comprehensive analysis of the economic viability and financial performance of the aforementioned nursery, while also assessing its overall contribution to the local economy. The data utilized in this analysis spans a period of five years, providing a robust foundation for evaluating the long-term sustainability and profitability of the nursery operations. The findings of the study reveal that the cost-benefit ratio, a key metric used to assess economic profitability, stands at 1.25. This positive value indicates that the project yields a favorable return on investment, thereby indicating profitability over the five-year period. However, it's noteworthy that the profitability of the project is contingent upon the effective management and control of factors such as the production of Poplar Entire Transplanting Plants (ETPs) in the face of challenges posed by insect pests and diseases.

Keywords: Poplar, nursery, production, income, cost-benefit ratio

Introduction

Poplar cultivation has emerged as a significant agricultural activity in Uttar Pradesh, owing to several favorable factors such as its rapid growth rate, versatile applications, and adaptability to diverse agro-climatic conditions. The poplar nursery located in the Nanauta District plays a pivotal role in this context, serving as a primary source for high-quality poplar saplings. These saplings are instrumental in supporting various afforestation initiatives and wood production endeavors across the region.

Poplar trees are known for their fast growth and are categorized as light-demanding species. They exhibit the capability to reach maturity within relatively short rotations of 10-12 years, making them economically viable for various purposes such as veneer production, matches, fiberboards, light cases, and paper pulp manufacturing. Additionally, poplar trees possess significant environmental benefits, including their capacity to sequester carbon dioxide from the atmosphere. This feature makes them valuable contributors to carbon mitigation efforts (Dhiman, 2009; Singh and Lodhiyal, 2009; Gera, 2011) ^[2, 4, 3].

Recognized as a model species for bio-energy, feedstock, phytoremediation, and carbon sequestration, poplar holds immense potential in addressing multiple environmental challenges. In India, the indigenous poplar species, *P. ciliata*, predominantly grows in hilly regions. Poplar cultivation typically involves vegetative reproduction methods, primarily through cuttings, known as Entire Transplanting Plants (ETPs). Recommended plantation spacing for poplar stands at 4 x 4 meters or 4 x 5 meters.

Successful poplar cultivation hinges on several factors, including appropriate nursery conditions. Ideal nursery soil characteristics entail sandy loam composition, deep fertility, excellent drainage, neutral pH levels, and rich organic content, supplemented by reliable irrigation facilities. The wood derived from poplar trees exhibits whitish or brownish-grey hues and possesses desirable qualities such as shine and softness, making it suitable for various applications such as water troughs, packing cases, and the match industry.

This study aims at evaluating the performance of poplar-based nursery entrepreneurship in terms of income, employment and environmental impact from the farmers' perspective.

Poplar-based agroforestry is economically viable and more profitable than many of the crop rotations followed in the study area. Overall, poplar cultivation represents a promising avenue for sustainable agriculture and forestry practices in Uttar Pradesh, offering economic benefits while contributing to environmental conservation efforts.

Materials and Methods

Study site

The data utilized in this study originates from the poplar nursery situated in Nanauta village, which falls within the Saharanpur district of Uttar Pradesh, India. Geographically, Nanauta village is positioned between the latitudinal coordinates of 29.71° N and longitudinal coordinates of 77.42° E. The village spans an approximate area of 3860 square kilometers and is situated proximately to the foothills of the Shivalik range. Geographically, it lies within the northern part of the doab region.

In terms of soil composition, the predominant soil types in the region include sandy loam, sandy, and clay loam. These soil types play a crucial role in determining the suitability and productivity of agricultural and horticultural activities in the area. Sandy loam soils offer good drainage properties, while clay loam soils tend to retain moisture and nutrients better. Understanding the soil composition is vital for optimizing agricultural practices and ensuring the successful cultivation of various crops, including poplar trees in the nursery setting.

The geographical and environmental characteristics of Nanauta village provide valuable insights into the local conditions influencing poplar cultivation and nursery operations. Factors such as latitude, longitude, soil types, and proximity to the Shivalik range contribute to the unique

agricultural landscape of the region, shaping the growth and development of the poplar nursery and its surrounding ecosystem. This contextual information enriches the understanding of the study area and facilitates informed analysis and interpretation of the research findings.

Methodology

The essential data pertaining to expenditure and income associated with the establishment and operation of the poplar nursery was meticulously collected from Nanauta village in the Saharanpur district of Uttar Pradesh, India. The nursery spans an area encompassing 27 bigha and is equipped with irrigation facilities facilitated by tube wells. The planting arrangement within the nursery is organized according to a spacing of 4 meters by 4 meters.

A comprehensive cost analysis was conducted to evaluate the ongoing operational expenses incurred in managing the poplar-based nursery. This analysis encompasses various components, including land preparation, labor costs, water usage, expenditure on fertilizers, and expenses related to pest control measures. Each of these factors plays a crucial role in determining the overall financial viability and sustainability of the nursery operations.

The detailed breakdown of costs associated with each operational aspect provides valuable insights into the financial dynamics of managing a poplar nursery. It allows for a thorough assessment of resource allocation, efficiency in expenditure management, and identification of potential areas for optimization or cost-saving measures. This data serves as a foundational basis for informed decision-making and strategic planning aimed at maximizing the productivity and profitability of the nursery operations in Nanauta village, Saharanpur district, Uttar Pradesh.

Table 1: Cost analysis of Poplar Nursery for 5 years

Particulates	Requirement	Cost
Land preparation (27 bigha or 2.16 hectare)		
Ploughing	7 hrs.	3500
Disc harrowing	7 hrs.	3500
Planking and levelling	5 hrs.	1500
Layout of the field	14 Labours	2800
Sowing and fertilizer application		
Kiliccar+ Sticker	1 kg	2500
Ciksal+ Sticker	2 kg fertilizer+1.5 liter sticker	6000
Boromix	2 kg	2500
Single Superphosphate	23 bags	11076
Asiphate + Sticker	4 kg fertilizer + 1liter sticker	13000
Admar + Sticker	1.5 kg fertilizer + 1 Liter sticker	3205
Labour for fertilization application	250 labours	50,000
Spray machine	10 Pices	5055
Irrigation		
Irrigation no. 7 times	45hrs.	12500
Labour for irrigation (56 labour in each irrigation)	392 labours	78,400
Transplanting and other operation	30 labours	600
Supervision charge	12 months	30,000
Soil work before transplantation	75Rs/plant	1,296,330
Transportation charge		20,000
Rental value of land	27 bigha	122,960
Other charges		
Electricity bill		149672
Petrol		25,560
Mobile bill		2420
Nursery expenses		10,307
Polybags	18 kg	4320
Power Breeder		60,000
Total cost for 5 years		1768034

Table 2: Revenue analysis of Poplar Nursery for 5 years

Particulates	Requirement	No./Rs.
No. of plants in each bigha		820
No. of plants in 27 bigha		22140
Price of 1 ETP		20
Income of 1 year = 22140 X 20		442800
Revenue for 5 years = 442800 X 5		2214000
Benefit for 5 years = 2214000- 1768034		445966
Cost Benefit Ratio	2214000/1768034	1.25
		Profitable

Results and Discussions

The data regarding nursery expenses, variances, and benefits derived from the sale of Entire Transplanting Plants (ETPs) are presented in Tables 1 and 2. This dataset spans a period of five years and provides a comprehensive overview of the financial dynamics associated with managing the nursery. Notably, the cost analysis includes various regular expenses such as fertilizers, irrigation, labor, and other operational costs, with the exception of the linear land value, which is not factored into the expenses explicitly outlined in the tables. Upon analyzing the cost side, it is observed that the total expenditure incurred over the five-year period amounts to Rs. 1,768,034. Additionally, it is noted that the nursery spans an area equivalent to 27 bighas of land, with each bigha accommodating 820 ETPs. Consequently, the total number of ETPs produced in the nursery over the five-year period amounts to 22,140.

The selling price of each ETP is fixed at Rs. 20, maintained consistently over the five-year duration. Consequently, the revenue generated from the sale of ETPs amounts to Rs. 442,800 annually, based on the sale of 22,140 ETPs at the specified rate. Over the entire five-year duration, the total revenue collected from the sale of ETPs sums up to Rs. 2,214,000, derived from the sale of 110,700 ETPs. This comprehensive dataset provides valuable insights into the financial performance and sustainability of the poplar nursery operations in Nanauta village, Saharanpur district, Uttar Pradesh. It facilitates a thorough assessment of revenue generation, expenditure management, and overall profitability, thereby informing strategic decision-making processes aimed at optimizing nursery operations and maximizing returns on investment.

Cost Benefit Ratio

Given that the cost-benefit ratio is positive, indicating that the benefits derived from the poplar nursery project outweigh its associated costs, it can be inferred that the project is profitable over the five-year period. However, this profitability is contingent upon factors such as the total production of Entire Transplanting Plants (ETPs) being maintained despite potential challenges posed by insect pests and diseases.

The positive cost-benefit ratio underscores the financial viability and potential profitability of the poplar nursery venture. It suggests that the revenue generated from the sale of ETPs, along with any other associated benefits, surpasses the total costs incurred in operating the nursery. This positive financial outcome is a favorable indication of the project's success and sustainability over the specified duration.

Conclusion

The finding of present study concludes that the cost-benefit ratio, a key metric used to assess economic profitability, stands at 1.25. This positive value indicates that the poplar nursery yields a favorable return on investment, thereby indicating profitability over the five-year period. However, it's noteworthy that the profitability of the project is contingent upon the effective management and control of the production of ETPs.

References

1. Chauhan SK, Mangat PS. Poplar based agroforestry is ideal for Punjab, India. *Asia-Pacific Agroforestry News*. 2006;28:7-8.
2. Dhiman RC. Carbon footprint of planted poplar in India. *ENVIS Forestry Bulletin*. 2009;9(2):70-81.
3. Gera M, Mohan G, Bisht NS, Gera N. Carbon sequestration potential of agroforestry under CDM in Punjab state of India. *Indian Journal of Forestry*. 2011;34(1):1-10.
4. Singh P, Lodhiyal LS. Biomass and carbon allocation in 8-year old poplar (*Populus deltoides* Marsh) plantation in Tarai agroforestry systems of Central Himalaya, India. *New York Science Journal*. 2009;2(6):49-53.
5. Chauhan SB, Keerthika A, Dhyani SK, Handa AK, Newaj R, Rajarajan K. National Agroforestry Policy in India: a low hanging fruits. *Current Science*. 2015;108(10):1826-1834.
6. Verma P, Bijalwan A, Dobriyal MJ, Swamy SL, Thakur TK. A paradigm shift in agroforestry practices in Uttar Pradesh. *Current Science*. 2017, 509-516.
7. Singh H, Mavi HK. Economic analysis of poplar based agroforestry system under riparian wet land conditions of Punjab. *Indian Journal of Economics and Development*. 2016;12(1):191-196.
8. Kareemulla K, Rizvi RH, Kumar K, Dwivedi RP, Singh R. Poplar agroforestry systems of western Uttar Pradesh in northern India: a socioeconomic analysis. *Forests, trees and livelihoods*. 2005;15(4):375-381.
9. Pawar N, Bishnoi DK, Sharma R. An Economic Analysis of Poplar Plantation in Haryana. *Indian Journal of Economics and Development*. 2016;12(4):769-774.