

Comparative Economics of Paddy Seed Production under Public and Private Seed Producing Agencies in Ayodhya District of Uttar Pradesh

Deep Narayan Yadav¹, Supriya¹, S.C. Vimal³, R.R. Kushwaha¹, Manish Kumar⁴ and Sadhna Baghel¹

¹Department of Agricultural Economics, Acharya Narendra Deva University of Agriculture & Technology, Ayodhya

Department of Seed Science & Technology³, Acharya Narendra Deva University of Agriculture & Technology, Ayodhya

⁴Department of Agricultural Statistics, Acharya Narendra Deva University of Agriculture & Technology, Ayodhya

Corresponding Author: drsupriya.anduat2019@gmail.com, drsupriya@nduat.org

DOI: [https://doi.org/10.63001/tbs.2026.v21.i02.S.I\(2\).pp1913-1919](https://doi.org/10.63001/tbs.2026.v21.i02.S.I(2).pp1913-1919)

Keywords:

*Seed production,
Cost of cultivation,
Profitability,
Benefit-cost ratio,
public seed agency,
Private seed agency*

Received on:
15-05-2026

Accepted on:
02-06-2026

Published on:
13-06-2026

Abstract

Seed production plays a crucial role in enhancing agricultural productivity, ensuring food security, and improving farmers' income through the availability of quality seeds. The present study was undertaken to examine and compare the economics of certified paddy seed production under public and private seed producing agencies in Ayodhya district of Uttar Pradesh. The study was based on primary data collected during the agricultural year 2024-25 from 60 certified seed grower farmers registered with Uttar Pradesh Beej Pramanikaran Sansthan. Cost and return analysis were carried out to assess the profitability and economic efficiency of seed production under both agencies. The findings revealed that the total cost of cultivation was lower in the public seed producing agency (₹56,252.19 per hectare) than in the private seed producing agency (₹69,004.25 per hectare). The private agency recorded a slightly higher net seed yield of 42.64 quintals per hectare compared to 40.94 quintals per hectare in the public agency. Consequently, gross income was higher in the private agency (₹1,05,808.00 per hectare) than in the public agency (₹1,02,058.00 per hectare). However, due to substantially higher production costs, the net income earned by public agency growers (₹45,805.81 per hectare) exceeded that of private agency growers (₹36,803.75 per hectare). The benefit-cost ratio was also higher in the public agency (1.81) than in the private agency (1.53), indicating better resource-use efficiency and profitability. The study concludes that certified paddy seed production is a profitable enterprise under both agencies, but public seed producing agencies offer greater economic viability owing to lower cultivation costs and higher net returns.

Introduction

Seeds are one of the most important agricultural inputs, and their production, quality, and distribution play a significant role in maintaining food security. Due to their strategic importance, seed trade is governed by strict regulations, including seed laws, quality testing procedures, certification standards, and national as well as international agreements. In India, the organized seed industry began with the establishment of the National Seeds Corporation (NSC) in 1963. For nearly two

decades, the public sector remained the dominant force in seed production and distribution. A significant transformation occurred with the introduction of the New Policy on Seed Development (NPSD) in 1988, which liberalized the sector by permitting domestic and multinational companies to import seeds and technologies and invest in seed research and development. Subsequent policy reforms further promoted private sector involvement, enhanced the growth of seed

companies, and facilitated greater access for foreign firms to participate in the Indian seed market.

High-quality seed is an essential prerequisite for achieving higher crop productivity and ensuring better economic returns to farmers. The seed sector, comprising both public and private organizations, plays a crucial role in supplying quality seed in adequate quantities while complying with established regulatory frameworks and quality standards. Continuous advancements in plant breeding by researchers from public institutions, international agricultural organizations, private seed companies, and farming communities have led to the development of numerous improved crop varieties. These varieties possess higher yield potential, enhanced resource-use efficiency, greater resistance or tolerance to biotic and abiotic stresses, and desirable quality characteristics. Such innovations have significantly contributed to increasing agricultural production and strengthening food and nutritional security worldwide. In countries like India, substantial growth in food grain production and productivity has been achieved through the adoption of modern breeding techniques, high-yielding varieties (HYVs), and improved crop production and protection technologies. These developments transformed the country from a food-deficit nation into a food-secure one, a transformation widely recognized as the Green Revolution.

India accounts for approximately 26.99 per cent of the world's total paddy cultivation area, while its share in global paddy production is around 21.15 per cent, making it the second-largest producer after China. Paddy is one of the most important cereal crops in India, covering an area of about 43.79 million hectares with a total

production of 112.91 million tonnes and an average productivity of 25.78 quintals per hectare during 2023-24. The crop plays a vital role in maintaining the country's food security due to its ability to adapt to a wide range of agro-climatic conditions and production systems. Furthermore, paddy contributes nearly 39.64 per cent of India's total food grain production, highlighting its significance in the national agricultural economy.

In Uttar Pradesh, paddy is the most important food crop and is cultivated across almost all regions of the state. It serves as a primary source of food for the population, fodder for livestock, and employment for a large section of the rural workforce. Therefore, any decline in the area under cultivation or production of paddy could adversely affect the state's food security and overall economy. During 2023–24 (Fourth Advance Estimates), paddy was cultivated on about 5.81 million hectares in Uttar Pradesh, producing 13.27 million tonnes with an average productivity of 22.83 quintals per hectare. The state accounted for 11.75 per cent of the country's total paddy production, ranking second after West Bengal, while possessing the largest share of paddy area in India at 13.28 per cent. Paddy cultivation in Uttar Pradesh is predominantly concentrated in the Kharif season, during which more than 98 per cent of the crop is grown, including early-, medium-, and long-duration varieties.

Quality seed production is a specialized activity, however the stored seed retained for next season cannot be used for quality seed production due to poor genetic vigour and germination. Paddy seed production has important share in expenditure on seed, which indicates that the economics of seed production has impacted both the seed producers and consumers. Several studies on economics

grain production pertinent to paddy have been reported but studies on economics of paddy seed production are limited. Considering the importance of economic study in paddy seed production, the current study was aimed with the objectives to delineate the economics of certified seed production of paddy by a private seed producing agency and public seed producing agency. The present study has been conducted in Ayodhya district of Uttar Pradesh state through survey of farmers and the methodology adopted is presented below.

Materials and Methods

The study is based on primary data collected from Ayodhya district of Uttar Pradesh. Data and information have been collected through survey from certified seed grower farmers who have been registered by Uttar Pradesh Beej Pramanikaran Sansthan, Ayodhya to estimate the economics of certified seed production of paddy by private seed producing agency and public seed producing agency. The list of certified seed grower farmers of paddy has been obtained

from Uttar Pradesh Beej Pramanikaran Sansthan, Ayodhya. The total number of selected farmers (private seed producing agency and public seed producing agency) was sixty. The primary data for the study on input used in the seed production of paddy and their costs and returns were collected by personnel interview with the respondents using a well-structured and pre-tested interview schedule for the agricultural year 2024-25. The interview schedule contains details of private seed producing agency and public seed producing agency, input items and their prices, output items and their prices used in paddy production.

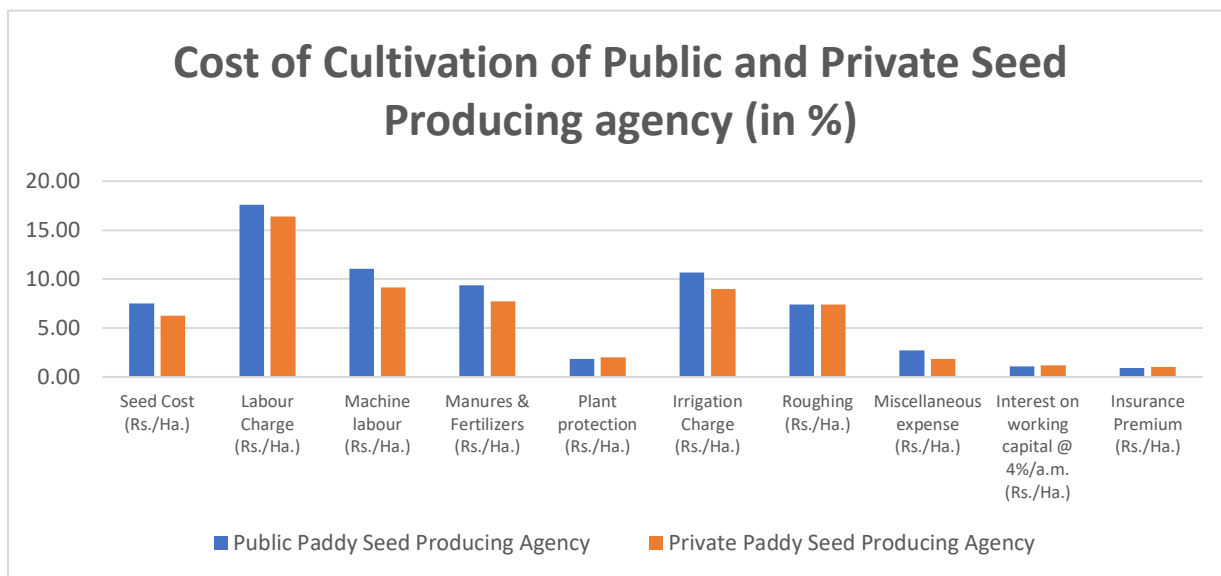
Cost Concept

The cost of cultivation is categorized broadly into variable and fixed costs, with variable costs encompassing expenses incurred on various inputs that fluctuate based on the scale of production, and fixed costs remaining constant regardless of the production quantity. The fixed costs include depreciation, land revenue/cess and other taxes, rental value of land, and interest on fixed capital.

Table 1 Cost of Cultivation and profit measure of Public and Private Seed Producing agency

Sr. No.	Cost items	Public Paddy Seed Producing Agency	Private Paddy Seed Producing Agency
1.	Seed Cost (Rs./Ha.)	4237	4329
2.	Labour Charge (Rs./Ha.)	9895	11301.5
3.	Machine labour (Rs./Ha.)	6211	6316
4.	Manures & Fertilizers (Rs./Ha.)	5267.8	5320.7
5.	Plant protection (Rs./Ha.)	1037	1375.5
6.	Irrigation Charge (Rs./Ha.)	6013	6180
7.	Roughing (Rs./Ha.)	4158.5	5124.6
8.	Miscellaneous expense (Rs./Ha.)	1526.3	1254.8
9.	Total Operational Cost (Rs./ha.)	38345.6	41202.1

10.	Interest on working capital @ 4%/a.m. (Rs./Ha.)	600.36	824.04
11.	Insurance Premium (Rs./Ha.)	520	705
12.	Rental value of land (Rs./Ha.)	20000	20000
13.	Subtotal (Rs./ ha.)	59465.96	62731.14
14.	Managerial Cost (at 10%) (Rs./Ha.)	5113.83	6273.11
15.	Total Cost of Cultivation (Rs./ha.)	56252.19	69004.25
16.	Yield (Q/ha)	44.40	46.00
17.	Rejected seed	3.46	3.36
18.	Net Seed yield (Q/ha)	40.94	42.64
19.	Main Product	94162.00	98072.00
20.	Rejected seed price	7266	7056.00
21.	By product (Rs./Ha.)	630.00	680.00
18.	Gross Income	102058.00	105808.00
19.	Net Income	45805.81	36803.75
20.	Cost of production (Rs./Q.)	2298.6	2300.17
21.	B-C Ratio	1:1.81	1:1.53



The comparative analysis of paddy seed production between public and private seed producing agencies reveals significant differences in the cost structure, profitability, and economic efficiency of seed production. The results indicate that while both agencies successfully produced certified paddy seed and generated positive returns, the public seed producing agency

performed better in terms of profitability and resource-use efficiency.

The total operational cost incurred by the public seed producing agency was ₹38,345.60 per hectare, which was lower than the ₹41,202.10 per hectare incurred by the private seed producing agency. The higher operational cost in the private sector was mainly attributed to greater

expenditure on labour charges, machine labour, plant protection measures, irrigation, and roughing operations. Labour cost constituted one of the major components of the total cultivation cost, accounting for ₹11,301.50 per hectare in the private agency compared to ₹9,895.00 per hectare in the public agency. Similarly, roughing expenses, which are essential for maintaining genetic purity in seed production, were substantially higher in the private agency (₹5,124.60 per hectare) than in the public agency (₹4,158.50 per hectare).

After including interest on working capital, insurance premium, rental value of land, and managerial cost, the total cost of cultivation was estimated at ₹56,252.19 per hectare for the public seed producing agency and ₹69,004.25 per hectare for the private seed producing agency. This indicates that the private agency incurred approximately 22.67 percent higher cultivation costs than the public agency.

With respect to productivity, the private seed producing agency recorded a slightly higher gross yield of 46.00 quintals per hectare compared to 44.40 quintals per hectare in the public agency. However, a portion of the harvested produce was rejected during seed processing due to failure to meet seed quality standards. The quantity of rejected seed was 3.36 quintals per hectare in the private agency and 3.46 quintals per hectare in the public agency. Consequently, the net seed yield was 42.64 quintals per hectare in the private agency and 40.94 quintals per hectare in the public agency. The higher seed yield obtained by the private agency may be attributed to intensive crop management practices and greater investment in production inputs.

The gross income realized from seed production, including the value of the main product, rejected seed, and by-products, amounted to ₹1,05,808.00 per

hectare in the private agency and ₹1,02,058.00 per hectare in the public agency. Although the private agency generated a slightly higher gross return owing to its superior yield performance, the advantage was offset by its substantially higher cultivation cost.

As a result, the net income earned by the public seed producing agency was ₹45,805.81 per hectare, which exceeded the net income of ₹36,803.75 per hectare realized by the private agency. This demonstrates that despite obtaining a lower yield, the public agency achieved higher profitability because of its lower production expenses. The difference in net returns clearly indicates that efficient cost management plays a crucial role in determining profitability in paddy seed production.

The cost of production per quintal was almost identical for both agencies, being ₹2,298.60 per quintal in the public agency and ₹2,300.17 per quintal in the private agency. This suggests that both agencies were nearly equally efficient in converting production costs into seed output. However, the overall economic performance differed considerably when total investment and returns were considered.

The Benefit-Cost (B:C) ratio further confirms the superior economic viability of public seed production. The B:C ratio was calculated to be 1.81 for the public seed producing agency, indicating that every rupee invested generated a return of ₹1.81. In contrast, the B:C ratio of the private seed producing agency was 1.53, meaning that every rupee invested yielded only ₹1.53. The higher B:C ratio observed in the public agency reflects better utilization of resources and greater profitability per unit of investment.

Overall, the findings suggest that paddy seed production is a profitable enterprise under both public and private seed producing agencies. However, the public seed producing agency demonstrated greater economic efficiency, higher net returns, and a better benefit-cost ratio despite producing slightly lower yields. The results highlight the importance of controlling production costs, particularly labour and management expenses, in enhancing profitability. Therefore, from an economic perspective, paddy seed production under public seed producing agencies appears to be more financially sustainable and rewarding than under private seed producing agencies.

References

- Bajwan, A., Singh, G., Walia, I., Bishnoi, R., & Kumar, A. (2023). Economic Analysis of Production and Processing of Cluster Bean in Southern Haryana: A Review. *International Journal of Environment and Climate Change*, 13(9), 2190-2201.
- Bhuker A, Bhatia J, Dhillon A, Kumar A. Comparative economics of seed production vis-à-vis commercial grain production in cluster bean in Haryana. *Forage Res.* 2018;43(4):327-329.
- Dadlani, M., & Yadava, D. K. (2023). *Seed science and technology: biology, production, quality* (p. 430). Springer Nature.
- Elvina TS, Siregar A, Ginting R. Analysis of Factors Influencing Rice Production in Labuhan Batu District. *J Soc Res.* 2023;2(9):3305-3317.
- Jayaprada, Y. A. R. R. A. M. S. E. T. T. Y. (2024). A comparative economic analysis of paddy seed and grain production in Karimnagar district of Telangana state. *Unpublished M. Sc (Ag) thesis*. Professor Jayashankar Telangana State Agricultural University, Hyderabad, Telangana State, India.
- Kumar, V. (2017). *An economic analysis of seed production of paddy and Chickpea in Mungeli district of Chhattisgarh* (Doctoral dissertation, Master's thesis). Indira Gandhi Krishi Vishwavidyalaya, Raipur).
- Lamani, C., & Thimmaiah, T. D. (2022). An economic analysis of paddy production: Special Reference to Karnataka. *Shodha Prabha UGC Care Journal*, 47(2), 1-11.
- Manjunatha, B. L., Rao, D. U. M., & Dastagiri, M. B. (2013). Trends in seed production, growth drivers and present market status of Indian seed industry: An analytical study. *Indian Journal of Agricultural Sciences*, 83(3), 315-320.
- Mula, G., Layek, N., & Roy, B. (2019). Economics of rice seed production and marketing—A study in Terai zone of West Bengal, India. *Int. J. Curr. Microbiol. App. Sci*, 8(12), 439-453.
- Pal G, Radhika C, Singh RK, Udaya Bhaskar K, Ram H, Prasad SR. Comparative economics of seed production vis-à-vis grain production of pigeon pea in Karnataka, India; 2015
- Pal Govind, Bhaskar UK, Kumar JSP, Sripathy KV, Ramesh KV, Agarwal DK, et al. Management, Socio-economic Dynamics of Farmers and

Economics of Certified Seed Production of Paddy in Karimnagar District, Telangana. *J Econ Manag Trade*. 2019;23(6):1-9.

Pal, G., Sripathy, K. V., Kamble, U. R., Kumar, S. P., Kumari, K., & Agarwal, D. K. (2020). An economic analysis of paddy seed production in Mau district of eastern Uttar Pradesh. *Journal of Economics, Management and Trade*, 26(4), 45-51.

Radha Y, Chowry KR. Comparative economics of seed production vis-à-vis commercial production of cotton in Andhra Pradesh. *Indian J Agric. Econ*. 2005;60(1):94-102.

Sahu, K., & Banafar, K. N. S. (2017). An economic analysis of seed production of paddy in Raipur district of Chhattisgarh. *M. Sc. (Agri.) Thesis (Unpublished) submitted to Indira Gandhi Krishi Vishwavidyalaya, Raipur*.