Original Research Article

Economic Analysis of Major Crops in Jammu division of Union Territory of Jammu and Kashmir

ABSTRACT

This micro-economic study focuses on the cost and returns analysis for major crops (wheat, paddy, and maize) in the districts of Jammu, Kathua, and Samba in the Jammu division. Conducted at SKUAST, Jammu during 2023, the study utilized a multistage random sampling method to achieve its objectives. Data was collected from 360 sample farmers, covering aspects such as land-holding size, costs, and return structures. The costs associated with crop cultivation varied significantly across the districts, with Samba incurring ₹14272.57 for Cost A2 and ₹33023.58 for Cost C3 which was the highest of overall costs. Jammu had the highest main-product yield of 25.22 quintals and by-product yield of 32.70 quintals. Jammu also recorded the highest fixed costs (₹13488.30) whereas the highest total cost was in Samba with ₹30021.43. Gross returns were highest in Jammu with ₹68303.22, resulting in net returns of ₹38740.29. Jammu also had the highest benefit-cost ratio of 1:2.30, as well as the highest family labor income and farm business income (₹41755.29 and ₹43060.92, respectively). The rental value of owned land (Cost B2) significantly impacted final costs, and Jammu district emerged as the most economically favorable for major crop cultivation.

Keywords: *micro-economical, wheat, paddy, maize, production, returns*

1. INTRODUCTION

Agriculture is a crucial sector in India's economy, contributing 15% to the nation's GDP. Despite a steady decline in its share over the years, it remains the largest single contributor to GDP and is essential for the country's overall socio-economic development [1]. Agriculture is a fundamental and vital sector in India, providing livelihood and employment to the majority of the population. With a significant number of poor and malnourished people, prioritizing agriculture is essential for reducing poverty and malnutrition and fostering inclusive growth. Boosting agricultural production is crucial to achieving an 8% GDP growth target during the Twelfth Five Year Plan, meeting the rising food demand for over 1 billion people, and supplying raw materials for agro-based industries [2].

The growth rates of Primary sector (comprising Agriculture, Forestry, Fishing and Mining & Quarrying) have been estimated as 3.9 per cent in 2021-22 as against a growth of 2.4 per cent in the previous year. However, Agriculture and allied sectors (Agriculture, Forestry and Fishing) have witnessed modest growth during this period, this can also be observed from the data of Gross Value Added by Economic Activity at Constant (2011-

12) Basic Prices which was 6.2% during 2019-20, 4.1% during 2020-2021 and 3.5% during 2021-2022 [3]. There is a considerable increase in the productivity of rice, wheat and maize in India in the recent past. The productivity of rice and wheat was 663.00 and 668.00 kg/ha in 1950-51 and it has increased to 2989.00 and 2239.00 kg/ha, respectively, during 2015-16 [4]. Similarly, the productivity of maize was 628.40 kg/ha in 1950-51 which improved to 2555.68 kg/ha during 2014-15 [5]. The increase in productivity of wheat, paddy and maize is due to the introduction of high-yielding varieties responsive to high doses of fertilizers coupled with an improved package of practices evolved by Agricultural Scientists for various regions.

India is the world's second-largest producer of wheat, following China. Over the past two decades, India has contributed 12.5% of the global wheat production, with its output increasing tenfold in the last five years. Despite this, India represents less than 1% of the global wheat trade [6]. Again, in case of rice India is the second-largest producer in the world, after China. In the 2022-2023 crop year, India produced over 135 million metric tons of milled rice, compared to China's 146 million metric tons. India is also the world's largest exporter of rice, shipping Basmati and non-Basmati varieties to many countries [7]. Rice exports significantly benefit India's economy and support millions of farmers. India ranks 7th globally in maize production and 4th in the total area dedicated to maize cultivation. India's maize production constitutes about 2% of the world's total, with its cultivation area covering roughly 4% of the global total. However, India's maize productivity, at 3.07 metric tons per hectare, is lower than that of other major maize-producing countries [8]. In fact, there is a considerable increase in the productivity of these major crops (wheat, rice and maize) in the country but there are still certain areas, where the productivity of these crops is very low. Productivity in such areas fluctuates significantly from region to region due to various factors such as soil type, soil fertility, rainfall pattern, flood, water logging and climatic conditions.

2. OBJECTIVES

The core objective of the present research is to empirically analyze the aspects of productivity of major crops (viz. wheat, paddy and maize cultivation) in Jammu, Kathua and Samba districts of Union territory of Jammu and Kashmir. The specific objectives are to analyses the component wise cost and returns from cultivation of these major crops in the study area; to explore the factors affecting the cultivation of the major crops in the study area; and to suggest possible policy measures for strengthening the cultivation in study area.

3. HYPOTHESES

Based on the objectives, the hypotheses that there are significant variations in the component-wise costs and returns cultivation of these major crops in the study area, influenced by different socio-economic and environmental factors; and the adoption of improved cultivation practices consequently yields better production have been formulated.

4. MATERIALS AND METHODS

This study was conducted at Sher-e-Kashmir University of Agricultural Sciences and Technology, Jammu (UT of Jammu & Kashmir), covering the districts of Jammu, Kathua, and Samba during 2023. The research relied exclusively on primary data, collected using a multistage random sampling method from 360 farmers across the three districts (3 districts * 2 blocks per district * 3 villages per block * 20 farmers per village = 360 farmers). Data was gathered through personal interviews with a structured questionnaire designed to capture detailed information on socio-economic profiles, landholding sizes, cropping patterns (including types of crops such as wheat, paddy, maize, and others, and the area utilized for each crop), input usage (seeds, fertilizers, pesticides, irrigation, etc.), and yields. The survey also covered costs associated with cultivation (land preparation, sowing, weeding, harvesting, etc.) and returns from agriculture (sales revenue, market prices, etc.). The questionnaire included both closed-ended and open-ended questions to collect quantitative data and qualitative insights. All cost concepts (as provided by CACP) and returns were calculated using MS-Excel 2019, with the values representing average costs for each crop across the three districts.

5. RESULTS AND DISCUSSION

5.1 Economics of major crops in Jammu, Kathua and Samba districts

The economic analysis of major crops (wheat, rice, and maize) in the three districts of Jammu, Kathua, and Samba involves several cost concepts (Table 1), each contributing to the overall cost of cultivation. Below is a detailed description of each cost component (A1, A2, B1, B2, C1, C2, and C3) and their respective values for the districts: Cost A1 includes expenses on hired labour (₹3329.67 in Jammu, ₹3473.33 in Kathua, and ₹3361.67 in Samba), machine labour (₹1070.00, ₹1048.33, and ₹1101.67 respectively), irrigation (₹525.00, ₹541.67, and ₹500.67), manure (₹2488.67, ₹2467.00, and ₹2609.33), seeds (₹1312.67, ₹1251.67, and ₹1407.33), fertilizers (NPK) (₹2394.00, ₹2476.00, and ₹2466.67), plant protection chemicals (₹502.00, ₹451.67, and ₹411.33), interest on working capital (₹1437.63, ₹1328.60, and ₹1451.90), and depreciation charges (₹963.33, ₹969.00, and ₹962.00). The total Cost A1 sums up to ₹14022.96 in Jammu, ₹14007.27 in Kathua, and ₹14272.57 in Samba.

Cost A2 is identical to Cost A1 in all districts since it includes Cost A1 plus rent paid for leased-in land, which is zero in each district. Cost B1 adds interest on fixed capital (excluding land) to Cost A1, resulting in totals of ₹15328.59 in Jammu, ₹15237.07 in Kathua, and ₹15523.43 in Samba. Cost B2 includes the estimated rental value of owned land added to Cost B1, leading to higher totals: ₹26547.93 in Jammu, ₹25845.07 in Kathua, and ₹26504.77 in Samba. Cost C1 incorporates the imputed value of family labor into Cost B1, with totals of ₹18343.59 in Jammu, ₹18272.27 in Kathua, and ₹19040.10 in Samba. Cost C2 adds the imputed value of family labor to Cost B2, yielding final amounts of ₹29562.93 in Jammu, ₹28880.27 in Kathua, and ₹30021.43 in Samba. Lastly, Cost C3 includes a management cost (10% of Cost C2), resulting in the highest overall costs: ₹32519.22 in Jammu, ₹31768.29 in Kathua, and ₹33023.58 in Samba.

Among the cost components given in Table 1, Cost B2 stands out as the highest in all three districts due to the inclusion of the estimated rental value of owned land. This significantly impacts the final cost of cultivation (Cost

C3), reflecting the major change in the total cost. The values for Cost B2 are ₹26547.93 in Jammu, ₹25845.07 in Kathua, and ₹26504.77 in Samba. This substantial cost highlights the importance of land value in the overall economics of crop production overshadowing other costs such as hired labor, fertilizers, and machinery [9, 10] which still represent a substantial input cost that can impact the profitability of major crop farming [11].

Table 1 Concept-wise cost of cultivation for major crops across all three districts.

S. No.	Particulars	Jammu	Kathua	Samba
1	**Cost A1**			
a)	Hired labour	3329.67	3473.33	3361.67
b)	Machine labour	1070.00	1048.33	1101.67
c)	Irrigation	525.00	541.67	500.67
d)	Manure	2488.67	2467.00	2609.33
e)	Seed	1312.67	1251.67	1407.33
f)	Fertilizers (NPK)	2394.00	2476.00	2466.67
g)	Plant protection chemicals	502.00	451.67	411.33
h)	Interest on working capital	1437.63	1328.60	1451.90
i)	Depreciation charges	963.33	969.00	962.00
	Total Cost-A1	14022.96	14007.27	14272.57
2	**Cost-A2**			
a)	Cost-A1	14022.96	14007.27	14272.57
b)	Rent paid for leased-in land	0.00	0.00	0.00
	Total Cost-A2	14022.96	14007.27	14272.57
3	**Cost-B1**			
a)	Cost A1	14022.96	14007.27	14272.57
b)	Interest on fixed capital (excluding land)	1305.63	1229.80	1250.87
	Total Cost-B1	15328.59	15237.07	15523.43
4	**Cost-B2**			
a)	Cost B1	15328.59	15237.07	15523.43
b)	Land revenue	0.00	0.00	0.00
c)	Estimated rental value	11219.33	10608.00	10981.33
	Total Cost-B2	26547.93	25845.07	26504.77
5	**Cost C1**			
a)	Cost B1	15328.59	15237.07	15523.43
b)	Imputed value of family labour	3015.00	3035.20	3516.67
	Total Cost-C1	18343.59	18272.27	19040.10
6	**Cost C2**			
a)	Cost B2	26547.93	25845.07	26504.77
b)	Imputed value of family labour	3015.00	3035.20	3516.67
	Total Cost C2	29562.93	28880.27	30021.43
7	**Cost C3**			
a)	Cost of management (10% of Cost-C2)	2956.29	2888.03	3002.14
	Total Cost-C3	32519.22	31768.29	33023.58

5.2 Cost and returns of major crops in Jammu, Kathua and Samba districts

The economic evaluation of major crops (wheat, paddy, and maize) in the districts of Jammu, Kathua, and Samba reveals variations in production, costs, and returns (Table 2). The production data shows that Jammu has the highest main product yield at 25.22 quintals (q), followed by Kathua at 23.72 q, and Samba at 23.02 q.

For by-products, Jammu again leads with 32.70 q, while Kathua and Samba produce 30.53 q and 31.37 q, respectively.

Examining the cost components given in Table 2, total fixed costs are highest in Jammu at ₹13488.30, compared to ₹12806.80 in Kathua and ₹13194.20 in Samba. Whereas the total variable costs were highest in Samba at ₹16827.23, followed closely by Jammu at ₹16074.63, and Kathua at ₹16073.47. This results in total costs of ₹29562.93 for Jammu, ₹28880.27 for Kathua, and ₹30021.43 for Samba. In terms of returns, Jammu achieves the highest gross returns at ₹68303.22, with Kathua and Samba earning ₹62963.57 and ₹61342.03, respectively. Net returns, calculated as gross returns minus total costs, are also highest in Jammu at ₹38740.29, followed by Kathua at ₹34083.30, and Samba at ₹31320.60. The benefit-cost ratio, which measures profitability, was highest in Jammu at 1:2.30, indicating that for every rupee spent, Jammu farmers receive ₹2.30 in return. Kathua has a benefit-cost ratio of 1:2.16, and Samba has the lowest at 1:2.02.

Furthermore, family labour income, which represents the returns to family labour after accounting for all costs except family labour, was highest in Jammu at ₹41755.29. Kathua follows with ₹37118.50, and Samba is at ₹34837.27. Similarly, farm business income, representing the returns over variable costs, showed Jammu leading at ₹43060.92, followed by Kathua at ₹38348.30, and Samba at ₹36088.13. Overall Jammu district demonstrates the highest returns from the cultivation of wheat, paddy, and maize, with superior figures in gross returns, net returns, benefit-cost ratio, family labour income, and farm business income. This indicates that Jammu was the most profitable district among the three for cultivating these major crops [11].

Table 2 Economics of major crops from all three districts

Particulars	**Jammu**	**Kathua**	**Samba**
Production			
Main product (q)	25.22	23.72	23.02
By-product (q)	32.70	30.53	31.37
Cost			
Total fixed cost	13488.30	12806.80	13194.20
Total variable cost	16074.63	16073.47	16827.23
Total cost	29562.93	28880.27	30021.43
Returns			
Gross returns	68303.22	62963.57	61342.03
Net returns	38740.29	34083.30	31320.60
Benefit cost ratio	2.30	2.16	2.02
Family labour income	41755.29	37118.50	34837.27
Farm business income	43060.92	38348.30	36088.13

6. CONCLUSIONS AND RECOMMENDATIONS

In major crop cultivation across the districts of Jammu, Kathua, and Samba, the most significant factor affecting the total cost is the estimated rental value of the land. This factor's dominance suggests that any strategies to minimize the total cost of wheat cultivation should prioritize reducing the land rental value or optimizing land use to maximize yields and, subsequently, profitability. Effective strategies for cultivation cost reduction might

include optimizing fertilizer use through precision farming techniques or exploring alternative, cost-effective fertilization methods.

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