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Mukta Nainwal

Ph.D Scholar, Department of Agrometeorology, G.B. Pant University of Agriculture & Technology, Pantnagar, U.S. Nagar, Uttarakhand, India

AS Nain

Professor, Department of Agrometeorology, G.B. Pant University of Agriculture & Technology, Pantnagar, U.S. Nagar, Uttarakhand, India

Subhash Chandra

Chief Scientist, Department of Agronomy, G.B. Pant University of Agriculture & Technology, U.S. Nagar, Uttarakhand, India

Corresponding Author:

Mukta Nainwal

Ph.D Scholar, Department of Agrometeorology, G.B. Pant University of Agriculture & Technology, Pantnagar, U.S. Nagar, Uttarakhand, India

Comparative economic analysis between summer rice and spring maize crop in Tarai region of Uttarakhand

Mukta Nainwal, AS Nain and Subhash Chandra

Abstract

The study conducted “Comparative economic analysis between summer rice and maize crop in tarai region of Uttarakhand in the year 2021 and 2022. Economic analysis is a tool to compare the crops in terms of economic feasibility and viability. The field level primary data were collected from randomly selected summer rice and maize growers in Kanpur village of tarai region and nearby areas. Overall average cost of cultivation of summers rice was found to be ₹ 78570 per hectare. Gross return for maize cultivation was ₹ 113800 per hectare. Net return for maize cultivation was found to be ₹ 35230 per hectare. B:C ratio for maize cultivation was 1.44. The analysis was compared to the economics of maize crop. Whereas, cost of cultivation of maize crop was found to be ₹ 46240 per hectare. Gross return for maize cultivation was ₹ 142600 per hectare. Net return for maize cultivation was found to be ₹ 96360 per hectare. B:C ratio for maize cultivation was 3.08. B:C ratio was more in case of maize shows that maize crop cultivation is more remunerative and profitable in comparison to summer rice crop in terms of irrigation cost included in the study.

Keywords: Cost of cultivation, economic analysis. Net return, gross return, B:C ratio

Introduction

Rice (*Oryza sativa* L.) is the most widely consumed cereal staple food which provides livelihood and nutritional security to the world’s population (Verma *et al.*, (2021) [6]. Rice is grown in various agro-climatic regions across the country. India is currently the second-largest producer of rice in the world after China. There are two main seasons of rice cultivation in the region namely summer and *kharif*. The seasons are named on the basis of their time of harvest. Rice cultivated during rabi season is also called as ‘summer rice’. In both seasons, paddy cultivation is practiced mostly under irrigated conditions. Rice is highly water demanding crop and its requirement of water many times higher than the most other field crops. So, the consumption of water is more in case of summer rice crop cultivation.

Due to the increase in population and changing food habits, the demand for food is increasing day by day. The Food and Agriculture Organization has estimated that world food production will have to rise by 40% by 2030 and 70% by 2050. Maize is known as queen of cereals due to its wider demand and adaptability. Maize accounts for about 10 percent of the total food grain production in the country. It also has the potential to provide food security, feed security, and nutritional security, enhancing the income of maize growers. Maize crop has the potential to replace the crop with optimum benefit. Spring maize is sown from the first week of February to the first week of March, while autumn maize starts from mid-May to mid-August. Previously, for maize production, farmers used to rely on local seed varieties, and maize was not a cash crop in those days. With the change in demand from consumers, there is a visible shift in maize production (Saeed *et. al*, 2018) [5]. In this study, both crops are compared in terms of economic feasibility and viability.

Methodology

The study was conducted in village Kanakpur vicinity of Pantnagar area. The sample random survey was done to collect the data. Economic analysis of summer rice and maize was done to check the viability of cultivation with profitability and sustainability of both the crops. For evaluating economic analysis cost of cultivation, total cost, gross cost, net profit, net return and benefit cost ratio calculated. On the basis of B:C ratio profitability of crop decided. It is very helpful in calculating the investment in the cultivation and obtained benefit by the crop. Economic analysis of the cultivation is very helpful tool for comparing two crops.

Estimation of cost of cultivation

The cost of cultivation was calculating various input at prevailing market price.

Total cost of cultivation = Sum of all variable cost + fixed cost

Gross return

Gross return = (the market price of crop* total output) + (the price of crop byproduct * total amount of byproduct)

Gross margin

Gross margin is the output of a firm computed by deducting total variable expenses from revenue. The total yield is computed by subtracting total growing expenses from the total yield.

Gross margin = Gross return (per hectare) – Total variable cost (per hectare)

Benefit-cost analysis

The Benefit to Cost Ratio (BCR) is widely regarded as one of the simplest and quickest methods of evaluating a farm's economic performance. Profit per cost unit is compared using BCR. As a result, the following formula was used to do a benefit-cost analysis

B: C ratio: Gross return / Total cost

Analysis based on B: C ratio

- If the B: C ratio < 1, the farm business is considered to be at loss.
- If the B: C ratio = 1, the farm business is recovering the cost of production.
- If the B: C ratio > 1, the farm business is considered to be profitable

Results and Discussion

Cost and returns of spring maize in relation to the summer rice cultivation

The main variable include in total variable expenses were land preparatory operations, transplanting, weeding, irrigation, crop protection and harvesting cost whereas the fixed cost variables were transportation charges, management charges. The analysis of summer rice and spring maize was done to compute the cost and return with performance of crop of the study area.

Cost of cultivation of summer rice of the study area:

The distribution of cost of cultivation of summer rice in the study area is depicted in Table 1. The result revealed that the total cost incurred in cultivation of summer rice was ₹ 78570 in Kanakpur and out of which, 97.3 percent was variable cost (₹ 76520) and 2.6 percent was fixed cost (₹ 2050). Preparatory operation for the cultivation the cost obtained was ₹ 9900. Seedling and transplanting cost were ₹ 5000 and ₹ 8750, respectively. Weeding cost was obtained ₹ 4750. Fertilizers, plant protection measure and harvesting cost was ₹ 6220, 5000 and 2500 respectively. The irrigation cost of summer rice cultivation was very high due to high water demand in rice crop. Results also in support of the study conducted by Poojitha *et al.*, (2022) ^[4] Total cost of cultivation was for transplanting rice was ₹ 51,044/ha. The cultivation cost was high due to nursery preparation, puddling and transplanting. Magar *et al.*, (2022) ^[2] did the same study of economic analysis of rice. Study favors the results of the

present result revealed that average variable cost of rice production is NRs. 114758.18. (Per hectare). Similarly, the total profit was NR 20979.32 and the total yield was NR 135737.5 (Per ha). B: C ratio of cultivation was 1.18, indicating that the paddy is growing economically viable.

Cost and return from summer rice cultivation in the study area

Per hectare cost and return obtained from summer rice cultivation in the study area is shown in table 2. The total cost of cultivation was obtained ₹ 78570. The gross return obtained from summer rice cultivation in the Kanakpur was found to be ₹ 113800. The yield obtained from main product was 80 quintals with value ₹ 120000. As the total cost of cultivation was ₹ 78570, net return was obtained from summer rice cultivation was ₹ 35230. The B:C ratio was obtained from the cultivation was 1.44, which indicate the economic viability of cultivation in the Study area.

Cost of cultivation of maize of the study area:

The distribution of cost of cultivation of maize crop in the study area is depicted in Table 3. The result revealed that the total cost incurred in cultivation of maize was ₹ 46240 in Kanakpur and out of which, 95.5 percent was variable cost (₹ 44170) and 4.4 percent was fixed cost (₹ 2070). The distribution pattern of variable cost revealed that harvesting operation incurred ₹ 4500. The highest expenses consumed in case of maize cultivation was in seed sowing operation ₹ 11500. Preparatory operation for the cultivation the cost obtained was ₹ 4000. Weeding cost was obtained ₹ 5500. Fertilizers, plant protection measure and harvesting cost was ₹ 5270, 4200 and 4500, respectively. Irrigation cost was obtained ₹ 9200 which is very low when it compared with summer rice cultivation. Maize crop does not require the same amount as summer rice crop is needed, so the number of irrigations are very less in case of maize cultivation. Thus, the cost of irrigation was very less in compared to maize cultivation. Comparative study was done in this survey. The results confirmed the findings of Patel *et al.*, (2022) ^[3], that maize is a very remunerative crop with very good profit. The total cost of maize cultivation was ₹ 6775.47. The relative change showed overall percent increase from the base year to the current year. It was found that all the cost concepts in maize production were increased by around 550 percent. The result favors the study conducted by Dhruw *et al.*, (2022) ^[1], the average cost of cultivation of hybrid maize was found ₹ 29731.31 per hectare. The cost of cultivation per hectare showed increasing trend with respect to the farm size. B:C ratio for the study was 1:2.35. Net return in hybrid maize cultivation was ₹ 69723.94/ha. The average yield of hybrid maize in the study area was 52.28 quintal/ha.

Cost and return from maize cultivation in the study area

Per hectare cost and return obtained from maize cultivation in the study area is shown in table 4. The total cost of cultivation was obtained ₹ 46240. The gross return obtained from maize cultivation in the Kanakpur was found to be ₹ 142600. As the total cost of cultivation was ₹ 46240, net return was obtained from maize crop cultivation was ₹ 96360 /ha. The B:C ratio was obtained from the cultivation was 3.08, which indicate the economic viability of cultivation in the Study area.

Comparative economics of spring maize and summer rice in study area

In village Kanakpur (the vicinity area of Pantnagar), lies in tarai region summer rice and maize were found to be competitive crops in terms of economic values and ground water consumption. The cost and return structure of both the crops are shown in Fig 1. The results revealed that the total cost of cultivation was found higher in summer rice

cultivation (₹ 78570 /ha) than maize crop (₹ 46240/ha). The gross return was obtained from summer rice and maize was (₹ 113800) and (₹ 142600), respectively. The net return of maize (₹ 96360) was higher than summer rice (₹ 35230). It is worth to mention that benefit -cost ratio was found more in maize cultivation with value 3.08 when it was compared to summer rice with value 1.44.

Table 1: Analysis of cost of cultivation of summer rice per hectare on the basis of cost concept (Rs./ ha)

S.N.	Particulars	Method	Type	No./Qty.	Value (Rs/ hac)	Total cost	
1.	Preparatory operations	Harrow		2	1000/ha	2000	
		Bunding	Dry condition	0.5 hr	1000/ha	500	
		Tractor	Manual	2 man day	350	700	
		Wet condition					
		Puddling	Tractor	Manual	2 man day	350	700
2.	Seedling					5000	
3.	Transplanting	Transplanting	Manual	25 man day		8750	
4.	Weeding	Weedicide application	Pretlechlor	1.5 lit	600/ lit	900	
		Hand weeding		10		3500	
		Irrigation application		90	100/irrigation	22500	
5.	Irrigation			0.25 man/ irr			
				34 man day	350	11900	
6.	Fertilizers	Fertilizer					
		140 kg N	13			1820	
		40 kg	40			1800	
		20 kg					
		15 kg Zn	80			1200	
		application					
7.	Plant Protection chemicals	Pest control insecticides		4300		4300	
		application		350x2=700		700	
		Combine harvesting		2500/hac		2500	
A.	Total variable cost				76520		
B.	Total interest in fixed cost				2050		
C	Total cost (A+B)				78570		

Table 2: Analysis of cost of cultivation of maize per hectare on the basis of cost concept (Rs./ ha)

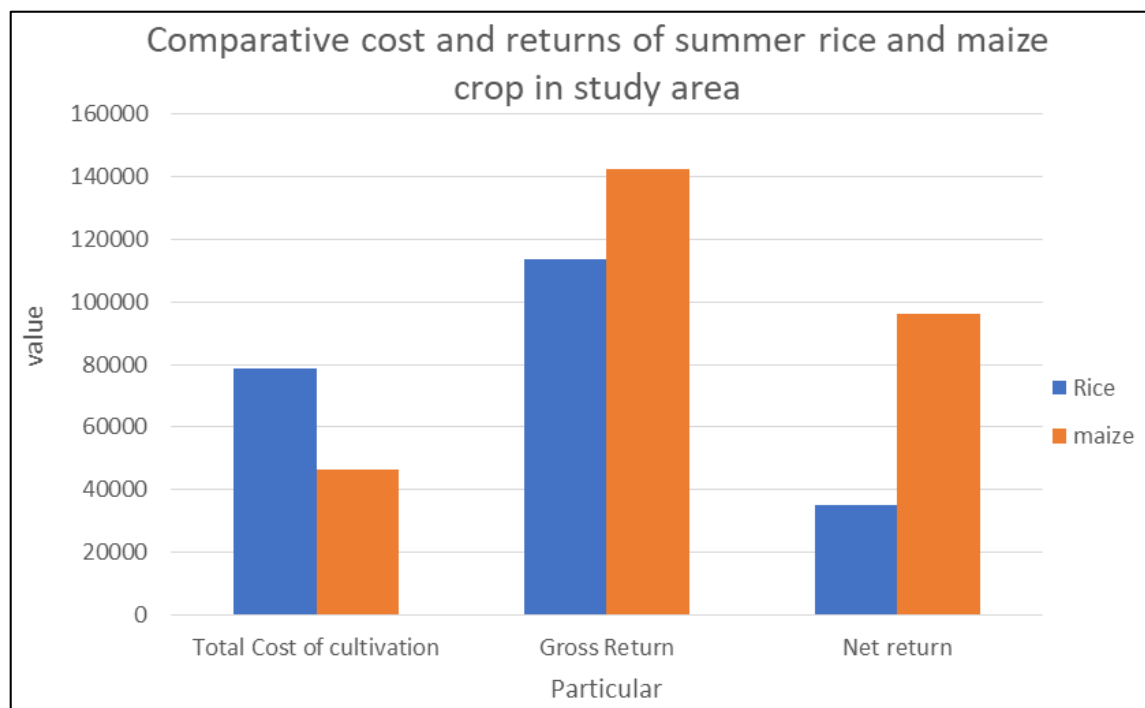
S.N.	Particulars	Method	No./Qty.	Value (Rs/ha)	Total price
1.	Preparatory operations	Harrow	3	1000	3000
			2 Planking	500	1000
2.	Seed		20 kg	450/kg	9000
	Sowing				
	Maize planter		2.5 hrs	1000	2500
3.	Fertilizer application	140 kg N	13		1820
		60 kg	40		2400
		30 kg			
		3 man day		350	1050
4.	Irrigation	8 no		100/irrigation depth	6400
		8 man day		350	2800
5.a.	Weeding chemical 2 man	2.5 units of tembotrione			
		1400/unit			2000
					700
b.	Hand weeding	8 man days		350	2800
6.	Plant protection chemicals	Coragen	2 spray		
		150 ml/ha	2000/150 ml		3500
		2 man days application			700
		Combine harvesting			4500
A.	Total variable cost				44170
B.	Total interest in fixed cost				2070
C	Total cost (A+B)				46240
	Total				46240

Table 3: Cost and return from summer rice in study area

S.N.	Particulars	Value
1.	Total Cost of cultivation	78570
2.	Gross Return	113800
3.	Gross Yield	82
4.	Net return	35230
5.	Cost of production	958.17

Table 4: Cost and return from spring maize in study area

S.N.	Particulars	Value
1.	Total Cost of cultivation	46240
2.	Gross Return	142600
3.	Gross Yield	78
4.	Net return	96360
5.	Cost of production	592.8

**Fig 1:** Comparative cost and return of summer rice and maize in study area

Conclusion

The study concluded that maize crop has the potential to earn profit in the market due to its high demand in industrial area. The B:C ratio was more in spring maize cultivation when it compared with summer rice crop. Rice is water loving crop and water requirement of rice is more than another crop. The cultivation cost of summer rice was more than spring maize because it includes the irrigation cost, which is very high in terms of water and electricity charges in summer. The gross return, net return and B:C ratio was more in spring maize cultivation. So, maize crop is more profitable and remunerative crop in comparison with summer rice.

References

1. Dhruw MK, Jain BC, Pathak H, Sahu DK. An economic analysis of production and marketing of hybrid maize in Gariyaband district of Chhattisgarh; c2022.
2. Magar KKB, Chaudhary B, Shah SK, Yadav B, Yadav SPS, Sah SK. An Economic Analysis of Paddy Production in Kanchanrup, Saptari District of Nepal. Asian Journal of Research in Agriculture and Forestry. 2022;8(4):135-146.
3. Patel S, Sharma HO, Mishra S, Kumar G. Cost, returns and profitability analysis of maize in Madhya Pradesh; c2022.
4. Poojitha K, Denesh GR. Effect of Different Establishment Methods and Nutrient Management Practices on Growth, Yield and Economics of Rice (*Oryza sativa* L.). Journal of Experimental Agriculture International. 2022;44(9):161-167.

5. Saeed R, Bashir A, Sohail M, Qasim M, Mahmood MA. Profitability, Production efficiency and marketing of spring maize in Punjab Pakistan. Social Sciences Research Institute (PARC) at AARI, Faisalabad, Pakistan. Pakistan Journal of Agriculture, Agricultural Engineering and Veterinary Sciences. 2018;34(1):78-86.
6. Verma V, Vishal B, Kohli A, Kumar PP. Systems-based rice improvement approaches for sustainable food and nutritional security. Plant Cell Rep. 2021;40:11.