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Comparative economic analysis of wheat cultivation in Shivalik foothills of Haryana

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Abstract
The present study was carried out with the objectives to work out costs and returns in cultivation of wheat in shivalik foothills of Haryana during 2022-23. The study was based on primary data. Panchkula and Yamunanagar districts were consciously selected. From both districts, four village from each district) were selected purposively i.e., Bagwala, Golpura, Tharwa and Bhagpur from Panchkula district and Jhiwerher, Uncha chandna, Sabri and Marwa khurd from Yamunanagar district. Finally, 10 farmers were selected randomly from each village and finally 80 farmers from all the selected eight villages were interviewed to gather all the desired information. The per hectare cost of wheat cultivation was found to be Rs. 89899 and Rs. 104210 in Panchkula and Yamunanagar district, respectively. On an average, the per hectare yield, gross returns and net returns obtained from the cultivation of wheat in Panchkula district were 46.8 quintals, Rs.120728 and Rs.30829, respectively. The corresponding figures for Yamunanagar district were worked out to be 48.9 quintals, Rs.103967 and Rs.19814, respectively. The B:C ratio and B:C ratio over variable cost of wheat cultivation was worked out to be 1:1.34 and 1:1.19, respectively for Panchkula & Yamunanagar district which found to be comparatively lower in Yamunanagar district, high cost of labour and rental value of land was the major reason for this.

Keywords: Cost, returns, cultivation, b-c ratio, b-c ratio over variable cost

Introduction
"Wheat is the most widely cultivated food crop of the world. It has been grown since pre historic time and being consumed in various form in the world. It is not only the major source of carbohydrates, vitamins, and proteins but also an important staple food of nearly 2.5 billion of world population. China was the leading wheat producing nation during the year 2022 with production volume of over 136.9 million metric tons. This was followed by the European Union and India with production volume of over 134 and 112.74 million metric tons respectively" [1]. "In India, this crop is cultivated in almost all the states, however the five major states in wheat production are Uttar Pradesh, Madhya Pradesh, Punjab, Haryana, and Rajasthan. Uttar Pradesh and Madhya Pradesh accounts for 50 per cent production of wheat in the country. In the year 2021-22, Uttar Pradesh ranked first in wheat production with 33.95 million tonne (31.77%) followed by Madhya Pradesh with 22.432 million tonne (20.98%), Punjab having 14.82 million tonne (13.87%), Haryana with 10.44 million tonne (9.77%) and Rajasthan with 94.84 million tonne (8.87%)" [2]. "The state with the largest area under cultivation of wheat were Uttar Pradesh (9853 thousand hectares) followed by Madhya Pradesh (6551 thousand ha), Punjab (3521 thousand ha), Rajasthan (3118 thousand ha), and Haryana (2534 thousand ha)" [3].

Wheat is an important cereal crop in the World trade grown on approximately 240 million ha area and production 789.50 million tonnes in the World (USDA). In the South Asia region, wheat-rice cropping system occupies 24 million hectares of area and India has 10 million hectares. India is the second largest producer of wheat after China contributing about 12 per cent to the total global wheat. India produced 112.74 million tonnes of wheat from 29.86 million ha during 2022-23 (Directorate of Economics and Statistics, GOI, New Delhi). There has been a rapid increase of about 30 per cent in area under wheat in India is predominantly an agricultural economy characterized by small scale, fragmented farming, employing traditional technology. The introduction of modern technology in agriculture has resulted into a remarkable increase in agricultural production. But, it is probably not uniform in different regions among different size of farms and even within the crops having relatively low technological breakthrough. However, agricultural development in India has initiated the shift from traditional to modern farming system.

Due to predominance of agriculture in the national economy, the overall rate of economic growth depends to a large extent on the growth of agricultural sector. Agriculture is characterized by the limited resources which are generally too scarce to adequately support the needs of an average Indian farmer collaborated by wide fluctuations in the output on account of vagaries of the monsoon. The low level of agricultural productivity is a result of heavy population pressure on agriculture, persuasion of traditional methods of production, unfavourable climate, higher cost of factor inputs, poor soils, low prices of outputs, insufficient knowledge of factor utilization etc. Inefficient use of resources has caused the low productivity in Indian agriculture. Increasing costs of agricultural inputs have been making agriculture a losing proposition. The profitability of crop production has been dwindling in real terms. In view of this, it is necessary that the available inputs should be used economically and efficiently. Increasing efficiency of resource use through appropriate allocation not only increases the productivity but also profitability on the farms. In Haryana during the year 2022-23 wheat grown over an area of 2375.8 thousand hectare having production 11127.64 thousand tonnes with average yield 4684 kgs. per hectare

Jha and Kumar (1976) examined the change in cost and income structure for wheat crop in Delhi territory for the period 1969-70 and reported that fertilizer input in the total cost had gone up while that of bullock labour, land and irrigation declined during the period under reference. Agnihotri (2002) reported that the economic appraisal of the land use systems with supplemental irrigation has established that whereas, poplar with intercrops as maize-wheat rotation provides the highest annuity (75622) in relatively better lands. Aonla, Ber and Kinnow-Bhabar systems have yielded the annuity as 65366, 32356 and 31502, respectively on inferior lands having multiple constraints. Raghuwanshi *et al*. (1999) analysed the resource use efficiency in wheat cultivation, in Bundelkhand region of Madhya Pradesh [4].

Methodology

Panchkula and Yamuna Nagar District which comes under the Shivalik foothills of Haryana were selected for the present study. Yamuna Nagar and Panchkula District having largest area under wheat & rice cropping pattern were selected randomly. Four villages from each district from plains were selected at random. Ten (10) farmers from each village were selected for the study. Forty (40) farmer from each district were selected. Thus, a total of 80 wheat farmers from 8 villages were taken for the study. Multistage random sampling technique was used for selection of farmers. The primary data for 2022-23 was collected using survey method by conducting personal interviews of the selected farmers with the help of pre-tested schedule.

Selection of study area

The present study was conducted in Haryana state to achieve well-defined objectives for wheat crop. Haryana state carved out from Punjab state in 1966 having geographical area 44,212 sq. km. The gross area sown in the state was 45.99 lakh ha during 1966-67 and during 2021-22 it was observed to be 66.20 lakh ha which showed an increase 20.15 lakh ha from 1966-67 to 2021-22, with cropping intensity of 141.06 per cent (Handbook of Statistics on Indian States, RBI (2021). Wheat crop alone occupies an area of 2375.8 thousand hectare with a total production of 11127.64 thousand tons in 2022-23 in the state (Economics and Statistical Analysis, Department of agriculture and farmers welfare Haryana).

Selection of Villages

A total of eight villages were selected randomly from both the districts that is four villages from each district.

Collection of data

The present study was based on the primary data. To work out the cost and returns in cultivation wheat to study the economics of wheat and to identify production of wheat in Panchkula and Yamunanagar district of Haryana for the year 2022-23. The primary data from selected farmers for the year 2022-23 was collected by survey method through personal interview with the help of well-structured interview schedule which include the following aspects.

1. General information of the selected farmers.
2. A detailed information about the per hectare input use pattern, prices of inputs to work out cost of cultivation of wheat crop and detailed information about wheat seed, total quantity of fertilizer purchased and various charges incurred in production of wheat etc.
3. Yield and returns from the crop and from the main and by-products obtained after harvesting of wheat.

Analytical Tools

The various statistical tools like Average, Percentage, costs, returns, Benefit-Cost ratio (B:C ratio) etc. were employed to draw valid inferences from the study. Cost and returns in production of Wheat

Following tools or formulae were employed to work out the cost and returns in the cultivation of wheat:

- Gross return = Main product value + By product value
- Return over variable cost = Gross return – Total variable cost
- Return over total cost (Net return) = Gross return – Total cost
- Benefit-cost ratio = Gross return/ Total cost
- Cost of production per quintal without by-product = $\frac{\text{Total cost}}{\text{Main product quantity in quintals}}$
- Cost of production per quintal with by-product = $\frac{\text{Reduced Total cost}}{\text{Main product quantity in quintals}}$

(Reduced Total Cost = Total Cost – Value of by-product).

- Working capital / variable cost = Total preparatory tillage cost + pre sowing irrigation charges + sowing value + FYM value + total fertilizer cost + irrigation value + pesticide cost + herbicide cost + manual weeding charges + Harvesting value + Threshing value + Miscellaneous charges.
- Management charges (10%) = Total variable cost *0.1
- Risk factor (10%) = Total variable cost *0.1
- Total fixed cost = Transportation charges +Rental value of land+ Management charges+ Risk factor.

Results and Discussion

Comparative economic analysis of wheat cultivation in shivalik foothills in selected districts were made on per

hectare basis. Result pertaining to cost details of wheat in Panchkula and Yamunanagar district is shown in Table 1. The results shows that total cost spent in growing wheat in Panchkula district (₹89899/ha) is higher than the cost incurred in Yamunanagar district (₹104210/ha). Total variable cost constituted for 47.7 per cent (₹42840/ha) and 41.0 per cent (₹42765/ha), in Panchkula and Yamunanagar district respectively, of total cost incurred in the cultivation of wheat. The overall average for both the districts for variable cost and total cost observed to be ₹42803 and ₹97055. Overall average of principal components of variable cost in decreasing order are preparatory tillage, harvesting cost, threshing and irrigation charges contributing 8.0, 4.5, 8.5 and 3.1 per cent, respectively of the total cost. While in fixed cost these were rental value of land, management charges, risk factor and transportation charges contributing 48.9, 4.4, 1.1, and 1.5 per cent, respectively. Returns from wheat cultivation in Panchkula and Yamunanagar district shown in the table shows that yield of wheat obtained to be 46.8 and 48.9 quintal per hectare respectively. Whereas, gross return received in Panchkula district were found to be ₹120728 and in Yamunanagar, it was obtained ₹124024 per hectare. While, net returns in Panchkula district (₹30829/ha) were estimated to be higher compared to Yamunanagar district (₹19814/ha). The benefit cost ratio (B:C ratio) for Panchkula and Yamunanagar district were recorded to be 1:1.34 and 1:1.19 respectively.

Table 1: Comparative economics of wheat crop grown in Shivalik foothills of Haryana (₹/ha)

		Panchkula			Yamunanagar			Overall Average		
Sr No	**Item**	**Qty.**	**Value**	**Percent**	**Qty.**	**Value**	**Percent**	**Qty.**	**Value**	**Percent**
1	Preparatory tillage	4.7	7963	8.9	4.5	7515	7.2	4.6	7739	8.0
2	Pre-sowing Irrigation		1040	1.2		1025	1.0		1032	1.1
3	Sowing		2106	2.3		2095	2.0		2100	2.2
4	Ridiging		441	0.5		473	0.5		457	0.5
5	Seed (qtl.)	102.2	3061	3.4	103.3	3053	2.9	102.8	3057	3.1
6	Seed Treament			0.0			0.0			0.0
7	FYM (qtl)	19.6	785	0.9	40.3	1612	1.5	30.0	1199	1.2
8	Fertilizer nutrients			0.0			0.0			0.0
9	(a)Nitrogen	152.9	1994	2.2	157.1	2048	2.0	155.0	2021	2.1
10	(b)Phosphatic	56.8	3044	3.4	56.8	3044	2.9	56.8	3044	3.1
11	(c) Potassic	21.4	1249	1.4	21.2	1239	1.2	21.3	1244	1.3
12	(d)Zinc Sulphate	2.6	263	0.3	1.9	190	0.2	2.3	227	0.2
13	Total Ferti.Invest		6551	7.3		6521	6.3		6536	6.7
14	Fertilizer Application		475	0.5		490	0.5		482	0.5
15	Irrigation	3.3	3022	3.4	3.4	2945	2.8	3.4	2983	3.1
16	Hoeing /Weeding			0.0			0.0			0.0
17	(a) Chemical		1792	2.0		1898	1.8		1845	1.9
18	(b) manual			0.0			0.0			0.0
19	Plant Protection		1104	1.2		1240	1.2		1172	1.2
20	Harvesting		4383	4.9		4369	4.2		4376	4.5
21	Threshing/ winnowing/Tying		8170	9.1		8275	7.9		8222	8.5
22	Miscellaneous		499	0.6		486	0.5		492	0.5
23	Total(1to 15)		41391	46.0		41352	39.7		41372	42.6
24	Interest on working Capital		1449	1.6		1413	1.4		1431	1.5
25	Variable cost		42840	47.7		42765	41.0		42803	44.1
26	Management charges		4284	4.8		4277	4.1		4280	4.4
27	Risk factor		1063	1.2		1063	1.0		1063	1.1
28	Transpotation		1446	1.6		1505	1.4		1476	1.5
29	Rentalvalue of land		40267	44.8		54601	52.4		47434	48.9
30	Total Cost		89899	100.0		104210	100.0		97055	100.0
31	Production(qtl.)									
32	(a) Main	46.8	99368		48.9	103967		47.8	101668	
33	(b)By Product		21360			20057			20708	
34	Gross return		120728			124024			122376	
35	Return over variable cost		77888			81259			79574	
36	Net return		30829			19814			25321	
37	Cost of Production/(qtl.)									
38	(a)Without by Product		4812			5324			5068	
39	(b)With by Product		3962			4462			4212	
40	B:C Ratio		1:1.34			1:1.19			1:1.26	
41	Number of farmers	40			40			80		
42	Area(acre)	100			105			103		
43	Labour									
44	(a) Human Days	90.4			89.8			90.1		
45	(b)Bullock days									
46	(c) Tractor hours	17.0			17.31			17.2		

Table 2: Resource use pattern in wheat in Panchkula and Yamunanagar district during 2022-23. (per hectare)

	Panchkula	Yamunanagar
Preparatory tillage (No.)	4.7	4.5
Seed (kg)	102.2	103.3
Fertilizer		
(a)Nitrogen	152.9	157.1
(b)Phosphatic	56.8	56.8
(c) Potassic	21.4	21.2
(d)Zinc Sulphate	2.6	1.9
FYM (qt)	19.6	40.3
Irrigation (No.)	3.3	3.4

Resource Use Pattern

The use of inputs and adoption of various cultural practices in the cultivation of wheat crop in Panchkula and Yamunanagar district has been given in the table 2.

The field preparation for wheat sowing in Northern Haryana starts in November month. On an average, 4.7 preparatory tillage operations in Panchkula district and 4.5 in Yamunanagar district were done to prepare the fields. Fields were prepared with the help of tractors. The per hectare seed rate used was 102.2 kg, in Panchkula district the corresponding figures for Yamunanagar district were 103.3 kg respectively. The quantity of FYM applied to the field in Panchkula district was 19.6 quintal per hectare and 40.3 FYM was used in Yamunanagar district respectively. Quantity of Nitrogen fertilizer used in Panchkula and Yamunanagar district was 152.9 and 157.1 kg per hectare .Quantity of Phosphate fertilizer used in Panchkula and Yamunanagar district was 56.8 kg per hectare. The Potassic feritilizer was used 21.4 and 21.2 kg per hectare in both district respectively. The Zinc sulphate was used 2.6 and 1.9 kg per hectare in both the district. On an average, 3.3 irrigations were given to the wheat crop in Panchkula district and 3.4 irrigations were given in Yamunanagar district by sample farmers.

Conclusion

It is concluded that wheat grown in Shivalik foothills of the study area. The gross returns from cultivation of wheat were worked out to be Rs. 120728 and Rs. 124024 in Panchkula and Yamunanagar district, respectively. The net returns per hectare worked out were Rs.30829 and Rs. 19814 with total cost of cultivation of Rs. 89899 and Rs. 104210 in Panchkula and Yamunanagar district, respectively. The per hectare return over variable cost and net returns from wheat crop was found to be ₹77888 and ₹30829 respectively in the Panchkula district and it was ₹81259 and ₹19814 in the Yamunanagar district. Among various variable cost items, threshing, preparatory tillage and harvesting of Wheat have maximum share i.e., 9.1, 8.9 and 4.9 per cent of total expenses incurred in cultivation of wheat in Panchkula district. While corresponding figures for Yamunanagar district were observed to be 7.9, 7.2 and 4.2 per cent of total expenses incurred. Total fixed cost components, the rental value of land have maximum share i.e., 44.8 and 52.4 per cent of total cost incurred in cultivation of wheat in Panchkula and Yamunanagar district, respectively. The B:C ratio was found to be 1:1.34 and 1:1.19 in Panchkula and Yamunanagar district, respectively. The study also revealed that Benefit Cost ratio is greater than one in both the districts which indicates that wheat grown in the Shivalik foothills to be economically viable. So, it is suggested that this crop should be promoted as much as possible in the water scarce region.

Competing Interest

Authors have declared that no competing interests exist.

References

1. Bareliya RS, Thakur SS, Rathi D. Impact of sprinkler irrigation system on production and profitability of wheat in Sagar district of Madhya Pradesh, India. Journal of Applied Science and Technology. 2020;39(48):183-188.
2. Balasubramanian A. The world's water. University of Mysore, Mysore; c2015.
3. Jha D. Agricultural Growth, Technology and Equity. Ind. J Agril. Econ. 1974;29:207-216.
4. Anonymous. Directorate of Economics and Statistics, DAC&FW; c2023.
5. Agnihotri Y. Economic appraisal of alternative land use systems for degraded Shivaliks Ind. J Forestry. 2002;25(1):60-66.
6. Pawar N, *et al*. Economic dimensions and resource use efficiency of wheat crop under sprinkler irrigation in Southern Haryana. Journal of Pharmacognosy and Phytochemistry. 2020;9(2S):54-57.
7. Ministry of Agriculture and Farmer's Welfare; c2021-22. Available: https://agricoop.nic.in/sites/default/files/Web%20copy_eng.pdf Access on Dec 25, 2022
8. Shankar MS, *et al*. Sprinkler irrigation–an asset in water scarce and undulating areas. Integrated Soil and Water Resource Management for Livelihood and Environmental Security; c2015. p. 2021-22.
9. Thakur S. Economic evaluation of sprinkler irrigation in Shimla district of Himachal Pradesh. (M.Sc. thesis), CSK Himachal Krishi Vishvavidyala, Palampur; c2010.
10. Sunita. Comparative study of sprinkler and surface method of irrigation in Jhunjhunu district of Rajasthan. (M.Sc. thesis). Swami Keshwanand Rajasthan Agricultural University, Bikaner; c2012.
11. Sharma SK, Mishra PK, Panse R, Jamliya G. Effect of irrigation methods on yields attributes and water productivity of wheat in vertisol of betwa river basin commands of Vidisha district of Madhya Pradesh, India. International Journal of Current Microbiology and Applied Sciences. 2018;7(8):2670-2673.
12. Nasseri A. Energy use and economic analysis for wheat production by conservation tillage along with sprinkler irrigation. The Science of the Total Environment. 2019;648:450-459.
13. Grewal SS, Lohan HS, Dagar JC. Micro- irrigation in drought and salinity prone areas of Haryana: Socio-economic Impacts. Journal of Soil Salinity and Water Quality. 2021;13(1):94-108.
14. Vaidyanathan A, Krishnakumar A, Rajagopal A, Varathanajan D. Impact of irrigation on productivity of land. Journal of Indian School of Political Economy. 1994;6(4):601-645.