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Research Journal of Agricultural Sciences
An International Journal

P- ISSN: 0976-1675
E- ISSN: 2249-4538

Volume: 12
Issue: 04

Res Jr of Agril Sci (2021) 12: 1124–1128

CARAS

Res. Jr. of Agril. Sci. (July-Aug 2021) 12(4): 1124–1128
www.rjas.org

Full Length Research Article

An Analysis of Farm Economics of Wheat and Paddy Farming in Western Uttar Pradesh: A Case Study

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Received: 26 Apr 2021 | Revised accepted: 09 Jun 2021 | Published online: 02 July 2021
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A B S T R A C T

Agricultural is the backbone of Indian economy. In India, majority of the places are occupied by agricultural land. The agriculture sector, which engages 64 per cent of the rural workforce, assumes a predominant role in improving the overall welfare of rural society. Unfortunately, the farmers are very poor in the economical level. Wheat and Paddy cultivation is the major cultivation in agriculture sector. This paper is going to study about the status of agricultural farmers. An attempt was made to study the economic analysis of wheat and paddy cultivation in western Uttar Pradesh. An investigation was done to work out the cost of production, cost of cultivation, returns and profitability from Wheat and Paddy crops in order to identify which crop is more profitable and economic for the farmers of Uttar Pradesh. Ghaziabad and Buland Shahr district of Western U.P. was selected purposively for study. The primary data were collected by personal interviews of the selected farmers with the help of a set of schedules specially prepared for this purpose for the. A four-stage stratified random sampling was used in the study for the selection of tehsils, villages and farmers in the study area. Simple statistical tools like averages and percentages were used for processing the data. Various cost and income concepts were also employed to examine cost and returns structure due to change in irrigation potential. The overall findings of the study revealed that the rental value of land contributes maximum to the total cost of production in each category of the farmer followed by human labour and agro-chemicals. The Canal + Diesel Tube well Irrigated Farms were getting the higher returns as compare to the other farms because this system has an advantage and supremacy over other irrigation systems in providing timely, adequate and assured supply of water. The observations indicated that per quintal cost of production for wheat crop was less than paddy crop, on the other hand per hectare net return, Percent Profit and Output- Input Ratio was the highest for wheat when compared to paddy crop.

***Key words*:** Cost, Return, B:C ratio, Production, Farming, Gross income, Family labour, Net income

Agriculture has been and will continue to be the life line of the Indian economy. As the largest private enterprise in India agriculture contributes nearly one fourth of the national GDP, Sustains livelihood. Of about two thirds of population and is the back bone of agro based industry. If food Sector alone agriculture contributes about Sector along agriculture contributes about Rs. 250 thousand annually. Agriculture is the backbone of Indian economy. It provides employment to 52 percent of the total labour force and contributed approximately 14 percent of the Indian GDP [1]. Wheat and Rice is one of the most important food crops in the world. Agricultural development in an agrarian economy largely depends on the existing nature of man-land relationship. Land is one of the most important assets of a farmer, providing food for the family while surplus yield can be used to earn income [2].

Agriculture sector witnessed inconsistent growth during last several years. But it is still mainstay of Indian Economy. It is contributing about 17.32 per cent of the national income and providing employment to about 54.6 percent of the total work force in the country. Wheat and Paddy are the main food grain crops grown in India as well as in Uttar Pradesh. India has become self-sufficient in food grains as the production of food grains has achieved a record level of 271.98 million tonnes in 2016-17 which is quite higher as compare to the 251.57 million tonnes in 2015-16. Agricultural exports accounted 12.1 per cent of India's total exports for the year 2014-15 [3]. Agriculture sector also plays a considerable role in the economy of Uttar Pradesh and predominantly it is an agriculture economy. The area under wheat and rice is continuously increasing in the state. During the previous fifty years, Indian agriculture has seen a

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critical change in input-utilize away from conventional input sources like human work, bullock work, ranch developed seeds, manure-compost and customary techniques for water system towards modern inputs like improved seeds, chemical fertilizers, farm machine and huge scope utilization of tubewells for water system [4]. It is appropriate to assess the impact of such changes on crop production cost and productivity of harvest undertaking. It is additionally imperative to learn whether the adjustment of COC, assuming any, is because of the progressions in degree of inputs use or its costs. The changing relative price of the factors of production prompts farmers to partially substitute the related factors (e.g., farm labour with machinery) in order to maximize their profits [5]. The assessment of impact of factor replacement on crop cultivation cost is helpful in conceiving reasonable methodologies for controlling the cost inflation in the country. Thus, the present paper was focused to study the cost and returns structure of wheat and paddy crop in the various irrigated farms. The objectives of the study were to study the cost and returns structure of wheat and paddy crop based on various cost and income concepts, and to examine the returns/profitability of farmers for wheat and paddy crop in different farms of Western U.P.

MATERIALS AND METHODS

Since the study was confined to the Bulandshahr and Ghaziabad dstrict of Western Uttar Pradesh, the data were collected for the year of 2018-19. The primary data were collected from the selected farmers relating physical input-output of the various crops and their prices for the agriculture year 2018-19 by interviewing the farmers personally with the help of a set of schedules specially prepared for this purpose. Besides, secondary data, the data related to the canal water, tubewell water, land resource, human labour, farm power, agro-chemicals, working capital etc. were also collected. A four-stage sampling technique is used for selecting the sample farms. Ghaziabad and Buland Shahr district were selected from western Uttar Pradesh. From the above two district 4 tehsils (two from each) were selected on the basis of highest operation holdings. Out of these 4 tehsils, 20 villages (5 from each tehsils) and 8 farmers from each village were randomly selected (160 farmers). In all 160 (randomly selected) farmers were interviewed with 32 farmers in each irrigation system situation. The farms were also classified under different categories i.e., small, medium and large sized farms according to their operational holdings in the study area. Under this classification, small farmers are those who are farming on land less than 2.0 hectares, medium farmers are farming on land between 2.1 to 4.0 hectares and farmers farming on land more than 4.0 hectares are considered large farmers. The farmers were selected randomly within each category. The number of farmers selected from various categories was 20 small, 7 medium and 5 large.

The data were subjected to tabular analysis to examine the resource endowment and their use, productivity, employment generation and fertilizer consumption in growing major crops on the various farms under different irrigation systems. Various cost and income concepts were also employed to examine cost and returns on farms due to change in irrigation potential.

Estimation of cost and returns

Cost concepts

Cost A1 = value of hired human labour + value of farm power + value of seed (both farm seed and purchased) + value of agro-chemicals + depreciation + irrigation cost + land revenue + interest on working capital

Cost A2 = Cost A1 + Rent paid for leased-in land

Cost B = Cost A2 + Interest on value of owned fixed capital assets (excluding land) + rental value of owned land

Cost C = Cost B + Imputed value of family labour

Income concepts

Gross Income = (Main Product × Price per unit) + (By Product × Price)

Net Income = Gross income - Cost C3

Family Labour Income = Gross Income – Cost B

Farm Business Income = Gross Income – Cost A1

Farm Investment Income = Net Income + Rental value of owned land + Interest on fixed

Capital Benefit Cost Ratio = Gross Income/ Cost C3

RESULTS AND DISCUSSION

Economics of wheat cultivation

Cost measures

It is quite evident that modern agricultural technology in general and irrigation in particular are the major factors responsible for the growth of farm production and income. Irrigation promotes more intensive use of existing resources like land, labour and fixed capital thus, increasing the use of modern resources like fertilizers, NPK, HYVs, manures and plant protective measures. If land is already irrigated, the need of fixed capital such as farm building and machinery per hectare may increase only marginally, whereas the requirements of fertilizer and human labour increase at the higher and adequate level of irrigation [6]. Keeping into consideration the above facts, this particular section attempts to examine the cost and returns for two major crops under five irrigation systems as a preface to the observed resource use efficiency. The evaluation of analysis of total cost of cultivation has its own importance as under or over utilization of farm resources along with their adjustment for effective production [7]. The examination of farm business analysis reveals that the variable cost component such as human labour, farm power, fertilizers and manures, seed, irrigation and plant protective measures accounted for more than 50 percent of the total cost (cost-c) and showed a mixed trend with increase in the adequate level of irrigation water.

The (Table 1) is a survey and examination of breakup of total cost of cultivation per hectare and different input used in cultivation process of wheat crop under different categories of farms like Canal Irrigated Farms, Electric Tubewell Irrigated Farms, Diesel Tubewell Irrigated Farms, Canal + Electric Tubewell Irrigated Farms and Canal + Diesel Tubewell Irrigated Farms. It is shown in the (Table 1) that approximately cost c (total cost of cultivation) is calculated to be Rs. 89105 per hectare of net sown area is the highest for Canal + Diesel Tubewell Irrigated farms, while the lowest cost Rs. 81562 is estimated by the canal irrigated farms [8]. A direct relationship of all the costs namely, Cost A, Cost B, Cost C have clearly been seen with the irrigation facilities, indicating thereby close association of inputs use in accordance with the levels of irrigation facility, that is, the increase in irrigation facilities boosts up the farmers just to increase the input use in crop cultivation per unit of land. When in total cost, the share of individual

input has been examined; it is found that the rental value of land had the highest share in total cost is accounted to be 38.94, 40.39, 36.43, 37.83 and 35.91 percent under Canal Irrigated Farms, Electric Tubewell Irrigated Farms, Diesel Tubewell Irrigated Farms, Canal + Electric Tubewell Irrigated Farms and Canal + Diesel tubewell irrigated Farms respectively. It was followed by human labour, farm power and agro-chemicals [9]. It was also observed that the higher cost of cultivation per hectare on Canal + Diesel Tubewell Irrigated Farms and, Canal + Electric tubewell irrigated farms was, therefore, on account of higher-level use of modern inputs other than high rental value of land [10].

Income measures

The important basis of failure or success of the farm business is the return which they earn from their farm produce. The (Table 3) shows a close examination of farm income measures under different categories of farms. A clear picture is drawn from the tabular analysis that the per hectare net returns (Gross income - Cost C) are observed highest (Rs.40871) on Canal + Diesel Tubewell irrigated farms, Canal + Electric Tubewell irrigated farms (Rs. 37465), Diesel Tubewell (Rs. 37587), Electric Tubewell irrigated farms (Rs. 35412) and the lowest remained up to Rs. 27792 Canal irrigated farms. Further the table also reveals that the gross income (value of product and by-product) is also observed maximum (Rs. 129976) on Canal + Diesel Tubewell irrigated farms, and it is least (Rs. 109354) on Canal irrigated farms [11]. The percent profit was 34.07% on Canal irrigated farms, 43.01% on Electric Tubewell irrigated farms, 44.75% on Diesel Tubewell, 43.26% on Canal + Electric Tubewell irrigated and 45.87% estimated on Canal + diesel Tubewell irrigated farms. Again, on an average the farm business income (gross income- cost A) on different farms are Rs. 69298, Rs. 77417, Rs. 76717, Rs. 79393 and Rs. 82281 respectively. Family labour income is also seen in the same manner. It gives an idea that the farmers have gained the most per unit of net sown area because of the fact that the farmers have get an assured and adequate irrigation facility [12].

Table 1 Analysis of total cost of cultivation of wheat crop under different irrigation systems

Items	Categories of farms (Rs. per hectare)				
	Canal irrigated farms	Electric tubewell irrigated farms	Diesel tubewell irrigated farms	Canal + Electric tubewell irrigated farms	Canal + Diesel tubewell irrigated farms
Rental value of land	31760 (38.94)	33250 (40.39)	30600 (36.43)	32760 (37.83)	32000 (35.91)
Interest on fixed capital	2278 (2.79)	2150 (2.61)	2320 (2.76)	2400 (2.77)	2450 (2.75)
Depreciation on fixed capital	2849 (3.49)	3000 (3.64)	3180 (3.78)	3360 (3.88)	3500 (3.93)
Interest on working capital	1900 (2.33)	1865 (2.26)	1810 (2.15)	2215 (2.56)	2200 (2.47)
Human labour					
A- Family	5568 (6.83)	4740 (5.76)	4400 (5.24)	4553 (5.26)	4760 (5.34)
B- Hired	11832 (14.51)	11060 (13.43)	11040 (13.14)	11147 (12.87)	12240 (13.74)
Farm power	11170 (13.69)	10660 (12.95)	12300 (14.64)	13750 (15.88)	13120 (14.72)
Seed	3680 (4.51)	4120 (5.00)	3800 (4.52)	3975 (4.59)	4000 (4.49)
Agro chemicals	7800 (9.56)	7800 (9.47)	8325 (9.91)	9200 (10.62)	9835 (11.04)
Irrigation	2725 (3.34)	3685 (4.47)	6225 (7.41)	3240 (3.74)	5000 (5.61)
Cost A	40056	40325	44870	44672	47695
Cost B	75994	77590	79600	82047	84345
Cost C	81562	82330	84000	86600	89105

Figures in parenthesis represent percentage to the total

Table 2 Analysis of total cost of cultivation of Paddy crop under different irrigation systems

Items	Categories of farms (Rs. per hectare)				
	Canal irrigated farms	Electric tubewell irrigated farms	Diesel tubewell irrigated farms	Canal + Electric tubewell irrigated farms	Canal + Diesel tubewell irrigated farms
Rental value of land	32200 (33.78)	31800 (31.04)	29600 (28.42)	31900 (31.25)	30000 (27.97)
Interest on fixed capital	1920 (2.01)	2220 (2.17)	2500 (2.40)	2000 (1.96)	2475 (2.31)
Depreciation on fixed capital	2640 (2.77)	2600 (2.54)	2680 (2.48)	2470 (2.42)	2500 (2.33)
Interest on working capital	1925 (2.02)	2170 (2.12)	2220 (2.13)	2080 (2.04)	2185 (2.04)
Human labour					
A- Family	8360 (8.77)	9610 (9.38)	8100 (7.78)	9465 (9.27)	8820 (8.22)
B- Hired	20840 (21.86)	21390 (20.88)	21900 (21.03)	21555 (21.12)	23380 (21.80)
Farm power	9000 (9.44)	10240 (9.99)	11000 (10.56)	10650 (10.43)	11400 (10.63)
Seed	2800 (2.94)	3000 (2.93)	3150 (3.02)	3000 (2.94)	3300 (3.08)
Agro chemicals	11800 (12.38)	12000 (11.71)	13000 (12.48)	12775 (12.52)	14920 (13.91)
Irrigation	3840 (4.03)	7400 (7.22)	10000 (9.60)	6170 (6.04)	8270 (7.71)
Cost A	50920	56630	61730	56620	63770
Cost B	86965	92820	96050	92600	98430
Cost C	95325	102430	104150	102065	107250

Figures in parenthesis represent percentage to the total

Economics of paddy cultivation

Cost measures: The evaluation of analysis of total cost of cultivation has its own importance as under or over utilization of farm resources along with their adjustment for effective production [13]. The examination of farm business analysis reveals that the variable cost component such as human labour, farm power, fertilizers and manures, seed, irrigation and plant protective measures accounted for more than 50 percent of the total cost (cost-c) and showed a mixed trend with increase in the adequate level of irrigation water.

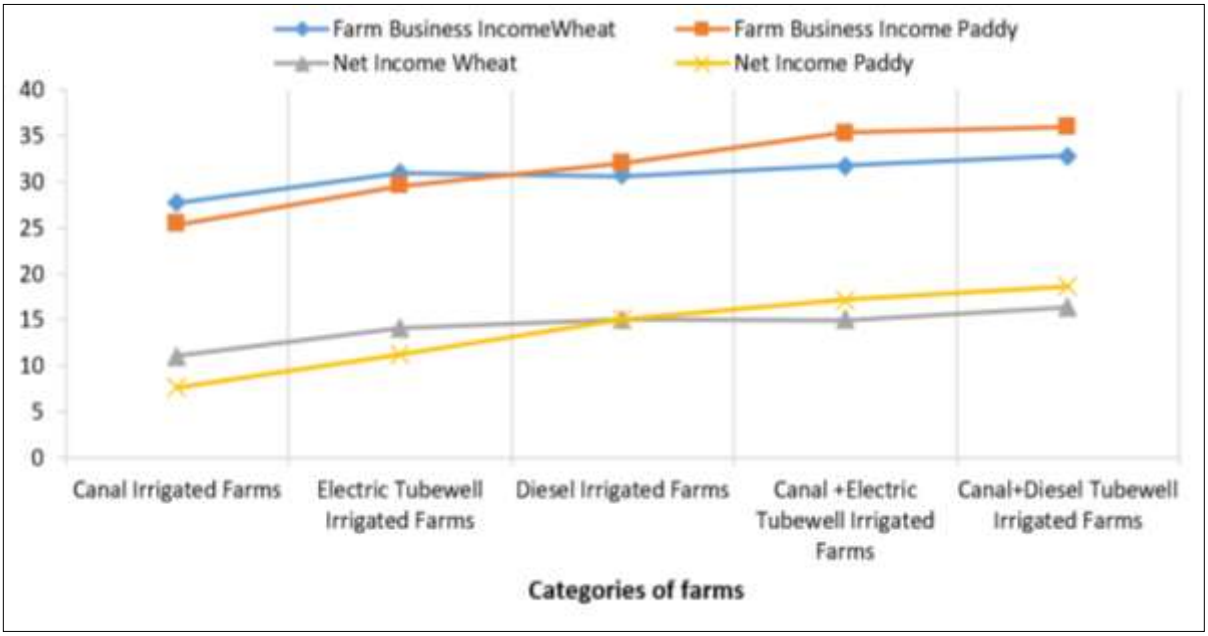

Fig 1 Income measures of wheat and paddy crop

The (Table 2) is a survey and examination of breakup of total cost of cultivation of per hectare and different input used in cultivation process of paddy crop under different categories of farms like Canal Irrigated Farms, Electric Tubewell Irrigated Farms, Diesel Tubewell Irrigated Farms, Canal + Electric Tubewell Irrigated Farms and Canal + Diesel Tubewell Irrigated Farms. It is shown in the (Table 2) that Cost- C (total cost of cultivation) is calculated to be Rs. 107250 per hectare of net sown area is the highest for Canal + Diesel Tubewell Irrigated farms, while the lowest cost Rs. 95325 is estimated by the canal irrigated farms [14]. A direct relationship of all the costs namely, Cost A, Cost B and Cost C have clearly been seen with the irrigation facilities, indicating thereby close association of inputs use in accordance with the levels of irrigation facility, that is, the increase in irrigation facilities boosts up the farmers just to increase the input use in crop cultivation per unit of land. When in total cost, the share of individual input has been examined; it is found that the rental value of land had the almost highest share in total cost is accounted to be 33.78, 31.04, 28.42, 31.25 and 27.97 percent under Canal Irrigated Farms, Electric Tubewell Irrigated Farms, Diesel Tubewell Irrigated Farms, Canal + Electric Tubewell Irrigated Farms and Canal + Diesel Tubewell Irrigated Farms respectively. It was followed by human labour, farm power and agro-chemicals. It was also observed that the higher cost of cultivation per hectare on Canal + Diesel Tubewell Irrigated Farms and, Diesel Tubewell Irrigated Farms was, therefore, on account of higher-level use of modern inputs other than high rental value of land [15].

Table 3 Gross income, net income, family labour income and farm business income of wheat crop under different categories of farms (Rs. per hectare)

Categories of farms	Gross income	Net income	Family labour income	Farm business income	Output / Input ratio	Percent profit
Canal Irrigated Farms	109354	27792	33360	69298	2.39	34.07
Electric Tubewell Irrigated Farms	117742	35412	40152	77417	2.61	43.01
Diesel Tubewell Irrigated Farms	121587	37587	41987	76717	2.47	44.75
Canal + Electric Tubewell Irrigated Farms	124065	37465	42018	79393	2.52	43.26
Canal+ Diesel Tubewell Irrigated Farms	129976	40871	45631	82281	2.48	45.87

Income measures

The important basis of failure or success of the farm business is the return which farmers' earn from their farm produce. The (Table 4) shows a close examination of farm income measures under different categories of farms. A clear picture is drawn from the tabular analysis that the per hectare net returns (Gross income - Cost C) are observed highest (Rs. 46650) on Canal + Diesel Tubewell irrigated farms, Canal + Electric Tubewell irrigated farms (Rs. 42920), Diesel Tubewell (Rs. 37630), Electric Tubewell irrigated farms (Rs. 28089) and the lowest remained up to Rs. 19094 on Canal irrigated farms. Further the table also reveals that the gross income (value of product and by-product) is also observed maximum (Rs. 153900) on Canal + Diesel Tubewell irrigated farms, and it is least (Rs. 114419) on Canal irrigated farms [16]. The percent profit was 20.03% on Canal irrigated farms, 27.42% on Electric

Tubewell irrigated farms, 36.13% on Diesel Tubewell, 42.05% on Canal + Electric Tubewell irrigated and 43.50% estimated on Canal + diesel Tubewell irrigated farms. Again, on an average the farm business income (gross income- cost A) on different farms are Rs. 63499, Rs. 73889, Rs. 80050, Rs. 88365 and Rs. 90130 respectively. Family labour income is also seen in the same manner [17]. It gives an idea that the farmers have gained the most per unit of net sown area because of the fact that the farmers have get an assured and adequate irrigation facility.

Table 4 Gross income, net income, family labour income and farm business income of paddy crop under different categories of farms (Rs. per hectare)

Categories of farms	Gross income	Net income	Family labour income	Farm business income	Output / Input ratio	Percent profit
Canal Irrigated Farms	114419	19094	27452	63499	1.93	20.03
Electric Tubewell Irrigated Farms	130519	28089	37699	73889	1.97	27.42
Diesel Tubewell Irrigated Farms	141780	37630	45730	80050	2.03	36.13
Canal + Electric Tubewell Irrigated Farms	144985	42920	52385	88365	2.19	42.05
Canal+ Diesel Tubewell Irrigated Farms	153900	46650	55470	90130	2.12	43.50

CONCLUSION

This study discusses on cost and income measures of the important major crops (Wheat and Paddy) under different irrigation systems reveals that adequate level of agrichemicals and irrigation facilities are associated with an advancement in the level of returns from all the major crops. The cultivation of wheat in Rabi and paddy crop in Kharif season results in more profit to farmers in the Western Uttar Pradesh. The examination of farm business analysis reveals that the variable cost component such as human labour, farm power, seed, agrochemicals, cost of irrigation accounted for less than 70% of the total cost (Cost C) and showed an increase in the adequate level of irrigation. The study clearly depicted that the rental value of land contributes maximum to the total cost of production in each category of the farmer followed by human labour and agro-chemicals. Price of the crop not increase in the same proportion as the input cost increases. The large category farmers were getting the higher returns as compare to the medium and small farmers main reason is large farmers have their own farm machinery. As the finding of study suggest that paddy is more profitable than wheat to in the three categories of farms while wheat was profitable in canal and electric tubewell irrigated farms. The percent profit of wheat was higher than of paddy crop in all irrigation systems. Gross income and farm business income estimated higher than wheat crop on all categories of farms. The farmers have gained the most per unit of net sown Area due to proper supply of irrigation water. To minimize the cost, farmers have to adopt improved technology, judicious use of fertilizers, crop diversification, eliminating the middlemen, fixing forming FPOs.

LITERATURE CITED

1. Agrawal PK, Yadav P, Mondal S. 2018 Economic analysis of cost and return structure of paddy cultivation under traditional and Sri Method: A comparative study. *International Journal of Agriculture Sciences* 10(8): 5890-5893.
2. Raghavan M. 2008. Changing pattern of input use and cost of cultivation. *Review of Agriculture, Economic and Political Weekly*, June 28. pp 123-129.
3. Gaytancioilu O, Surek H. 2001. Input use and production cost in rice cultivation in Turkey. www. resources.ciheam.org
4. Kumar V. 2009. An economic analysis of cost of production of paddy under different farm size groups. *Plant Archives* 9(1): 197-198.
5. Biswas BC, Tewatia RK. 1990. Wheat production in India: Strategies for nineties. *Fertilizer News* 35(12): 71-77.
6. Ahirwar RF, Verma AK, Shekhawat LS. 2015. Cost and income structure of wheat cultivation in Vindhyan Plateau of Madhya Pradesh. *Economic Affair* 60(1): 83-88.
7. Churpal D, Koshta AK, Choudhary VK. 2015. An economic analysis of rice cultivation and constraint in Dhamtari district of Chhattisgarh, India. *Plant Archives* 15(2): 651-656.
8. Sheokand RS, Narinder S, Sheoran OP. 2000. Comparative economics of different farming systems under paddy-wheat farming sequence in rice-belt of Haryana. *Haryana Agril. Univ. Jr. Research* 30(1/2): 49-53.
9. Nirmal C. 2006. Economics of wheat production in the farmer's field in Uttaranchal. *Indian Research Journal of Extension Education* 6(3): 44-46.
10. Surjeet V. 2008. Evolution of the study of cost of cultivation in India. Presented in Conference Held in December 21-24.
11. Gaurav S, Mishra S. 2011. Size class and returns to cultivation in India: A cold case reopened, IGIDR Working paper, WP-2011-027.
12. Sen A, Bhatia MS. 2004. Cost of cultivation and farm income. State of the Indian Farmer: A Millennium Study, Vol. No. 14, Government of India, Academic Foundation, New Delhi.
13. Hossain SKM. 2007. Economic analysis of rice production in Bardhman district of West Bengal. *M. Sc. Thesis* of department of Agricultural Economics, G.B.P.U.A. & T. Pantnagar.
14. Suneetha K, Kumar NI. 2013. Cost and returns structure of paddy in Andhra Pradesh. *Ind. Jr. of Research* 3(5): 40-42.
15. Narayanamoorthy A. 2013. Profitability in crops cultivation in India: Some evidence from cost of cultivation survey data. *Indian Journal of Agricultural Economics* 68(1): 104-121.
16. Gandhi, Vasant P. 1997. Technology, cost reduction, and returns in agriculture: A study of wheat and rice in Punjab. *Vikalpa* 22(2). April-June.
17. Chandra N. 2006. Economics of wheat production in the farmers' fields in Uttaranchal. *Indian Res. Jr. Ext. Education* 6(3): 44-46.