Research Journal of Agriculture
Volume 14, Number 4; April-2023;
ISSN: 2836-6050 | Impact Factor: 6.58
https://zapjournals.com/Journals/index.php/rja/index
Published By: Zendo Academic Publishing

CULTIVATING RETURNS: AN ECONOMIC EXPLORATION OF WHEAT AND PADDY FARMING IN WESTERN UTTAR PRADESH

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Article Info

Keywords: agriculture, economic status, farmers, cost and returns, wheat cultivation, paddy cultivation, Uttar Pradesh, profitability, economic viability.

Abstract

Agriculture has long served as the bedrock of India's economy, acting as a critical sustainer of livelihoods for a substantial portion of its populace while contributing a significant share to its Gross Domestic Product (GDP). This study delves into the economic landscape of the agricultural sector, particularly focusing on the state of Uttar Pradesh, a prominent agricultural region within India. By specifically scrutinizing the cost and return structure of wheat and paddy cultivation, this research seeks to ascertain the economic standing of farmers in Western Uttar Pradesh.

The Indian agricultural sector plays a pivotal role in its economic fabric, employing over half of the nation's labor force and contributing around one-seventh of its GDP. The government's steadfast commitment to investing in agriculture underscores its crucial role in enhancing productivity and the welfare of the populace. Despite its significance, agriculture's growth trajectory has exhibited irregular patterns, necessitating the identification and resolution of persistent challenges.

Among the chief predicaments faced by the Indian agricultural sector is the financial distress experienced by farmers. This is a paradox, given that the sector absorbs a substantial portion of the rural workforce and holds a pivotal position in enhancing rural welfare. The financial well-being of farmers emerges as a linchpin for sustaining agricultural growth. This study focuses on Western Uttar Pradesh, particularly the districts of Ghaziabad and Buland Shahr, as case study locales.

By meticulously analyzing the cost and returns involved in wheat and paddy cultivation, this study intends to unravel the profitability dynamics of these staple crops. Through comprehensive data analysis and a purposive selection of study areas, the research aims to provide insights into the comparative economic viability of wheat and paddy cultivation in the region. The findings are expected to offer pertinent information for policy formulation, ensuring equitable returns for farmers and fostering the economic robustness of the agricultural sector in Western Uttar Pradesh

Introduction

Agriculture has been the backbone of the Indian economy since time immemorial. It sustains livelihoods for about two-thirds of the population and contributes nearly one-fourth of the national GDP. The sector provides employment to 52 percent of the total labor force and contributes approximately 14 percent of the Indian GDP [1]. The importance of agriculture in the Indian economy cannot be overemphasized, and it is the reason why the government has continued to invest in the sector to improve productivity and welfare.

Wheat and paddy are two of the most important food crops grown in India as well as in the state of 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 than the 251.57 million tonnes in 2015-16. Agricultural exports accounted for 12.1 percent of India's total exports for the year 2014-15 [3]. However, the agricultural sector has witnessed inconsistent growth over the last several years, and there are still challenges that need to be addressed.

One of the significant challenges facing the agricultural sector in India is the poor economic conditions of farmers. Unfortunately, farmers are very poor at the economic level, despite the fact that the agriculture sector engages 64 percent of the rural workforce, and assumes a predominant role in improving the overall welfare of rural society. This is a concern because the economic well-being of farmers is crucial for the growth and sustainability of the agricultural sector. The objective of any government is to ensure that farmers receive a fair return on their investment and are economically stable.

The primary goal of this study is to analyze the economic status of farmers in Western Uttar Pradesh, focusing on the cost and returns structure of wheat and paddy cultivation. The study aims to identify which crop is more profitable and economic for the farmers of Uttar Pradesh. The study focuses on Ghaziabad and Buland Shahr districts of Western U.P., which were selected purposively for the study

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 inputoutput 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 byproduct) 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

Categories of farms (Rs. per hectare)					
Items	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					
B- Hired	5568 (6.83)	4740 (5.76)	4400 (5.24)	4553 (5.26)	4760 (5.34)
	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 Padd y crop under different irrigation systems

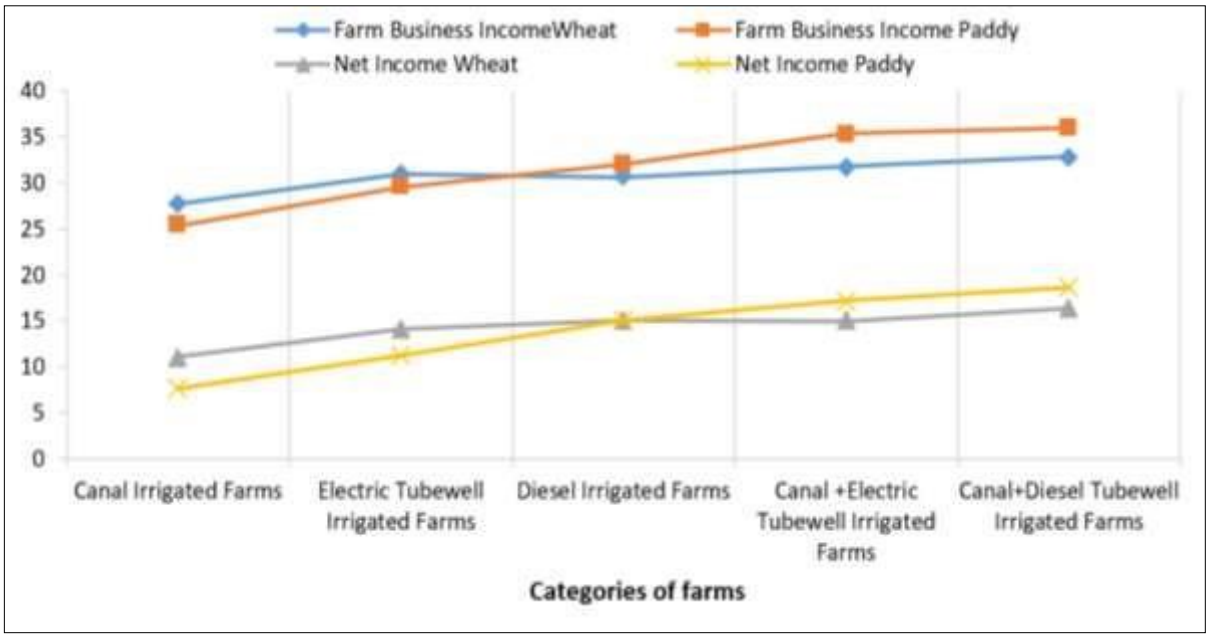
Items	Categories of farms (Rs. per hectare)				
	Canal irrigated farms	Electric tubewell irrigated farms	Diesel tubewell irrigated farms	Canal + Electric tubewell irrigated farms	Canal + Diesel tubewell irrigated farms
Rental value of land	32200 (33.78)	31800 (31.04)	29600 (28.42)	31900 (31.25)	30000 (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 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 *Income measures*

effective production [13]. The examination of farm business trend with increase in the adequate level of irrigation water.



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 agrochemicals. 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].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 byproduct) 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.

Fig 1 Income measures of wheat and paddy crop

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 Far 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

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 Far 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

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.

Raghavan M. 2008. Changing pattern of input use and cost of cultivation. *Review of Agriculture, Economic and Political Weekly*, June 28. pp 123-129.

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.

Biswas BC, Tewatia RK. 1990. Wheat production in India: Strategies for nineties. *Fertilizer News* 35(12): 71-77.

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.

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.

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.

Nirmal C. 2006. Economics of wheat production in the farmer's field in Uttaranchal. *Indian Research Journal of Extension Education* 6(3): 44-46.

Surjeet V. 2008. Evolution of the study of cost of cultivation in India. Presented in Conference Held in December 21-24.

Gaurav S, Mishra S. 2011. Size class and returns to cultivation in India: A cold case reopened, IGIDR Working paper, WP-2011-027.

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.

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.

Suneetha K, Kumar NI. 2013. Cost and returns structure of paddy in Andhra Pradesh. *Ind. Jr. of Research* 3(5): 40-42.

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.

Gandhi, Vasant P. 1997. Technology, cost reduction, and returns in agriculture: A study of wheat and rice in Punjab. *Vikalpa* 22(2). April-June.

Chandra N. 2006. Economics of wheat production in the farmers' fields in Uttaranchal. *Indian Res. Jr. Ext. Education* 6(3): 44-46.