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An economic analysis of potato cultivation: A case study in Kannauj district of Uttar Pradesh

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Abstract

In the present paper, an attempt has been made to examine various of potato production in different categories of the farmers. A study on an economic analysis of potato cultivation and its processing in Kannauj district of Uttar Pradesh was conducted for analysis the cost of input-output in potato cultivation. The study covered five villages of 'Umarda' block in Kannauj district and data on potato cultivation, farm structure, costs, returns, cropping intensity and cost- return aspect of potato cultivation were collected from 100 farmers. The study reveal that average holding size was 0.49 hectare and cropping intensity was 222.45 percent, potato occupied 1.09 hectare of gross cropped area. It offers overall net income of Rs.70013.40 with on expenditure 80533.58 as total cost per hectare. Cost of production per quintal was found to be 845.95 which should the positive relationship with the farm of size holding.

Keywords: Economic, potato cultivation, Kannauj

1. Introduction

Potato is an economical food, it provides source of energy to the human diet. Potato is known as the king of vegetable has emerged as the most important food crop of India. It is the world third most important food crop after wheat and rice with a production of 43.42 million tones fresh weight produced from 2.16 million hectare area (2015-16). Potato was produced about 28.5 million tonnes from 1.56 million hectare with an average yield of 18.4 tonnes per hectare (Nayak and Lal 2012). India ranks 2nd in area and production after China.

In Uttar Pradesh potato is grown is 5.05 lakh hectare with a production of 11.1 million tonnes. Although potato productivity in the state ranks 3rd next to Gujrat and West Bengal.

In Kannauj district of Uttar Pradesh potato occupies an area of 52.50 million hectare and its productivity was 224.20 q/ha. The total production was 1177.16 million tonnes (Horticultural statistics at a glance 2015-16).

2. Methodology**2.1 Sampling technique**

The purposive and random sampling techniques were used to select block, village and farmers. The district Kannauj was selected purposively. The sampling techniques were sub divided into following stages:

- Selection of block
- Selection of village
- Selection of farmers

a. Selection of block

At first a list of all blocks of Kannauj district of Uttar Pradesh along with acreage in potato cultivation were prepared and arranged in descending order. the namely 'Umarda' having highest area in potato was selected purposively for this study.

b. Selection of village

A list of all villages following umarda block was prepared and arranged in ascending order to the area covered under potato crop and 5 villages selected randomly from this list.

c. Selection of farmers

A separate list of potato grown of five selected villages was prepared along with their size of holding and stratified into three categories i.e-

- Marginal - (below 1ha)

2. Small - (1-2ha)
3. Medium - (2-4ha).

2.2 Methods of enquiry

The primary data information was collected by survey method through personal interview. The data were selected on well structure & pre tested schedule but secondary information were obtain from Tehsil/Block/Village and District level official records.

2.3 Period of enquiry

The primary data were collected for the period of one year i.e. Agriculture year 2016-17.

2.4 Analytical tools

Tabular analysis was used for analysis of data weighted average, cropping intensity and cost benefit ratio was worked out with the following formula.

$$\text{Weight average (W.A.)} = \frac{\sum wix_i}{\sum w_i}$$

$$\text{Cropping intensity (C.I.)} = \frac{\sum x}{N}$$

3. Result and Discussion

3.1 Structure of farms

This section includes the components of size of farms, cropping pattern, cropping intensity and per hectare and per farm investment.

Average size of sample farms under different size of groups:-
The average size of holding on various group of sample farms are presented in table 1. It is evident from the table that the average size of holding in study area was 0.28, 1.59 and 2.28 hectare in marginal, small and medium size group of farms respectively. Whereas overall average of holding size was 0.49 hectare.

Table 1: Average size of holding on sample farms under different size group of farms.

S. N.	Size group of farm	No. of sample farm	Total cultivated area	Average size of holding
1.	Marginal (below 1ha)	86	24.27(100)	0.28
2.	Small (1-2ha)	11	17.50(100)	1.59
3.	Medium (2-4ha)	03	6.84(100)	2.28
	Total	100	49.07(100)	0.49

3.2 Investment of farm assets

Investment on farm assets such as farm building, Implement & machinery and livestock on marginal, small and medium farms and overall farm are displayed in table 2. an average investment on overall farm for farm building, implement, machinery and livestock accounted for 59.94, 40.97 and 7.09percent respectively for the total farm assets. Which occurred Rs.225805.90, Rs.178076.00 and Rs.30853.49 respectively. Similarly per farm investment on implements

machinery also had the position trend with farm size as it increases with increasing the farm size. It was recorded as Rs.152873.00, Rs.313010.50 and Rs.405800.70 against marginal, small and medium farm respectively. It is concluded from the table that per farm investment on building and farm machinery had direct relationship with farm size but in case of livestock the investment was higher on marginal farms followed by small and medium size of farms respectively.

Table 2: Per farm average investment of assets on different size group of farms (RS.)

S. No.	Particulars	Marginal(below-1ha)	Small(1-2ha)	Medium(2-4ha)	Overall average
1.	Building	199568.70(52.89)	355335.10(49.16)	503000.10(49.06)	225805.90(51.94)
2.	Livestock	24846.73(6.58)	54475.44(7.54)	116433.30(11.36)	30853.49(7.09)
3.	Implements & machineries	152873(40.52)	313010.50(43.30)	405800.70(39.58)	178076.00(40.97)
	Average grand total	377288.40(100)	722821.00(100)	1025234.40(100)	434735.40(100)

3.3 Cropping Pattern/ Cropping Intensity

A cropping pattern is the proportion of area under different crops at a point of time. In thus differ from a crop rotation in the sense that it does not denote succession of crop in a field over time as rotation dose.

The area allocated to different crops under various season are presented in table 2. It is depicted from the table that among the cereals rice, wheat and maize have substantial area and became a major cereals crops. As it cover 23.87, 23.92 and 18.52 percent of the total cropped area. Other important crops included in the cropping pattern were in mustard in rabi (1.47%). In zaid maize, chari, urd and vegetable were given

much important by the sample farmers, as it were allotted 13.85 % each of the gross cropped area on over all farms.

$$\text{Cropping intensity} = \frac{\text{Total cropped area}}{\text{Total shown area}} \times 100$$

It has been computed for all size group of farms and is presented in table 3. The maximum cropping intensity was observed as (235.71) at marginal size group of sample farms followed by small (216.71) and medium (200.00) size group of farms. Overall cropping intensity in the study area was found to be 222.45 percent.

Table 3: Cropping Pattern on Different Size of Sample (Area in ha and %)

S. No.	Crop grown under different season	Size group of farms			
		Marginal	Small	Medium	Overall average
1.	Kharif	0.25(37.88)	1.59(46.08)	2.27(49.78)	0.46(42.39)
a.	Paddy	0.13(19.70)	1.00(28.98)	1.23(26.97)	0.26(23.87)
b.	Maize	0.12(18.18)	0.59(17.10)	1.04(22.81)	0.20(18.52)
2.	Rabi	0.27(40.91)	1.59(46.09)	2.27(49.79)	0.47(43.73)
a.	Wheat	0.13(19.70)	1.03(29.85)	1.14(27.00)	0.26(23.92)
b.	Mustard	0.01(1.51)	0.04(1.16)	0.10(2.21)	0.02(1.47)
c.	Potato	0.13(19.70)	0.51(14.78)	1.03(22.58)	0.19(18.34)
3.	Zaid	0.14(21.21)	0.27(7.82)	-	0.16(13.85)
a.	Maize	0.07(10.60)	0.19(5.51)	-	0.08(7.48)
b.	Chari	-	0.19(0.58)	-	0.01(0.20)
c.	Urd	0.05(7.60)	0.05(1.45)	-	0.05(4.47)
d.	Vegetable	0.02(3.03)	0.01(0.29)	-	0.02(1.70)
	Gross cropped area	0.66(100)	3.45(100)	4.54(100)	1.09(100)

Table 4: Cropping intensity on different size of sample farms (%).

S.No.	Size group of farm	No. of farm	Net cultivated area	Gross cropped area(ha)	Cropping intensity
1.	Marginal (below 1ha)	86	0.28	0.66	235.71
2.	Small (1-2ha)	11	1.59	3.45	216.98
3.	Medium (2-4ha)	03	2.28	4.56	200.00
	Total	100	0.49	1.09	222.45

3.4 Structure of Costs and Returns

Per hectare cost and income from the cultivation of potato crop on different categories of farm were worked out and present in Table 4. The per hectare cost "C3" was worked to

Rs.79997.53 on marginal, Rs.83221.60 on small and Rs.86043.90 on medium farms with an overall average of Rs.80533.58 respectively. Cost of production per quintal had the negative relation with the size of farms.

Table 5: Per hectare cost and income of potato cultivation

S. No.	Particulars	Marginal		Small		Medium		Overall average	
		Rs.	%	Rs.	%	Rs.	%	Rs.	%
A.	Cost expenditure								
1.	Seed and showing	14843.43	18.55	15952.41	19.17	17333.34	20.14	15040.12	18.67
2.	Manures& fertilizer	14234.40	17.80	16454.43	19.77	17267.09	20.06	14569.58	18.09
3.	Chemical (plant protection)	1247.82	1.56	1432.89	1.72	1465.89	1.70	1274.72	1.58
4.	Irrigation	8750.20	10.94	8867.07	10.65	8445.43	9.81	8753.91	10.87
5.	Family labours	13485.70	16.86	5766.60	6.93	5477.55	6.36	12396.35	15.39
6.	Hired labours	7440.34	9.30	13415.43	16.12	13832.54	16.07	8289.37	10.29
7.	Total human labours	20926.04	26.16	19182.03	23.05	19310.09	22.44	20685.72	25.68
8.	Machinery power	5155.58	6.44	5565.4	6.68	5876.72	6.83	5222.29	6.48
9.	Total working capital	51671.77	64.60	61687.64	74.12	64221.01	74.63	53149.99	65.99
10.	Return value of owned land	5000.00	6.25	5000.00	6.0	5000.00	5.81	5000.00	6.21
11.	Interest on working capital	2066.87	2.58	2467.50	2.96	2568.84	2.98	2126.00	2.64
12.	Interest of fixed capital	500.69	0.62	734.30	0.88	854.34	1.11	539.99	0.67
13.	Sub total	72725.03	90.91	75656.05	90.91	78221.74	90.91	73212.34	90.91
14.	Managerial cost @10% of subtotal	7272.50	9.09	7565.61	9.09	7822.17	9.09	7321.23	9.09
15.	Grand total	79997.53	100	83221.65	100	86043.91	100	80533.58	100
B.	Income								
16.	Gross income	150390.00		151392.00		151950.00		150547.00	
17.	Net income	74572.50		68170.40		65904.10		70013.00	
18.	Family income	91150.70		81502.60		79205.80		89731.00	
19.	Farm business income	96651.40		87236.90		85160.20		95271.00	
20.	Farm investment income	80073.30		73904.70		71860.40		75553.40	
21.	Cost of production Rs./q	302.00		32900		339.00		306.08	
22.	Yield q/h	250.65		252.32		253.25		250.91	
23.	Input –output ratio	1:1.88		1:1.81		1:1.76		1:1.87	

4. Conclusion

The overall size of holding in the study area was 0.28, 1.59 and 2.28 ha in marginal, small and medium size of farms respectively. It was found that medium farmers were cultivating maximum area followed by small and marginal categories of farms.

The cropping intensity was 222.45 percent on an overall average. The cropping intensity decreased with increase in the size of holding.

Per farm average investment came to be Rs.377288.40, Rs.722821.00 and Rs.1025234.40 corresponding to marginal, small and medium size group of farms. It may be able to be conducted that per farm investment on farm assets was having direct relationship with size of holdings.

Gross income, net income, farm business income, family labour income and farm investment income shows the positive relationship with the size of farms.

The per quintal cost of production of potato overall farm are Rs.306.08 whereas cost of production (Rs/qtl) Rs.302.00, Rs.329.00 and Rs.339.00 of marginal, small and medium farms respectively.

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