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Economics of Potato Production in Agra District of Uttar Pradesh

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Abstract

In the present paper, an attempt has been made to examine various expenditure of potato production in different categories of the farmers. A study on an economic analysis of potato cultivation in Agra district of Uttar Pradesh was conducted for analysis the cost of input-output in potato cultivation. The study covered six villages of Shamsabad, Khandauli and Etmadpur ofAgra district and data on potato cultivation, farm structure, costs, returns, cropping intensity and cost- return aspect of potato cultivation were collected from 144 farmers. The study revealed that the average holding size was 1.84 hectare and the size of operational holding was 4.33 ha., potato occupied3.95 hectare of gross cropped area. It offers overall net income of Rs. 125316.86 with on expenditure Rs.72116.58 as total cost per hectare. The cost of production per quintal was found to be Rs.269.32 which was the highest on large farms followed by small and medium size farms.

Key words: Potato production, economics, Uttar Pradesh.

Introduction

Potato (*Solanum tuberosum* L.) is herbaceous annual plant and belongs to the family Solanaceae. Potato is a rich source of energy and produces more food per unit area and time than all major food crops. Potato is one of the most efficient food crops which produces more dry matter, dietary fiber, quality protein, minerals and vitamins than wheat, maize and rice per unit area and time is considered as a balanced and nutritive food[1]. It is a nutritious food which contains all the essential dietary constituents. Potato contains about 20.6% carbohydrates, 2.1% protein, 0.3% fat, 1.1% crude fiber and 0.9% ash. It also contains a good amount of essential amino acids like leucine, tryptophane and isoleucine[3]. It also contains essential minerals like phosphorus, calcium and iron. The total area in world under potato cultivation during 2018-19 was 19.03 million hectares with total production of 354.81 million tones. Whereas in India, during 2018-19 total area, production and productivity was 2.17 million ha., 50.19 million tones and 23.96 tones/ha, respectively. India is the second largest producer of potato contributing 13.55% after China with 24.79 % of the world potato production. The contribution of U.P. alone in area and production during 2018-19 was 610.50 thousand ha. and 15323.55 thousand tones, respectively with 25.10 q/ha productivity. In an agriculture-dominated country like India instability of commodity prices has always been a major concern for farmers. There are various ways to cope with this problem. Apart from increasing the stability of the market by direct government intervention, various factors in the farm sector can better manage their activities. This study was conducted to assess the existing production practices, production, productivity, cost, income and benefit of potato production in Agra district of Uttar Pradesh[4].

Methodology

The study was carried out in Agra District of Uttar Pradesh. A multistage stratified random sampling technique was adopted for the ultimate selection of potato growers. The sampling process in this study consists of three stages, *viz*. selection of blocks, selection of villages and selection of sample cases.Out of all the 15 blocks of Agra district Shamsabad, Khandauli and Etmadpur blocks having higher ranks with respect to area under potato crop were selected purposely.Further, six villages from selected blocks were selected. Finally, a sample of 144 potato growers were selected with the help of probability proportion criteria. Thus, the sample consisted of 102 small, 33 medium and 9 large farmers. To study the economics of potato production, the tabular analysis was employed to estimate cost and income pattern of potato on different size of farms. The standard cost concepts approach was used to study the costs and returns from potato production. To work out cost of cultivation standard method of cost of cultivation employed by Commission for Agricultural Costs and Prices (CACP), Directorate of Economics and Statistics, Government of India was adopted.

1. Result and Discussion

1.1. Holding size

The average area owned by small, medium and large potato growers was 1.10, 3.06 and 5.67 ha., respectively, with an overall average of 1.84 ha (Table-1). 6.25 per cent of the large potato growers owned 19.28 per cent of the total area while 42.54 per cent of the total area was occupied by 70.83 per cent small farmers. Overall, per farm size of operational holding was 4.33 ha., which was 2.20, 5.57 and 23.97 ha., on small, medium and large farms respectively. The Table-2 indicates that not only per farm leased–in area but also the leased-out area varied directly with the size of farm. The reason is obvious that potato growers have tried to increase their operational holding for commercial production of potato for more income as well as to take full advantage of their available resources. Few farmers due to any reason were unable to cultivate all land so they leased-out a part of their owned land.

1.2. Structure of Costs and Returns

1.2.1. **Per hectare operation wise cost of cultivation**

Table 3 shows that overall, per hectare operation-wise total cost came to about Rs. 46623, being Rs.47518.64, Rs. 45032.95 andRs. 46995.23 on small, medium andlarge farms, respectively. The average cost of preparatory tillage accounted for nearly 13 per cent of the total operational cost. Small farmers mainly depend on hired tractors for preparation of land for potato and due to the limited supply and peak season they have to pay more, therefore per hectare cost incurred on preparatory tillage was found to be highest on small farms which varied inversely with the size of farm. The expenditure incurred on sowing by small, medium and large potato growers was about Rs. 22802, Rs.21124 and Rs.25513 per hectare, respectively. The difference in the expenses on sowing in different farm size groups is attributed to the quantity and quality of the seed material. Most of the large farmers use quality seed which is costlier than the local or home-produced seed while on the other side the small farmers use comparatively cheaper seed

and apply in more quantity per hectare as compared to medium and large farmers. The per hectare cost of manuring and fertilization decreases as the size of farm increases. This is mainly influenced by more use of fertilizers by the small farmers without estimating the actual requirement and due to large area, many of the medium and large farmers do not use organic manure. Overall expenses on the irrigation were about 8 percentof total per hectare operational cost, which was almost the same in case of all the farm size groups. Potato crop is very sensitive towards diseases and climate hence plant protection is a very important operation which requires sincere attention of the farmers and occupied 1.02 percent of the per hectare operational cost. Large farmers were using more chemicals for plant protection, that's why spent more on this operation i.e. 1.37 per cent of the total operational cost. Among all the operations, digging of potato is also an important operation, shared about one tenth of the total operational cost. Quantum of the production has direct bearing on the expenditure on digging consequently per hectare cost of digging varied directly with the farm size.

1.2.2. **Per hectare Item wise cost of potato cultivation**

It is quite apparent from the table that the overall average cost of cultivation per hectare (Cost C_2) of potato was about Rs. 71403 out of which nearly 67 per cent was in the form of variable and rest 33 per cent was by way of fixed cost. Major components of variable cost of potato cultivation are seed, machine labour and fertilizer & manure and which were Rs 21250, Rs 12011.66 and Rs 6583.06 respectively while in fixed cost items, important components are rental value of own land and rent paid for leased-in land, amounting Rs. 8149.79 and Rs.10781.86, respectively. Per hectare cost of cultivation of potato varied in different size groups of farms, it was about Rs.71249, Rs. 67403and Rs. 74664 on small, medium and large farms, respectively. The difference, though is not of very high extent, is on account of small variation in cost of seed, machine labour, value of fertilizers and manure added and rental value of owned and leased-in land.

1.2.3. **Cost Concept-wise Cost of Cultivation of Potato**

Comparative cost under different cost concepts per hectare of Potato cultivation on different farm size groups of sample farmers is depicted in Table 5. The overall per hectare total cost (C_3) of potato came to about Rs. 72117which was estimated to be about Rs. 71961, Rs.68077 and Rs. 75411 on small, medium and large farm size groups respectively.

The production of potato was the highest on large farms *i.e.*271.25 qt./ha. followed by small (268.79qt./ha.) and medium (261.68qt./ha.) farms (Table 6) andthe per hectare gross income from potato varied directly with the size of farm. Large farmers received good price of their product, so that, per hectare gross income, farm business income, family labour income and ultimately net income were the highest on large farms and varied directly with the farm size. Overall output/input ratio was 2.74, being 2.61, 2.82 and 2.78 on small, medium and large farms respectively. Thus, it can be concluded that with the investment of one rupee in potato cultivation, small, medium and large farmers earnedRs.2.74, Rs.2.61 and Rs.2.78, respectively[5,6].

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

Farm size groups	Sample size	Total cultivated area (ha.)	Average size of holding (ha.)
Small (< 2 ha.)	102	112.55 (42.54)	1.10
Medium (2-4 ha.)	33	101.02 (38.18)	3.06
Large (>4 ha.)	09	51.01(19.28)	5.67
Total	144	264.58 (100.00)	1.84

(Figures in italics indicate percentage)

Table 2 Per farm operational holding on Different Categories of Farm Size

Farm size groups	Area Owned (ha.)	Leased-in (ha.)	Leased-out (ha.)	Total operational area (ha.)
Small (< 2 ha.)	1.10	1.18	0.09	2.20
Medium (2-4 ha.)	3.06	2.70	0.20	5.57
Large (>4 ha.)	5.67	18.63	0.33	23.97
Overall	1.84	2.62	0.13	4.33

(Figures in italics indicate percentage)

Table 3 Per hectare operation wise cost of potato cultivation

Operations	Small	Medium	Large	Overall
Area (ha)	1.88	5.15	23.06	3.95
Green Manuring	331.13 (0.70)	222.89 (0.49)	192.83 (0.41)	248.59 (0.53)
Preparatory tillage	6885.17 (14.49)	6500.80 (14.44)	5426.13 (11.55)	6243.41 (13.39)
Seed treatment	1054.09 (2.22)	973.61 (2.16)	675.77 (1.44)	892.84 (1.92)
Sowing	22802.25 (47.99)	21123.57 (46.91)	25513.30 (54.29)	23307.91 (49.99)
Manuring/Fertilizer	7815.06 (16.45)	7153.93 (15.89)	5797.48 (12.34)	6887.54 (14.77)
Irrigation	3685.32 (7.76)	3737.69 (8.30)	3548.71 (7.55)	3654.04 (7.84)
Interculture	97.15 (0.20)	45.19 (0.10)	109.86 (0.23)	86.34 (0.19)
Plant Protection	381.80 (0.80)	341.13 (0.76)	674.04 (1.43)	476.58 (1.02)
Digging	4466.68 (9.40)	4934.16 (10.96)	5057.10 (10.76)	4825.32 (10.35)
Total operational cost	47518.64 (100.00)	45032.95 (100.00)	46995.23 (100.00)	46622.56 (100.00)

(Figures in parentheses indicate percentage to total)

Table 4 Per hectare Item wise cost of potato cultivation

Items of Cost	Small	Medium	Large	Overall
Area (ha.)	**1.88**	**5.15**	**23.06**	**3.95**
Family labour	1483.10 (2.08)	999.41 (1.48)	542.93 (0.73)	996.71 (1.40)
Hired labour	5110.93 (7.17)	5490.73 (8.15)	5396.07 (7.23)	5332.49 (7.47)
Machine labour	12386.66 (17.39)	12320.12 (18.28)	11386.53 (15.25)	12011.66 (16.82)
Seed	20744.68 (29.12)	19029.13 (28.23)	23489.45 (31.46)	21250.00 (29.76)
Fertilizer & manure	7410.01 (10.40)	6831.42 (10.14)	5601.33 (7.50)	6583.06 (9.22)
Insecticide & pesticide	268.69 (0.38)	273.61 (0.41)	570.97 (0.76)	380.67 (0.53)
Miscellaneous	114.60 (0.16)	136.41 (0.20)	163.82 (0.22)	139.17 (0.19)
Interest on working cost	1422.12 (2.00)	1348.33 (2.00)	1409.62 (1.89)	1396.64 (1.96)
Total Variable Cost	48940.79 (68.69)	46429.16 (68.88)	48560.72 (65.04)	48090.39 (67.35)
Interest on fixed capital	3315.51 (4.65)	2763.03 (4.10)	1089.96 (1.46)	2341.02 (3.28)
Depreciation on fixed capital	2984.22 (4.19)	2191.77 (3.25)	991.86 (1.33)	2022.85 (2.83)
Rental value of land	9361.70 (13.14)	9506.80 (14.10)	5901.13 (7.90)	8149.79 (11.41)
Land revenue	8.11 (0.01)	19.54 (0.03)	22.14 (0.03)	16.65 (0.02)
Rent paid for leased-in land	6638.30 (9.32)	6493.20 (9.63)	18098.87 (24.24)	10781.86 (15.10)
Total Fixed Cost	22307.84 (31.31)	20974.34 (31.12)	26103.96 (34.96)	23312.16 (32.65)
Total Cost	71248.63 (100.00)	67403.50 (100.00)	74664.68 (100.00)	71402.55 (100.00)

(Figures in parentheses indicate percentage to total)

Table 5 Cost of cultivation as per the CACP approach (Rs. / ha.)

Cost concept	Small	Medium	Large	Overall
A_1	50450.02	47641.06	49031.79	49133.18
A_2	57088.32	54134.27	67130.66	59915.04
B_1	53765.53	50404.09	50121.75	51474.19
B_2	69765.53	66404.09	74121.75	70405.84
C_1	55248.63	51403.50	50664.68	52470.90
C_2	71248.63	67403.50	74664.68	71402.55
C_3	71961.12	68077.54	75411.33	72116.58

Table 6 Farm business analysis

Income concepts	Small	Medium	Large	Overall
Average yield (q/ha.)	268.79	261.68	271.25	267.78
Average price (Rs. /q)	699.44	733.16	774.11	737.31
Gross income (Rs. /ha.)	188001.13	191852.00	209975.98	197433.43
Farm Business Income (Rs. /ha.)	130912.81	137717.73	142845.32	137518.40
Family Labour Income (Rs. /ha.)	118235.60	125447.91	135854.23	127027.59
Net Income (Rs. /ha.)	116040.01	123774.46	134564.65	125316.86
Cost of production (Rs. /q)	267.72	260.16	278.01	269.32
Output-input ratio	2.61	2.82	2.78	2.74

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