



**Research Paper**

# Economics of production of *Rabi* potato in Pune district

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**ABSTRACT :** Potato (*Solanum tuberosum* L.) is most widely used and universal vegetable of India. The study was conducted in Pune district. Total four villages and thirty farmers from each village *i.e.*, total 120 farmers were selected randomly as sample size. Data used were pertaining to the period 2012-2013. Economic analysis of data indicated that, at the overall level the per hectare use of human labour and manure were 55.34 man days and 10.69 cartloads, respectively. The per hectare use of bullock labour and fertilizers was 5.27 pair days and 414.50 kg at the overall level. Economic analysis of data indicated that, Cost 'C' was found to Rs. 61,274.33 and Net returns over cost 'C' was Rs. 55,072.33 and input-output ratio at cost 'C' was 1:1.89 at the overall level.

**KEY WORDS :** Root vegetable, Potato, Cost of cultivation, Economics of production

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## INTRODUCTION :

Potato belongs to the family Solanaceae, Genus *Solanum* and Species *Tuberosum*. Potato (*Solanum tuberosum* L.) is one of the important tuber crops in India. Potato popularly known as 'The king of vegetables'. Nutrient content in potato protein 1.6 per cent, vitamin C 17 mg/100 g, potassium 568 mg/100 g and solanin 5 mg/100 g. If solanin is greater than 20 mg/100 g, it is unfit for consumption. India is the fourth largest potato producing countries in the world which include erstwhile USSR, China, Poland and USA. In India, potato is being grown on about 87.76 lakh hectares of land. Uttar Pradesh, West Bengal and Bihar are the largest producers and account for nearly 75 per cent of area and 82 per cent of production. Uttar Pradesh has highest area under potato cultivation *i.e.*, 5.68 lakh hectares with 141.26 lakh MT followed by West Bengal with 3.77 lakh hectares area and production of 96.93 lakh MT. The per hectare productivity of potato

is observed to be the highest in Gujarat (29.68 MT/hectare) followed by West Bengal with 25.72 MT/hectare. In Maharashtra state, Potato is one of the major cash crops, grown in Pune and Satara districts and account for 87 per cent of area and 72 per cent of production. Total area under potato in Maharashtra was 0.18 lakh hectares, with production 3.60 lakh MT. In Maharashtra, Pune has an area of about 9649 hectare of land under potato with production of 1.72 lakh MT production followed by Satara district with 4805 hectares area and production of 0.49 lakh MT. In Pune district potato crop is extensively grown in Ambegaon and Khed tahsils as the principal cash crop. Area under potato in Ambegaon tahsil is 1969 ha (20.40 %) and Khed tahsil 1500 ha (15.54 %).

## Objectives :

- To estimate resource use structure of *Rabi* potato
- To estimate cost of cultivation of *Rabi* Potato

## MATERIALS AND METHODS :

### Sources of data :

#### Primary data :

The primary source of data for the present study was the selected sample potato growers. The data for production were obtained through survey method from the potato grower in Ambegaon and Khed (Rajgurunagar) tahsils of Pune district for the year 2012-2013.

#### Selection of the district :

Pune district is the leading district for growing potatoes in Maharashtra. Pune district was selected purposively as highest area under potato crop.

#### Selection of the tahsils :

Ambegaon and Khed tahsils were selected purposively for this study because these tahsils have maximum area under potato crop in Pune district.

#### Selection of the villages :

Two villages viz., Avasari (BK) and Pimpalgaon from Ambegaon tahsil and two villages viz., Saygaon and Kadus from Khed tahsil were selected randomly.

#### Cost concept :

- Cost 'A' : It included the expenditure on seed manures and fertilizers hired human labour, bullock labour, land revenues, irrigation charges, machinery charges, interest on working capital and depreciation on farm implements.

- Cost 'B' : Cost A + rental value of owned land + interest on owned fixed capital (excluding land)
- Cost - Cost B + Imputed value of family labour

## RESULTS AND DATA ANALYSIS :

The findings of the present study as well as relevant discussion have been presented under following heads :

### Resource use structure in the potato cultivation :

The information on per hectare utilization of different resources in cultivation of *Rabi* potato by sample farms in presented in Table 1.

From the Table 1 it is revealed that, at the overall level the per hectare use of human labour and manure were 55.34 man days and 10.69 cartloads, respectively and these were higher in small and large size groups, respectively at 59.44 man days and 10.96 cartloads. The per hectare use of bullock labour and fertilizers was 5.27 pair days and 414.50 kg at the overall level and the use was highest in large size group at 5.93 pair days and 432.78 kg, respectively. The use of tubers, machine labour and plant protection charges showed increasing trend with an increase in size group of holding. Among the different size groups, these were highest in large size groups at 1506.24 kg, 7.24 hours and Rs.2147.58, respectively and the same were 1480.55 kg, 7.06 hours and Rs. 2053.39, respectively at the overall level.

At the overall level, the use of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O was 151.89 kg, 121.83 kg and 140.78 kg per hectare *i.e.*, farmer were using more N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O than the recommended

**Table 1 : Per hectare resource use for *Rabi* potato on sample farms**

Sr. No.	Particulars	Size groups of holding			Overall
		Small	Medium	Large	
1.	Total human labour (hired+family) (mandays)	59.44	52.96	53.62	55.34
	Male	22.63	21.28	21.04	21.65
	Female	36.81	31.68	32.58	33.69
2.	Bullock labour (pair days)	4.41	5.47	5.93	5.27
3.	Machine labour (hrs)	6.92	7.02	7.24	7.06
4.	Tubers (seeds)(kg)	1465.23	1473.19	1506.24	1480.55
5.	Manures (CL)	10.42	10.69	10.96	10.69
6.	Fertilizers (kg)				
	Nitrogen (kg)	144.17	150.12	161.38	151.89
	Phosphorus (kg)	118.15	122.23	125.12	121.83
	Potassium (kg)	136.01	140.06	146.28	140.78
	Total (kg)	398.33	412.41	432.78	414.50
7.	Irrigation charges (Rs.)	1228.1	1324.02	1434.46	1328.93
8.	Plant protection charges (Rs.)	1996.48	2016.13	2147.58	2053.39

Table 2 : Per hectare cost of cultivation of <i>Rabi</i> potato		Size groups of holdings			(Rs.)
Sr. No.	Particulars	Size groups of holdings			Overall
		Small	Medium	Large	
1.	Hired human labour (days)				
	Male	1767.58 (3.12)	1814.26 (3.20)	1925.49 (3.35)	1835.77 (3.22)
	Female	2189.20 (3.86)	1902.60 (3.36)	1984.17 (3.45)	2025.32 (3.56)
2.	Bullock labour	1623.84 (2.87)	1640.14 (2.90)	1778.54 (3.09)	1680.84 (2.95)
3.	Machine labour	3118.33 (5.50)	3160.12 (5.58)	3261.02 (5.67)	3179.82 (5.58)
4.	Tubers	10235.64 (18.07)	10312.38 (18.21)	10543.73 (18.33)	10363.91 (18.20)
5.	Manures	3126.83 (5.52)	3209.11 (5.67)	3288.81 (5.72)	3208.25 (5.63)
6.	Fertilizers N	2987.495 (5.27)	3003.11 (5.30)	3088.35 (5.37)	3026.32 (5.31)
	P	1344.37 (2.37)	1351.40 (2.38)	1389.75 (2.41)	1361.84 (2.39)
	K	1643.12 (2.90)	1651.71 (2.91)	1698.59 (2.95)	1664.47 (2.92)
	Total fertilizer	5974.99 (10.55)	6006.23 (10.61)	6176.70 (10.74)	6052.64 (10.63)
7.	Irrigation	1228.31 (2.17)	1324.02 (2.34)	1434.46 (2.49)	1328.93 (2.33)
8.	Plant protection	1996.48 (3.52)	2016.13 (3.56)	2147.58 (3.73)	2053.39 (3.61)
9.	Repairs and incidental charges	528.15 (0.93)	532.14 (0.94)	568.35 (0.99)	542.88 (0.95)
	Working capital (1 to 9)	31789.35 (56.12)	31917.13 (56.36)	33108.85 (57.56)	32271.75 (56.68)
10.	Interest on working capital @ 6 % per annum.	953.68 (0.96)	957.51 (0.97)	993.24 (1.01)	968.14 (0.98)
11.	Depreciation	3501.76 (6.18)	3563.62 (6.29)	3239.46 (5.63)	3434.94 (6.03)
12.	Land revenue and other cesses	272.35 (0.48)	296.96 (0.52)	215.96 (0.38)	261.75 (0.46)
	Cost A	36517.14 (64.74)	36735.22 (65.15)	37557.51 (65.58)	36936.62 (65.16)
13.	Rental value of land	19114.31 (27.33)	18663.04 (26.73)	19610.70 (26.03)	19129.35 (26.69)
14.	Interest on fixed capital @ 10 %	3041.23 (5.37)	3468.36 (6.12)	3878.02 (6.74)	3462.54 (6.08)
	Cost B	58672.68 (96.44)	58866.62 (97.00)	61046.23 (97.35)	59528.51 (96.93)
15.	Family labour				
	Male	1628.70 (2.88)	1379.52 (2.44)	1226.79 (2.13)	1411.67 (2.48)
	Female	388.58 (0.69)	316.25 (0.56)	297.63 (0.52)	334.15 (0.59)
	Cost C	60689.96 (100.00)	60562.39 (100.00)	62570.65 (100.00)	61274.33 (100.00)
16.	Production (qts.)	145.4	142.2	148.7	145.4333
17.	Gross returns (Rs.)	116320	113760	118960	116346.7
18.	Per quintal cost of cultivation (Rs.)	417.4	425.89	420.78	421.35

Figures in the parentheses indicate percentages to the respective total cost

Table 3 : Costs, returns and net profitability of <i>Rabi</i> potato		Size group of holding			(Rs./ha)
Sr. No	Particulars	Size group of holding			Overall
		Small	Medium	Large	
1.	Production (Qtls.)	145.4	142.2	148.7	145.43
2.	Gross income	116320	113760	118960	116346
3.	Total cost				
	Cost A	36517.14	36735.22	37557.51	36936.62
	Cost B	58672.68	58866.62	61046.23	59528.51
	Cost C	60689.96	60562.39	62570.65	61274.33
4.	Income				
	FBI	79802.86	77024.78	81402.49	79410.04
	FLI	57647.32	54893.38	57913.77	56818.15
	NI	55630.04	53197.61	56389.35	55072.33
5.	Cost of cultivation /kg	4.17	4.25	4.20	4.20
6.	Average price per kg received	8.02	8.04	8.06	8.04
7.	B:C ratio	1.91	1.87	1.90	1.89

dose of 150 kg N, 60 kg P<sub>2</sub>O<sub>5</sub> and 120 kg K<sub>2</sub>O.

It is concluded that, the per hectare resource use of *Rabi* Potato decreases with increase the size of groups of land holdings. It also concluded that, the *Rabi* Potato cultivators used more fertilizer dose (152:122:141) than recommended dose (100:60:120).

#### Per hectare cost of cultivation of *Rabi* potato :

The per hectare cost of cultivation of *Rabi* potato was worked out by using standard cost concepts normally used in farm management studies. The information on item wise cost of cultivation of potato for different size groups of holding is presented in Table 2.

It can be seen that, at overall level, the per ha cost 'A', Cost 'B' and cost 'C' was Rs. 36936.62, 59528.51, and 61274.33, respectively. The contribution in Cost A on Tubers was 18.20 per cent, fertilizers 10.63 per cent, manures 5.63 per cent plant protection charges 3.61 per cent were major items of expenditure. At the overall level share of cost 'A', cost 'B' to total cost was 65.16 and 96.13 per cent, respectively. The share of cost 'A' ranged 64.74 per cent in small, to 65.15 per cent in medium and 65.58 in large size groups. The major input tuber was 18.07 per cent in small to 18.21 per cent in medium and 18.33 per cent in large size groups. Fertilizers was 10.74 per cent in large to 10.61 per cent in medium 10.55 per cent in small size group. Manure was 5.52 per cent in small to 5.67 per cent in medium and 5.72 per cent in large size group. Plant protection charges 3.52 per cent small to 3.56 per cent in medium and 3.73 per cent in large size groups.

Among different size group, the per hectare total cost of cultivation for *Rabi* potato was higher in large (Rs. 62570.65) than small size group (Rs. 60689.96) and then medium size group (Rs. 60562.39). It was mainly due to amongst the different items of cost such as the rental value of land, tubers charges, fertilizers and manners resources.

It is clearly indicated that, the per hectare cost of cultivation near about same in all size groups except medium size groups. The per hectare cost of cultivation of medium size increased due to the land production.

#### Costs, returns and profitability of *Rabi* potato :

An attempt has been made to compare the per hectare yield, cost of production, gross returns and net profit in *Rabi* potato cultivation in different size groups of holdings. The details in this respect are given in Table 3.

It is noted from the Table 3 that, the per hectare total yield obtained from potato at the overall level was 14543 kg. Among the different size group of holdings, the yield was 14540 kg, 14220 kg and 14870 kg in small, medium and large size group of holdings, respectively. The gross income received from potato was 116346.7 at the overall while in small, medium and large size group of holdings, it was Rs. 116320, Rs. 113760 and Rs. 118960, respectively.

The per hectare total cost *i.e.*, cost C was the highest in large size group of holdings, followed by small and medium size group of holdings while the same was Rs. 61570.65 at the overall level. The B:C ratio which indicates the profitability of investment was observed to be 1.89 at the overall level. At the cost C the B: C ratio was greater than unity indicating that the cultivation of potato was profitable when both direct and indirect costs were taken into account Ghulghule *et al.* (2009).

Among the size group of holding, the B:C ratio at cost C was the highest in small size group (1.91) compared to medium (1.87) and large (1.90) size group of holdings.

This indicates that the cultivation of potato was more profitable in small size group of holdings than of that medium and large size group of holdings.

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