

Economics and Constraint of Potato crop in Kohima District of Nagaland

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Abstract

A study on economics and major constraints in potato production in Kohima district of Nagaland was conducted during 2012-13. The study covered six villages from two blocks of Kohima district and data on constraints and cost-return aspects of potato cultivation were collected from 60 respondents. The total cost of potato production per hectare on overall farm was found to be Rs. 19367.67, whereas the average family labour income was Rs. 38,764.18 and the average net income per hectare of potato production was Rs. 30,045.13 per hectare. The overall benefit-cost ratio was worked out to be 2.92: 1. The main constraints were inadequate transport facilities, non-availability of market locality, low marketable surplus, absence of market information, lack of organization among producers, problems of storage etc; during the production of potato crop in the study area.

Key words: Costs, returns, cost-concept, constraints, potato.

Introduction

Potato (*Solanum tuberosum* L.) is one of the major starch tuber vegetable crops of the world. It is a wholesome food and consumed by all sections of the people. More than one billion people consume potatoes worldwide and potatoes are a part of the diet of half a billion people in the developing nation. Potato is a nutritious food. It contains practically all the essential dietary constituents. Apart from starch, of which it is a rich source, it provides essential body building substances such as vitamins, minerals and proteins. Potato provides rich source of calories needed to maintain day to day output of human energy. Potatoes have a great potential to meet the increasing food requirements. Potato protein is comparable to egg and milk protein and is superior to other vegetables, cereals and pulse proteins in its nutritional value. Being income

Material and Methods

A sample of 60 potato grower was selected by following the multi-stage random sampling technique. In the first stage, two

generating crop, times its production is affected due to many constraints faced by the farmers^[1, 5].

In India, the Central Potato Research Institute (CPRI) is mainly responsible for basic seed production. Presently it produces about 2,500 tonnes of breeder (basic) seed and supplies 2,000 tonnes to the state Departments of Agriculture / Horticulture, the National Seed Corporation and state Seed Corporations (Singh *et. al.* 2000). These organizations multiply breeder seed further to produce foundation seed and certify and provide it to farmers. The seed produced through the formal system is not able to meet the demand of the large numbers of farmers far from seed-producing zones such the North East region of India.

development blocks of Kohima district viz; Jotsoma and Konoma were selected by purposively sampling methods, being highest

production and productivity in the state. Further in the second stage, three villages from each block were selected randomly. Then in the final stage a list of farmers of these villages were prepared separately from each village and further arranged in the ascending order, then ten farmers from each village were selected by following the stratified random sampling method from the list and it was

further classified into three sub-groups viz; group I (0.01 - 1.00 ha) with 40 farmers, group II (1.01 - 3.00 ha) with 18 farmers and group III (3.01 ha and above) with 2 farmers, respectively, based on the area under potato cultivation / land holding of the respondents. The distribution of total respondents according to size classes of holding in various villages under potato cultivation is presented in table 1.

Table 1 Numbers of selected respondents on the basis of land holdings (ha)

Class (ha)	Frequency (f)	\sqrt{f}	Cum \sqrt{f}	Group	No of selected samples farmers
0.00 - 1.00	80	6.32	6.32	I	40
1.01 - 3.00	36	4.80	11.12	II	18
3.01 & above	4	1.41	12.53	III	2
Total	120	12.53	29.97	Overall	60

The data on cost-returns aspects of potato cultivation were collected through pre-structured questionnaires. The data were collected during the year 2012-13 for the present study and was subjected to economic analysis. The cost-concept approach to farm

costing is widely used in India (Raju and Rao, 1990). These cost concepts includes: Cost A₁, Cost A₂, Cost B₁, Cost B₂, Cost C₁, Cost C₂ and Cost C₃. Various costs have been worked out by applying following methods:

Cost A₁ = All actual expenses in cash and kind incurred in production.

Cost B₁ = Cost A₁ + interest value on fixed capital assets.

Cost C₁ = Cost B₁ + imputed value of family labour.

Cost C₃ = Cost C₁ + 10 per cent of Cost C₁ on account of risk and managerial functions performed by the potato growers.

Results and Discussions

Potato was sown from mid February to March in the study area. The cost of production includes the cost of inputs viz; seeds, human labour, marketing and transportation cost, interest on working capital, rental value of land at the prevailing rate in the study area, depreciation on implements and interest value on owned fixed assets. The estimate of per hectare total cost of potato production on sample farmers is presented in table 3.

Table 2 reveals that the average per hectare total cost of potato production was Rs 19,367.67, amongst all the inputs items, the cost of seed constituted the highest being

24.91 per cent followed by marketing cost 20.68 per cent, hired human labour 15.86, rental value of land 14.25, family labour 13.01 per cent, transportation 7.16 per cent, interest on working 3.26 per cent, interest on fixed cost and depreciation of implements 0.44 per cent and 0.41 per cent respectively. While the share of variable cost was 84.89 per cent and the fixed cost was 15.11 per cent from the total cost. The share of cost among the various items within the farm size groups in variable and fixed cost were found to be almost similar with the average farm situation except in haired human labour which was found high in large group with 18.73 per cent.

Further table 2 reveals that the per hectare cost of potato production was Rs 19,198.04, Rs 18,992.37 and Rs 19,912.90 respectively for small, medium and large group with an average of Rs 19,367.76 in the sample group of farmers. The share of human labour was highest (28.86 per cent) in total variable cost and the share of rental value of owned land (14.25) was the major of fixed cost in the study area.

Table 3 reveals the cost and return of potato production the cost concept of Cost A₁,

Cost B₁ Cost C₁ and Cost C₂ were used in the present study. The per hectare Cost A₁ which includes all the cash expenses in production of potato ranges from Rs. 13,780.31 in group I to Rs. 14,671.13 in group III. Cost A₁ for group II farmers was Rs. 13,553.47 with an average of Rs 14,001.64. The cost of cultivation shows an increasing trend with an increase in farm size which is mainly due to increase in labour and seeds with the increase in sizes. The per hectare Cost B₁

Table 2 Per hectare cost of potato production across size group (in Rs)

S. N.	Particulars		Group I	Group II	Group III	Overall
A.	Variable cost:					
	1	Human Labour	2634.49	2552.54	2375.80	2520.93
		i) Family labour	(13.72)	(13.44)	(11.93)	(13.01)
		ii) Hired labour	2359.18	3124.89	3730.48	3071.50
			(12.29)	(16.45)	(18.73)	(15.86)
	2	Marketing cost	4555.50	3787.18	3671.52	2343.74
			(23.72)	(19.94)	(18.44)	(20.68)
	3	Transportation	1483.84	1295.6	1385.20	1388.21
			(7.73)	(6.82)	(6.95)	(7.16)
	4	Seed	4678.50	4650.70	5145.20	4824.98
			(24.37)	(24.49)	(25.84)	(24.91)
	5	Interest on working capital	628.46	616.44	652.35	565.97
			(3.27)	(3.24)	(3.28)	(3.26)
	6	Total variable cost	16339.97	16027.35	16961.10	14715.37
			(85.11)	(84.39)	(85.18)	(84.89)
B.	Fixed cost:					
	1	Rental value of owned land	2700	2800	2780	2760
			(14.06)	(14.74)	(13.96)	(14.25)
	2	Depreciation on implements	74.83	78.66	85.83	79.77
			(0.34)	(0.41)	(0.43)	(0.41)
	3	Interest on fixed capital excl. land	83.24	86.36	85.97	85.19
			(0.43)	(0.45)	(0.43)	(0.44)
	4	Total fixed cost	2858.07	2965.02	2951.80	2924.96
			(14.89)	(15.61)	(14.82)	(15.11)
C.		Total cost (A + B)	19198.04	18992.37	19912.90	19367.67
			(100.00)	(100.00)	(100.00)	(100.00)

(The figure in the parentheses indicates percentage in total)

Table 3 Per hectare yield, cost and return of potato production across size group (in Rs)

Particulars	Small	Medium	Large	Overall
Average yield (quintals / hectare)	60.74	58.61	56.82	58.72
Average price (per quintal)	900	900	900	900
Gross income per hectare	54666	52749	51138	52851
Cost of production per hectare	19198.04	18992.37	19912.90	19367.67
Cost A ₁	13780.31	13553.47	14671.13	14001.64
Cost B ₁	13863.55	13639.83	14757.10	14086.83
Cost C ₁	16498.04	16192.37	17132.90	16607.77
Cost C ₂	1649.80	1619.23	1713.29	1660.77
Income per hectare (Rs)	35467.96	33756.63	31225.10	33483.33
Net return over cost A ₁	40885.69	39195.53	36466.87	38849.37
Net return over cost B ₁	40802.45	39109.17	36380.90	38764.18
Net return over Cost C ₁	38167.96	36556.63	34005.10	36243.23
Net return over cost C ₂	36518.16	34937.39	32291.81	34582.46
Family labour income	40802.45	39109.17	36380.90	38764.18
Return from management	53016.2	51129.76	49424.71	51190.23
BCR based on management	3.35	3.29	3.01	3.21
BCR based on total cost	3.01	2.96	2.67	2.92

With the inclusion of interest value of own capital assists was found to be highest in group III (Rs. 14,757.10) and lowest in group II (Rs. 13,639.83). Cost B₁ for group I was Rs. 13,863.55 and the average Cost B₁ was Rs. 14,086.83. Thus Cost A₁ and Cost B₁ showed a direct relationship^[4, 5] with size group of farmers. It is because large group of farmers employed more number of hired human Labour and less family Labour in cultivation of potato. Per hectare Cost C₁ was worked out by including the imputed value of family labour to Cost B₁. The Cost C₁ was Rs. 16,498.04, Rs. 16,192.37 and Rs. 17,132.90 for small, medium and large group of farmers and the average was found to be Rs. 16,607.77 in the study area. Cost C₂ was worked by taking 10 per cent of the total cost on account of managerial function performed by potato farmers. The Cost C₂ was Rs. 1,649.80, Rs. 1,619.23 and Rs. 1,713.29 for small, medium and large group with an average of Rs. 1,660.77 per hectare, respectively.

The average yield of potato per hectare was found to 60.74 q, 58.61 q and 56.32 q for small, medium and large group of

farmers respectively. Considering the prevailing price of potato in the study area which is Rs. 900.00 per q, the gross income was found to be Rs. 54,666, Rs. 52,749 and Rs. 51,138 for small, medium and large group respectively with an average yield in the study area was 58.72 q with an average gross income of Rs. 52,851. Study reveals that per hectare gross income showed a decreasing trend with an increase in farm size groups.

The family labour income was calculated by deducting Cost B₁ from gross income. The family income per hectare was Rs. 40,802.45, Rs. 39,109.17 and Rs. 36,380.90 for small, medium and large group of farmers respectively. The average family labour income was Rs. 38,764.18 per hectare. It was observed that the family labour income was highest in small group (Rs. 40,802.45) and lowest in large group (Rs. 36,380.90) in the study area. This showed that small group of farmers utilized more labour than hired labour during the cultivation of potato crop in the study area.

The average net return over cost C₂ from potato cultivation was Rs. 34,582.46.

The Net return per hectare was highest (Rs. 36,518.16) in small group and lowest (Rs. 32,291.81) in large group, while the net return was Rs. 34,937.39 for medium group of farmer. Also study reveals that the net income decrease with the increase in farm size, this is because the farmers could not manage properly on large size farm group. The average per hectare return from management was Rs. 51,190.23. It was highest (Rs. 53,016.20) on small group and lowest (Rs. 49,424.70) on large group of farmers. The return from management for medium group of farmers was Rs. 51,129.76, respectively^[3].

The benefit cost ratio over variable cost per hectare from potato cultivation was found to be 3.34, 3.29 and 3.01 with an average of 3.21 for small, medium and large farm size groups. The benefit cost ratio over variable cost was highest (3.34) on small group and lowest (3.01) on large size group. The benefit-cost ratio based on total cost was highest (3.01) on group I and lowest (2.67) on group III. The benefit-cost ratio for group II was 2.96 and the average for the sample group of farmers in the study area was 2.92^[6].

Table 4 Problems of potato production in Kohima district of Nagaland

S. N.	Constraints	Frequency	Percentage	Rank
1	Non availability of seed on time and lack of seeds	52	86.66	I
2	Lack of knowledge about plant protection measures	43	71.66	II
3	Lack of technical knowledge of recommended packages and practices	37	61.66	III
4	Non availability of credit facilities	36	60.00	IV
5	Non availability of fertilizers and lack of knowledge about its application / recommended doses	35	58.33	V
6	Production instability	34	56.67	VI
7	High labour cost	26	43.33	VII
8	Lack of training and demonstration	21	31.66	VIII

The main problems (Table 4) faced by the respondents viz; non-availability of seed on time and lack of seeds (86.66 per cent), lack of knowledge about plant protection measures (71.66 per cent), lack of technical knowledge of recommended package and practices (61.66 per cent), non-availability of credit facilities (60.00 per cent), non-availability of fertilizer and lack of knowledge

about its application / recommended doses (58.33 per cent), production instability (56.67 per cent), high labour cost (43.33 per cent), lack of training and demonstration (31.66 per cent) were some of the problems faced by the sample farmers in the area. The intensity of those problems was higher in lower farm size groups.

Table 5 Constraints in marketing of potato in Kohima District of Nagaland

S. N.	Constraints	Frequency	Percentage	Rank
1	Lack of proper domestic markets and poor market facilities	53	88.33	I
2	Lack of storage facilities	38	63.33	II
3	Inadequate transportation facilities	34	56.67	III
4	Absence of market information	31	51.67	IV
5	Low marketable surplus	27	45.00	V
6	Lack of suitable Government policy	26	43.33	VI
7	Price Uncertainty	25	38.33	VII
8	Lack of organization among producers	21	35.00	VIII

Table 5 reveals that the main constraints during the marketing viz; lack of proper domestic markets and poor market facilities (88.33 per cent), lack of storage facilities (63.33 per cent), inadequate transportation facilities (56.67 per cent), absence of market information (51.67 per cent), low marketable surplus (45.00 per cent),

Conclusion

It may be concluded that human labour (hired and family human labour) constituted major costs in the total variable costs. Since the average benefit-cost ratio was 2.92, potato cultivation is economical in the study area. Lack of marketing problems, lack of finance and capital, transport facilities and transport cost, cost of packing materials and packing materials, lack of own funds, lack / price of fertilizers, sorting and grading, lack of scientific knowledge, harvesting and lack of insect and pesticides, harvesting, government

lack of suitable Government policy (43.33 per cent), price uncertainty (38.33 per cent) and lack of organization among producers (88.33 per cent), respectively faced by the respondents in the study area. The intensity of those constraints was higher in lower farm size groups.

support, seed cost, training, middleman, price of insecticides and pesticides, lack of cost of fertilizers, disease and pests, production and lack of seed supply / availability are some of the constraints faced by the respondents in the study area. The intensity of those problems was higher in lower farm size groups. Management of above problems certainly is helpful in enhancing the yield levels and will result in increasing the income of the potato growers in the district of Kohima of Nagaland.

References

1. Nirmala B. and Muthuraman P. (2009). Economics and Constraint Analysis of Rice Cultivation in Kaithal district of Haryana. *Indian Research Journal of Extension Education*. **9**. (1): 47-49.
2. Johl, S. S. and Dhaiya, P. S. (1999). Potato Marketing with Special Reference to Storage and Processing in the World. Abstracts, Global conference on potato, New Delhi: 51-53.
3. Nirmal Chandra (2006). Economics of wheat production in the farmers fields in Uttaranchal. *Indian Research Journal of Extension Education*. **6**. (3): 44-46.
4. Raju V. T. and Rao D. V. S. (1990). Economics of Farm Production and Management. Oxford and IBH Publishing Company Private Limited, New Delhi.
5. Sharma, Amod (2012). Economic and Constraints of King Chilli Growers in Dimapur District of Nagaland. *Journal of Interacademia*. **15**. (4): 710-719.
6. Shekhawat, G. S; Grewal, J. S. and Verma, S. C. (1992). Potato in India. Central Potato Research Institute, Shimla. **1**: 1-3.
7. Singh, P. K., Kakadia, B. H. and Patel, V. M. (1993). Marketing Potato in a Major Potato Producing Area of Gujrat. *Indian Journal of Agricultural Marketing*. **7**. (2): 179-185.
8. Venyo, Vengoto. (2013). Production and Marketing of Potato Crop in Kohima District of Nagaland. A M. Sc. (Ag.) (Unpublished) thesis work submitted to Department of Agricultural Economics, SASRD, Nagaland University, Medziphema: Campus, Nagaland.