

Full Length Research Paper

Study on economics of potato growing towards livelihood security

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Potato plays a very significant role in the agricultural economy. It is economically significant not only for its contribution to the livelihood of thousands of farmers and for its dominance in the agricultural consumption basket of the households but also for its growing linkages to fast growing potato processing industry. The present study was conducted in purposively selected sub-divisions of Marh, R.S. Pura, Dayalchak and Samba in three districts of Jammu division, namely Jammu, Kathua and Samba. These are the main potato growing districts in Jammu division. Fifteen villages were selected from the selected sub-divisions by proportionate allocation method based on the maximum area under potato crop. From each selected village, 15 potato growers were selected making a total sample size of 225 potato growers. The potato growing is an income generating venture and in order to earn their livelihood, farmers have adopted commercial cultivation of potato. The study showed that majority of the farmers were literate with large size of family and small land holdings. The findings have revealed that the total average sale price of potato crop was Rs.549/quintal. Average gross income of potato crop was Rs. 142740.00/ha. In case of average expenditure of potato crop, it was clear from the data that average expenditure on potato crop was Rs. 82484.20/ha, whereas average net income from potato crop was Rs 60255.80/ha.

Key words: Potato, expenditure, income.

INTRODUCTION

Potato has significant share in the overall agricultural production in the country. At current prices, fruits and vegetables share close to 25% of agricultural production and within the fruit and vegetable segment, the share of potato was estimated to be around 8% during 1998 to 1999. At 1993 to 1994 prices, the value of potato is

estimated to be Rs. 4161 crore against total production of fruits and vegetables amounting to Rs. 57988 crore and value of overall agricultural output amounting to Rs. 2.38 lakh crore ((National Accounts Statistics, 2002, CSO). India produced 42.34 million tonnes from 1.86 million ha with an average yield of 22.72 tonnes/ha of Potato

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during 2010-2011 (Agricultural statistics at a glance, 2012). India is the second largest producer of potato in the world after China and both the countries put together contribute nearly one third of the global potato production (Scott and Suarez, 2012).

India in particular and Asia in general are showing rapid growth in potato production. Potato is highly remunerative crop of Jammu and Kashmir, particularly in high altitude and cold arid areas. In Jammu division it is a leading cash crop, and has highest area cover after rice, wheat and maize. During last five years, there has been 10% increase in area from 4845 ha in 2002-2003 to 5650 ha in 2008-2009. Similarly, the production has shot up by nine percent during the same period from 75485 to 89600 t, with overall average productivity of potatoes is 15.3 to 16.0 t/ha in Jammu division which is quite low when we compare to the leading states like Gujarat (Rana et al., 2011). A field of potatoes produces more energy per hectare per day than a field of any other crop. Potatoes grow well from sea level to 14,000 feet on a wider variety of soils, under a wider range of climatic conditions, than any other staple food. The potato crop matures faster that is, in 90 to 120 days, and will provide small but edible tubers in just 60 days. All in all, the potato is about the world's most efficient means of converting plant, land, water and labour into a palatable and nutritious food (Sahadevan, 2007). Instability of commodity prices has always been a major concern of the producers, processors, merchandisers as well as the consumers in an agriculture-dominated country like India. Farmers direct exposure to price fluctuations, for instance, makes it too risky for them to invest in otherwise profitable activities. There are various ways to cope with this problem. Apart from increasing the stability of the market by direct government intervention, various actors in the farm sector can better manage their activities in an environment of unstable prices through derivatives markets mainly futures and options on futures. These markets serve a risk-shifting function, and can be used to lock in prices in advance instead of relying on uncertain price developments in future. Apart from being a vehicle for risk transfer among hedgers and from hedgers to speculators, these markets also play a major role in price discovery (Combe, 1997). The present study was conducted to examine the cost structure and economics of production and marketing of potato crop in Jammu sub-tropics.

MATERIALS AND METHODS

The study was carried out in the sub-tropical zone of the Jammu division. Three districts namely Jammu, Kathua and Samba were selected purposively on the basis of maximum area under potato crop. Marh and R.S. Pura sub-divisions of Jammu district, Dayalachak sub-divisions of Kathua district and Samba sub-division of Samba district were selected purposively for having maximum area under potato crop. Seven villages from sub-division Marh, four villages from sub-division R.S. Pura, three villages from sub-

division, Dayalachak and one village from sub-division, Samba were selected purposively on the basis of proportionality of area under potato cultivation. The villages with highest area under potato crop in each of the four sub-divisions were selected for the present study. After the selection of villages, 15 respondents were selected from each village randomly, making a total sample size of 225 from overall 15 villages. To study the economics of potato crop, simple cost accounting method was followed. The price used in the analysis were the average for the crop harvesting period 2011 to 2012

RESULTS AND DISCUSSION

Socio-economic profile and resource structure of sample farmers

This is evident from Table 1 that the average size of operational land holding was small (2.18 ha) for the sample farmers. The sample farmers grow agricultural crops, mainly maize, paddy and wheat on 53.22% of the total cultivable land and potato crop over rest of the land (46.78%). The family size is one of the important factors for cultivation of labour intensive crop such as potato. On the average size of the family in the present study was found to be considerably large (6.12 in number). It was also observed that the majority of the farmers were literate. More of the literacy reflects that the farmers are more knowledgeable and better prepared to take up improved methods of cultivation of potato crop. Resource structure particularly irrigation and farm machinery are important assets for growing of an agriculture enterprise like potato. The irrigation sources and farm machinery status were worked out and are given in the table. Among the sources of irrigation, 63.56% farmers are using canal water and 43.56% are dependent on pump set for irrigation (multiple responses). It is also obvious from the table that the majority of the farmers (58.22%) own tractor and an equal per cent of the farmers own cultivator and leveler. Most of them (95.11%), however reported to possess spray pumps which shows the farmers are overwhelmingly adopting plant protection measures.

Cost of cultivation incurred on fertilizers and plant protection measures

It is evident from Table 2 that on an average the total cost incurred on fertilizers and plant protection measures on per hectare basis was to the tune of Rs. 4412.25 and Rs. 2220.32, respectively. Amongst the fertilizers, cost of DAP on per hectare basis was highest (Rs. 2451.20) followed by cost of urea (Rs. 1255.00) and cost of MOP (Rs. 706.05). Whereas, of the plant protection measures, fungicide 2nd spray on per hectare basis involved highest cost of Rs. 1088.70 followed by cost of weedicide (Rs. 500.00), cost of insecticide spray (Rs. 462.30) and fungicide 1st spray (Rs. 169.32).

Table 1. Socio economic and resource structure of potato growers n=225.

Particulars	
Average operational land holding (in ha)	2.18
Average size of family (Number)	6.12
Literacy level	87.11
Cropping pattern (%)	
Agricultural Crops (Maize, paddy, wheat etc.)	53.22
Potato Crop	43.56
Irrigation sources (%)	
Canal	63.56
Pumpset	43.56
	(Multiple response)
Farm machinery (%)	
Tractor	58.22
Cultivator	58.22
Leveler	58.22
Spray Pumps	95.11
Pump set	55.11

Table 2. Cost of cultivation on Fertilizers and Plant protection measures on per hectare basis (Rs./ha).

S/N	Fertilizers	Cost	Plant protection	Cost
1.	UREA	1255.00	Fungicide Ist spray	169.32
2.	DAP *	2451.20	Fungicide IInd spray	1088.70
3.	MOP *	706.05	Insecticide one spray	462.30
4.			Weedicide	500.00
Total		4412 .25	Total	2220.32

Labour days utilized for production of potato crop

The data in Table 3 indicates that on an average, a total of 124 labour days are required for cultivation of potato in one hectare area. The distribution chart of labour among various important agricultural operations in potato cultivation reveals that on an average, the maximum number of labour days is expended in performing operations of interculture with one hoeing and earthing up as well as harvesting of the crop (40 labour days each). Beds preparation and sowing of seeds consume 35 labour days which is followed by preparatory tillage with three ploughings and three plankings (20 labour days). Application of FYM (10 labour days), application of fertilizers (7 labour days), plant protection measures (7 labour days) and irrigation (5 labour days) in that order required the least number of labour days.

Cost structure in cultivation of potato crop

The per hectare cost and return from the cultivation of potato crop was calculated at current prices and have been presented in Table 4. The data in Table 4 reveals

that the average estimate of cost of potato cultivation on per hectare basis was Rs. 82502.195. The input utilization pattern in cultivation of potato crop showed that the major share of cost was on potato seed (36.67%), labour days (29.28%), FYM (11.11%), transportation (9.45%), tractor charges (5.81%), fertilizers (5.35%) and plant protection measures (2.28%). In pure monetary terms, the cost of seed was highest (Rs. 30257.50) and the cost incurred on plant protection measures was the least (Rs. 1884.375). The data in Table 4 reveals that cost of seed per hectare of potato was Rs 30257.5 followed by the other costs viz. Cost of tractor charge per hectare (Rs 4800.00), cost of FYM per hectare (Rs 9168.32), cost of fertilizers per hectare (Rs 4414.00), cost of plant protection measures per hectare (Rs 1884.37), cost of transportation per hectare of potato (Rs7800.00) and cost of labour per hectare Rs 24160.00.

Economics of potato crop production

The figures in Table 5 depicts that average area under potato cultivation was 1.02 ha. As far as average yield of potato crop was concerned, potato crop gave an average

Table 3. Distribution of labour days for production of potato crop on per hectare basis.

S/N	Operations	Total
1	Preparatory tillage with three ploughing Followed by three planking's	20 labour
2	Application of F Y M	10 labour
3	Application of fertilizers	7 labour
4	Preparation of beds and sowing of seeds	35 labour
5	Interculture with 1 hoeing and earthing up	40 labour
6	Irrigation (Two)	5 labour
7	Plant protection measures (with three spray)	7 labour
8	Harvesting	40 labour
	Total	124 labour

Table 4. Cost structure in cultivation of potato crop (Rs./ha).

S/N	Average expenditure	Cost
1	Seed	30257.50 (36.67)
2	Tractor charge	4800.00 (05.81)
3	FYM	9168.32 (11.11)
4	Fertilizers	4414.00 (05.35)
5	Plant protection measures	1884.375 (02.28)
6	Transportation	7800.00 (09.45)
7	Labour	24160.00 (29.28)
	Total	82502.195

(Note: Figures in parentheses are percentages of corresponding values).

Table 5. Economics of potato crop.

S/N	Potato crop	Average
1	Area of potato (ha)	1.02
2	Yield of potato (qt/ha)	260
3	Sale Price (Rs/qt)	549
4	Gross Return (Rs/ha)	142740.00
5	Gross Cost (Rs/ha)	82484.20
6	Net Return (Rs/ha)	60255.80
7	B-C Ratio	1.73

*DAP = Di-ammonium Phosphate, *MOP = Murate of Potash.

yield of 260 quintal per hectare and total average sale price of potato crop was Rs. 549 per quintal. The economics of potato cultivation presented in Table 5 revealed that the total return per hectare was Rs. 142740.00 whereas, total expenditure cost amounted to Rs. 82484.20. The net return over cost per hectare was Rs. 60255.80. The benefit-cost ratio estimate comes around 1.73 which reveals that potato crop is remunerative enterprise for the farmers and emphasis should be laid on overcoming the constraints impeding the growth of the enterprise.

Marketing of produce by the potato growers

It can be observed from the data presented in Table 6 that overall majority of the respondents 59.11% had marketing their produce in distant market, followed by Narwal Mandi (48.00%) and local market (18.22%) respectively. In Marh subdivision majority (64.76%) of the respondents followed by (56.67%), from, R S Pura, (60.00%) from Dayalachak Subdivisions and 26.67% from Samba Sub division marketing their produce in distant market respectively. The findings are in conformity

Table 6. Distribution of potato growers according to their marketing of produce n=225.

Marketing terminal	Sub-Division-wise percentage of respondents				Overall %age of respondents from all sub divisions
	Marh n=105	R S Pura n=60	Dayalachak n=45	Samba n=15	
Distant Market	64.76	56.67	60.00	26.67	59.11
Narwal Mandi	44.76	45.00	42.22	100.0	48.00
Local Market	18.09	18.33	13.33	33.33	18.22

Multiple responses.

Table 7. Constraints faced by the respondents for storage and marketing practices n= 225.

Constraints	Number	Percentage
Lack of storage facilities near the farm	109	48.44
Deterioration of potato tubers	58	25.78
Greening of potato tubers	75	33.33
Sprouting of potato tubers	92	40.89
Lack of marketing facilities near the farm	225	100.0
Less support price	225	100.0
Price fluctuation	225	100.0
Lack of transportation facilities	129	57.33
Poor shelf life	119	52.89
Power failure in storage units	85	37.77
Inadequate supply of storage material	74	32.89

Multiple responses.

with those of Sharma (1996) and Hakim (1998) who had reported that majority of the total respondents sold their produce in the local market and distance market.

Constraints faced by the respondents in adoption of recommended and marketing practices

All of the respondents had reported that lack of marketing facilities near the farm, less support price and price fluctuation were the main constraints which were faced by them in marketing and storage of potato. The figures in Table 7 further revealed that lack of transportation facilities, poor shelf life, lack of storage facilities and sprouting of potato tubers were the problems faced by 57.33, 52.89, 48.44 and 40.89% of potato growers in marketing and storage of potato crop. About 37.77, 33.33, 32.89 and 25.78% of total respondents mentioned power failure in storage units, greening of potato tubers, inadequate supply of storage material and deterioration of potato tubers were the some other constraints in the adoption of recommended, storage and marketing practices of potato crop. The above findings got support from the study of Chander et al. (1990), Shaikh et al. (1993), Khurana and Sharma (1995), Singh and Prasad (1995) and Prakash (2009).

Conclusion

Growing potato is essentially a profitable economic activity. However, farmers often fail to realize profitable price primarily due to inadequate formal marketing facilities and lack of collateral credit availabilities from formal sources. The long supply chain which accommodates large number of middlemen in both the markets is prohibiting farmers from otherwise profitable prices. These markets are highly unorganized and dominated by large number of small players. Moreover, the markets are characterized by price seasonality and price instability. This is an outcome of the unorganized nature of these markets. On the supply side, potato markets have no information about the total expected supply during the season. Average expenditure of potato crop is Rs 82484.20 per ha, average gross income is Rs 142740.00 per ha and average net income is Rs 60255.80 per ha. The probable reason for higher expenditure on cultivation of potato crop is due to higher cost of potato seed, FYM and expensive labour.

The net income from the crop may be increased if they get remunerative prices of their produce and this is possible only if they get higher share in the market price of their produce. The findings of the study indicates that average area under potato cultivation is only 1.02 ha which is less

than the average total land holding of the farmers. This is because they cultivate other vegetables also for generating more income. Majority of the farmers reported that low productivity of potato crop; less sale price and higher cost of cultivation were the main reasons for not growing the crop on whole of the land area. Majority of the respondents that is, 59.11% sold their produce in distant market. It could be concluded from the findings that poor shelf life, inadequate supply of storage material, lack of marketing facilities, less support price and price fluctuation were the main constraints encountered by the potato growers in the adoption of recommended crop production technologies. Therefore, more emphasis should be given to some of the most serious constraints, such as inadequate supply of storage material, lack of marketing facilities and less support price and though the distribution of pertinent literature in simple language on potato cultivation among the potato growers. Necessary action should be taken to strengthen the supply services at villages to make available the inputs like seeds, fertilizer, fertilizer, insecticides, pesticides, agricultural implements. The credit facilities to growers at right time may facilitate to adopt more technologies by the potato growers.

ABBREVIATIONS

Hectare, **Ha**; Quintal, **Qt**; Farm yard manure, **FYM**; Di-ammonium Phosphate, **DAP**; Murate of Potash, **MOP**.

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