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Contract Farming of Potato in Punjab: A Comparative Study

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ABSTRACT

The present study was conducted in Hoshiarpur district in Punjab during year 2019-2020. Data were collected from 98 respondents who were practicing contract farming and non-contract farming of potato. The study revealed that all the contract farmer respondents had purchased their seeds from the contracting agency while the majority of non-contract respondents purchased their seeds privately which was significantly different. All the contract respondents had used FC 3 (FL1867) variety whereas 77.55 per cent of non-contract respondents used the Kufri Pukhraj variety (an early sown variety). All the contract respondents followed more than recommended row to row-R spacing whereas the majority of non-contract respondents followed the recommended spacing which shows that data was varying significantly. In contract respondents, the majority had harvested their crop in 70-80 days whereas 71.49 per cent of non-contract respondents harvested their crop in 60-70 days. Majority of contract and non-contract respondents got a yield of about 90-120 q/acre.

INTRODUCTION

Vegetables are the bank of nutrients that are good for health. They not only provide nutrients but also play a major role in enriching the taste of food. After China, India is the second largest producer of vegetables. Vegetables are the alternative to grains which can help in solving the issue of lack of food. Although availability of wheat and paddy is in abundance at cheaper rates, but there is shortage of other food items like pulses, vegetables, oilseeds (Kaur and Kumar, 2020). The demand for vegetable production has raised the development of the horticulture sector (Kumar, 2017). India is the third-largest producer of potatoes which bring about 25 million tonnes of the tuber. India comes at number four in the area under potato cultivation whereas the yield rate is lower. Uttar Pradesh, Bihar, West Bengal, Punjab, Madhya Pradesh, Karnataka, Assam, and Gujarat were major potato producing regions. In India, most of the potatoes grown in the winter season. Only 0.5 per cent of potatoes are exported by India because of its consumption which is higher in the nation (Sidhu and Singh, 2011). In India, contract farming plays an important role in the processing sector. In the early nineties, India's processing sector was poorly developed due to some major factors such as insufficient processing variety of potatoes. Many indigenous and foreign varieties were introduced which makes more potato areas suitable for processing. Several contract companies were set up their plants through contract farming by collecting raw materials. Pepsi Foods was the first company who entered the processing sector with the Frito-Lays division. Maharashtra, West Bengal, and Punjab were the states where Pepsi Foods established processing plants. Sometimes farmers faced many problems like poor technical guidance, poor quality and faced the problem of the price which was higher in the open market than that of the contract price, lack of crop insurance etc. (Mishra and Singh, 2010 & Rana, 2011). Therefore, the present study was conducted to study and compare contract and non-contract farming of potato in Punjab.

METHODOLOGY

The present study was conducted to explore the difference in cultural practices adopted by contract and non-contract potato growers. The study was conducted in the Hoshiarpur district of

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Punjab as it was the leading district in vegetable cultivation (Anonymous, 2019a). Potato was growing over largest area in the district (15100 ha) among all vegetables, had been selected for this study purpose (Anonymous, 2019b). A list of potato growers in the Hoshiarpur district was prepared with the help of the Department of Horticulture, Punjab. From that list, 50 respondents who were practicing contract farming for potato were selected randomly from which 49 has given response. Similarly, the same number of respondents were selected under non-contract farming for the potato crop. In this way, a total of 100 respondents were selected for this study from which 98 responses were received. A research instrument was prepared for the collection of data consisting of battery of questions relating to socio-personal characteristics, existing agronomic and cultural practices followed by the contract and non-contract farmers. The prepared interview schedule was pre tested 40 vegetable growers from the non-sampled area i.e., Jalandhar district and after analysis necessary modifications were done. Data were collected from respondents by the personal interview method. Two proportion z test was used to compare two proportions regarding different agricultural practices between the contract and non-contract respondents.

RESULTS AND DISCUSSION

Agronomic practices followed in potato crop

Agronomic practices followed in potato crop had been analysed and data placed in Table 1 revealed that all the contract respondents had purchased their seeds from the contracting agency while the majority (71.42%) of non-contract respondents purchased their seeds from the private farm with a significant difference. About 16.32 per cent of non-contract respondents had used their seed. Only 8.16 of the non-contract respondents had purchased seed from private seed shops. About 4.08 per cent of non-contract respondents had purchased their seed from friends. All the contract respondents had used FC-3 variety (processing variety) whereas there were no non-contract respondents who had used the same variety for cultivation. 77.55 per cent of non-contract respondents had used the Kufri Pukhraj variety (an early sown variety). 18.36 per cent of non-contract respondents had used LR variety and four per cent had used diamond variety. Only eight per cent of contract respondents had sown their crop at the time of 1st week of October to mid of October which was recommended by PAU whereas 16.32 per cent of contract respondents had sown their crop at the same time. The majority (83.67%) of contract and 32.65 per cent of non-contract respondents had sown their crop from mid-September to the last week of September. This shows that there was a significant difference between sowing times. 59.18 per cent of non-contract respondents had sown potato crop from 1st week of September to mid-September while no one from the contract respondents had sown their crop at the same time. In contract respondents, the Majority (89.79%) of them had harvested their crop in 70-80 days whereas 12.24 per cent of non-contract respondents had harvested their crop at the same time. This shows that respondents were significantly different in terms of harvesting time. 71.49 per cent of non-contract respondents had harvested their crop in 60-70 days while there is no one from contract respondents who had harvested their crop in 60-70 days with a significant difference. Findings are supported by Uddin et al., (2010) & Mane et al., (2017) where it was reported that majority of the respondents had medium extent of adoption of recommended production technology of potato.

Cultural practices followed in potato crop

Data present in Table 2 revealed that all contract and non-contract respondents had used planter for sowing (100%). 42.85 per cent of contract respondents had used seed rate less than recommended whereas 67.34 per cent of non-contract respondents had used seed rate less than recommended. More than half (57.14%) of contract respondents had used the recommended seed rate while 32.65 per cent of non-contract respondents also used the recommended seed rate. There was a significant difference between the seed rates of respondents. The majority (81.63%) of non-contract respondents had used seed treatment with monceren and

Table 1. Agronomic practices adopted in potato crop

S.No.	Aspects	Contract (n=49) (%)	Non-contract (n=49) (%)	Z value
1.	Source of seed			
	Private seed shops	-	8.16	2.06*
	Private Farm	-	71.42	10.95*
	Own	-	16.32	3.05*
	Friends	-	4.08	1.42NS
	Contract agency	100	-	0NS
2.	Varieties			
	Pukhraj	-	77.55	12.87*
	LR	-	18.36	3.28*
	Diamond	-	4.08	1.42NS
	FC-3	100	-	0NS
3.	Time of Sowing			
	1st week of September – Mid of September	-	59.18	8.34*
	Mid of September to last week of September	83.67	32.65	5.91*
	1st week of October-mid of October	16.32	8.16	1.22NS
4.	Harvesting time after planting (days)			
	60-70	-	71.49	10.97*
	70-80	89.79	12.24	12.04*
	80-90	10.20	16.32	0.88NS

**Significant at 5% level of significance*

10.20 per cent of non-contract respondents had used Bavistin seed treatment. Eight per cent of non-contract and 12.24 per cent of contract respondents had used gaucho as a seed treatment. The majority (87.75%) of contract respondents had used mancozeb + bactocide as a seed treatment whereas there is no one from non-contract respondents who had used the same seed treatment for the potato crop. It was found that there was a significant difference between seed treatments. The findings are in line with Nyankanga et al., (2007). All the contract respondents followed more than recommended R-R spacing whereas the majority (69.38%) of non-contract respondents followed the same R-R spacing which shows that data was varying significantly. 30.61 per cent of non-contract respondents followed recommended R-R spacing while no one from contract respondents followed recommended R-R spacing. It might be due to the different soil conditions. It was found that respondents were significantly different from each other in terms of recommended R-R spacing. The majority (87.75%) of contract respondents and 51.02 per cent of non-contract respondents followed less than recommended plant- plant spacing. Less than half (44.89%) of non-contract respondents followed recommended P-P spacing while 12.24 per cent of contract respondents followed the same P-P spacing which was significantly different. Only four per cent of the non-contract respondents followed more than recommended P-P spacing while no one from contract respondents followed more than recommended P-P spacing. The majority (77.55%) of non-contract and 28.57 per cent of contract respondents had used gramoxone to control weeds with a significant difference. Most (71.42%) of the contract and eight per cent of non-contract respondents had used Sencor weedicide which was significantly different. Eight per cent of non-contract respondents had used stomp while no one from contract respondents had used the same weedicide. There was a significant difference in the use of weedicide. Four percent of non-contract respondents had used lasso and two per cent of non-contract respondents had used atrazine to control weeds. Only 10.20 per cent of contract and 16.32 per cent of non-contract respondents had harvested their crop in 80-90 days. Only 10.20 per cent of contract respondents did seed production while 16.32 per cent of non-contract respondents did seed production. The findings are in line with Dua et al., (2008) who found that there was a huge variation among the cultivation practices

Table 2. Cultural practices adopted in potato crop

S.No	Aspects	Contract respondents (%)	Non-contract respondents (%)	Z value
1.	Method of sowing			
	Planter	100	100	0^{NS}
2.	Seed rate			
	Less than recommended	42.85	67.34	2.48*
	Recommended (13-18 q/acre)	57.14	32.65	2.48*
3.	Seed treatment			
	Monceren (Pencycuron 250 SC)	-	81.63	14.60*
	Bavistin (Carbendazin)	-	10.20	2.33*
	Gaucho (Imidacloprid)	12.24	8.16	0.661^{NS}
	Mancozeb + bactocide	87.75	-	18.54*
4.	Spacing (R-R)			
	Recommended 60 cm	-	30.61	4.60*
	More than recommended	100	69.38	4.60*
5.	Spacing (P-P)			
	Less than recommended	87.75	51.02	4.25*
	Recommended 20 cm	12.24	44.89	3.79*
	More than recommended	-	4.08	1.42^{NS}
6.	Weed control			
	Gramoxone (Paraquat)	28.75	77.55	5.51*
	Syngenta (Atrazine)	-	2.04	0.99^{NS}
	Lasso (Alachlor)	-	4.08	1.42^{NS}
	Stomp (Pendimethalin)	-	8.16	2.06*
	Sencor (Metribuzin)	71.42	8.16	8.29*
7.	Seed production			
	Yes	10.20	16.32	0.88^{NS}
	No	89.79	83.67	0.88^{NS}
8.	Fertilizer Application			
i.	Urea (kg/acre)			
	Less than recommended	100	89.79	2.33*
	Recommended (165)	-	10.20	2.33*
ii.	MOP (kg/acre)			
	Recommended (40)	-	6.12	1.76NS
	More than recommended	100	93.87	1.77NS
iii.	SSP (kg/acre)			
	Less than recommended	-	14.28	2.82*
	Recommended (155)	-	8.16	2.06*
iv.	DAP (kg/acre)			
	100-150	79.59	65.30	1.58NS
	150-200	20.40	12.24	1.08NS

**Significant at 5% level of significance*

Table 3. Gross returns from potato crop

Aspects	Category	Contract respondents (%)	Non-contract respondents (%)	Z value
Yield (q/acre)	60-90	10.20	16.32	0.88^{NS}
	90-120	75.51	55.10	2.15*
	120-150	14.28	28.57	1.73^{NS}
Price (Rs/q)	500-1000	-	16.32	3.05*
	1000-1500	22.44	38.77	1.76^{NS}
	1500-2000	77.55	44.89	3.48*
Gross returns (Rs/acre)	30,000-90,000	10.20	16.32	0.88^{NS}
	90,000-1,80,000	77.55	61.22	1.76^{NS}
	1,80,000-3,00,000	12.24	22.44	1.33^{NS}

**Significant at 5% level of significance*

in respect of their adoption, the highest for sequence cropping and the lowest for seed rate and seed treatment.

The data placed in Table 2 further revealed that 10.20 per cent of the non-contract respondents had used the recommended dose of urea while no one from the contract respondents had used the same dose of urea. All the contract respondents had used less than the recommended dose of urea whereas 89.79 per cent of non-contract respondents had used the same dose of urea. There was a significant difference between urea doses. All contract respondents had used more than the recommended dose of MOP while 93.87 per cent of non-contract respondents had used the same dose of MOP. Further six per cent of non-contract respondents had used a recommended dose of MOP whereas none of the contract respondents had used the same dose of MOP with a non-significant difference. About 14 per cent of non-contract respondents had used less than the recommended dose of SSP while no one from the contract respondents had used SSP fertilizer. About eight per cent of non-contract respondents had used the recommended dose of SSP. There was a significant difference between SSP doses. Majority (79.59%) of contract and 65.30 per cent of non-contract respondents had used 100-150 kg of DAP. Around 20.40 per cent of contract respondents had used 150-200 kg of DAP while 12.24 per cent of non-contract respondents had used the same dose of DAP which varies significantly. Findings are in line with Bezabih et al., (2011) who revealed that farmers applied lower doses of fertilizers for potato due to higher cost of fertilizers. On the contrary Nyamwamu et al., (2014) reported that farmers using recommended rates of fertilizers were 58 per cent and farmers using recommended fertilizer types were 96% for potato production.

Gross returns from the potato crop

The data given in Table 3 revealed that the majority (75.51%) of contract and 55.10 per cent of non-contract respondents got a yield of about 90-120 q/acre. Only 14.28 per cent of contract respondents got a yield of about 120-150 q whereas 28.57 per cent of non-contract respondents got the same quantity of yield. 16.32 per cent of the non-contract respondents got a yield of about 60-90 q whereas 10.20 per cent of contract respondents got the same quantity of yield. There was a non-significant difference between yields. Majority (77.55%) of contract and 44.89 per cent of non-contract respondents got 1500-2000 rupees per quintal as the contract respondents got price on the basis of potato size like 35 mm - 45 mm got 1800 rupees per quintal while 46 mm-55 mm size potato got 1100 rupees per quintal. 38.77 per cent of non-contract respondents got 1000-1500 rupees per quintal while 22.44 per cent of contract respondents got the same price per quintal. Only 16.32 per cent of non-contract respondents got 500-1000 rupees per quintal whereas none of the contract respondents fall in the same category with a significant difference. The data from Table 3 revealed that the majority (77.55%) of contract and 61.22 per cent of non-contract respondents got gross returns of rupees 90,000-1,80,000. Around 22 per cent of non-contract and 12.24 per cent of contract respondents got gross returns of rupees 1,80,000-3,00,000. About 10 per cent of contract respondents got gross returns of Rs 30,000-90,000 whereas 16.32 per cent of non-contract respondents belonged to the same category with a non-significant difference. It concludes that the non-contract respondents were getting more gross returns due to market prices which was higher in local market due to the shortage of potatoes. Findings are in agreement with the Tripathi et al., (2005) and Kaur (2014). Who found that contract farming is more profitable than non-contract farming in potato crop because yield, net income, cultivation cost, gross income was higher in contract farming than non-contract farming and contract faming provides a more reliable, regular and timely sources of income to farmers. Gondalia et al., (2017) also shown similar results and found the yield, price and net return per hectare on contract farms of potato significantly higher over the noncontract farmers.

CONCLUSION

Study concludes that the difference between contract and non-contract farming lies on the basis of quality parameters which are attained by contract farmers whereas in case of non-contract farmers, they practice for earning more profit by concentrating on more yield. Last year, non-contract farmers got more yield in potato than contract farmers due to Kufri Pukhraj variety which was high in yielding and got more gross return than that of contract farmers due to more price variation in local market while contract farmers acquired less yield due to high quality standard of crop.

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