

CHAPTER 6

DIVERSIFICATION AND RETURNS AMONG CONTRACT AND NON- CONTRACT FARMERS

Punjab's agrarian economy was acknowledged for its opulence due to its contribution towards the success of green revolution, but since 1980s, agriculture started showing the signs of deceleration and stagnation in yield level of major crops. The policy makers and various studies recommended for the diversification through contract farming (Singh, 2004; Dhillon and Singh, 2006). It is argued that diversified agricultural economy is expected to enhance farm income and reduce the risks of the producer. Linking farmers to contracting firms may also cause a shift in the cropping pattern toward high value crops and consequently, result in diversification away from traditional crops like wheat-paddy. Therefore, an attempt has been made to examine the impact of contract farming on diversification by comparing the cropping pattern and cropping intensity of the contract farmers with the non-contract farmers. This chapter also studies the impact of contract farming on net returns of the farmers by comparing costs and returns from contracted crops with the traditional existing crops on non-contract farms.

6.1 Cropping Pattern

6.1.1 Comparative analysis of potato's contract and non-contract farmers

Cropping pattern for each farm size category among potato contract farmers is presented in Table 6.1. Among contract farmers, the highest proportion of area was devoted to paddy (38.63 per cent) followed by potato (20.62 per cent) and wheat (17.09 per cent). The area under contract crops was only 13 per cent, while 87 per cent of the gross cropped area (GCA) was under non-contract crops. The semi-medium farmers put about 33.33 per cent of GCA under potato contract crop as compared to 19.66 per cent by medium and 11.36 per cent by large farmers. The medium and large farmers along with potato contract crop also grew it for the open market as the company provided seed for the maximum 10 acres, while some farmers grew it for spreading risk as sometimes open market prices rises more than the contract prices. The overall GCA under potato was 33.33 per cent among semi-medium, 22.34 per cent among medium and 20.06 per cent among

large farmers. Among potato contract growers, 6 per cent were also involved in the contract farming of chicory, while another 4 per cent also did the contract farming of sugarbeet. After potato crop, the major proportion of area was under moong (11.4 per cent of GCA), followed by maize (5.81 per cent) and mint (2.73 per cent). Carrot, radish and peas were also grown by the large farmers. Among all farmer categories, large farmers had highest GCA under traditional crops (56.49 per cent) like wheat, paddy followed by medium (54.15 per cent) and semi-medium farmers (33.33 per cent). Surprisingly, semi-medium farmers did not grow wheat even for domestic consumption, which also they purchased from fellow farmers. During field survey, few farmers revealed that cultivation of two crops such as mint, maize, moong (of three month duration each) was more beneficial instead of growing single wheat crop in same time period, which helped them to earn more income. It was further supported by the fact that cropping intensity was turned out to be highest among semi-medium farmers (300) followed by medium (257.3) and large farmers (246.4) (Table 6.1).

On the other hand, among non-contract farmers, small farmers put about 26.4 per cent of GCA under potato followed by 25.9 per cent each by medium and large farmers; and 24.2 per cent by semi-medium farmers. Other vegetables like carrot, radish and peas were also grown by the large farmers. The GCA under traditional paddy crop was 28.8 per cent in case of small farmers, 36.4 per cent each in case of semi-medium and medium farmers and 36.9 per cent in case of large farmers. On the other hand, GCA under wheat was 11.2 per cent in case of small farmers, 13.6 per cent in case of semi-medium, about 11 per cent each in case of medium and large farmers. The cropping intensity was found to be highest among small farmers (271.7) followed by medium (269.1), large (268.8) and semi-medium farmers (259.3). Accordingly, semi-medium farmers surprisingly had lowest cropping intensity as compared to the other farmer categories. However, GCA under traditional paddy-wheat crop was also highest among semi-medium farmers category. Among overall non-contract farmers, paddy occupied the highest proportion of GCA (36.6 per cent), followed by potato (25.7 per cent), moong (16.1 per cent), wheat (11.2), mint (4.7 per cent) and maize (4.0 per cent) (Table 6.2).

Table 6.1

Category-wise Cropping Pattern of Contract Farmers

Category /Cropping pattern	Semi-medium		Medium		Large		All	
	Acres	% of GCA	Acres	% of GCA	Acres	% of GCA	Acres	% of GCA
Contract crops								
Potato	10	33.33	9.36	19.66	13.85	11.36	12.36	12.93
Sugarbeet	-	-	-	-	0.12	0.09	0.08	0.8
Chicory	-	-	-	-	0.32	0.26	0.21	0.22
Contract	10	33.33	9.36	19.66	14.29	11.7	12.65	13.23
Non-contract crops								
Mint	-	-	1.82	3.82	3.18	2.61	2.61	2.73
Moong	6.67	22.23	6.5	13.65	13.15	10.79	10.9	11.4
Maize	-	-	2.36	4.95	7.42	6.08	5.56	5.81
Bajra	-	-	-	-	1.51	1.24	1	1.04
Wheat	-	-	7.57	15.9	21.54	17.67	16.34	17.09
Paddy	10	33.33	18.21	38.25	47.32	38.82	36.93	38.63
Fodder	-	-	0.46	0.96	2.4	1.97	1.72	1.8
Tomato	3.33	11.1	-	-	0.03	0.02	0.22	0.23
Potato	-	-	1.28	2.68	10.6	8.7	7.36	7.69
Others*	-	-	-	-	0.45	0.37	0.3	0.31
Non- contract	20	66.67	38.2	80.24	107.6	88.26	82.94	86.75
GCA	30	100	47.6	100	121.9	100	95.6	100
Net area (acre)	10		18.5		49.48		38.44	
CI**	300		257.3		246.4		248.7	

Note: Others* include vegetables- carrot, radish, peas etc

CI** is cropping intensity

Table 6.2

Category-wise Cropping Pattern of Non-contract Farmers

Category /Cropping pattern	Small		Semi-medium		Medium		Large		All	
	Acres	% of GCA	Acres	% of GCA	Acres	% of GCA	Acres	% of GCA	Acres	% of GCA
Potato	3.3	26.4	5.7	24.2	13.3	25.9	32.6	25.9	15.3	25.7
Mint	0.1	0.8	0.3	1.3	1.4	2.7	8.1	6.4	2.8	4.7
Moong	2.4	19.2	4.8	20.3	10.9	21.2	16.1	12.8	9.6	16.1
Maize	1.1	8.8	0.3	1.3	0.7	1.4	6.9	5.5	2.4	4.0
Mustard	0.1	0.8	0.2	0.8	0.1	0.2	-	-	0.1	0.2
Wheat	1.4	11.2	3.2	13.6	5.8	11.3	13.8	10.9	6.7	11.2
Paddy	3.6	28.8	8.6	36.4	18.7	36.4	46.5	36.9	21.8	36.6
Fodder	0.3	2.4	0.2	0.8	0.2	0.4	0.3	0.2	0.2	0.3
Others*	0.1	0.8	0.3	1.3	0.3	0.6	1.4	1.1	0.6	1.0
GCA	12.5	100	23.6	100	51.4	100	125.8	100	59.6	100
Net area (acre)	4.6		9.1		19.1		46.8		22.2	
CI**	271.7		259.3		269.1		268.8		268.5	

Note: Other* include vegetables- carrot, radish, peas, etc.

CI** is cropping intensity

Surprisingly, the comparison between contract and non-contract farmers revealed that non-contract medium and large farmers had higher GCA under potato crop than that among contract farmers. Only semi-medium contract farmers had higher GCA under potato as compared to non-contract farmers. It is evident from the fact that the company assigned the contract with farmers for 10 acres only. The proportion of area under other than traditional (paddy-wheat) crops was 66.67 per cent in case of semi-medium, 45.85 per cent in case of medium and 43.51 per cent in case of large contract farmers. On the other side, in case of non-contract farmers, it was turned out to be 60 per cent among small, 50 per cent among semi-medium, around 52 per cent each among medium and large farmers. The GCA under other than traditional crops was also highest only among semi-medium contract farmers as compared to the semi-medium non-contract farmers; however

in all other farmer categories, it was higher among non-contract farmers. Furthermore, cropping intensity was also turned out to be higher among semi-medium contract farmers than that among non-contract semi-medium farmers. Hence, it can be concluded that semi-medium contract farmers and small non-contract farmers had shown greater crop diversification away from traditional (wheat-paddy) as compared to other farmer categories and that diversification mainly took place towards potato and moong.

The Simpson's Index of Diversification (SID) (Table 6.3) was highest in semi-medium contract farmers (0.67) followed by medium (0.46) and large farmers (0.44). Furthermore, in case of non-contract farmers, SID was turned out to be highest among small farmers (0.61) followed by 0.50 in case of semi-medium and 0.52 each in case of medium and large farmers. However, overall, SID among contract farmers (0.44) was also lower as compared to that among non-contract farmers (0.52). Across contract farm size categories, the diversification away from traditional crops was least among large farmers as compared to semi-medium and medium farmers. However, across non-contract farm size categories, all semi-medium, medium and large farmer categories had lesser diversification than the small farmers. Thus, diversification mainly towards cultivation of potato and moong was observed in both contract and non-contract farmers. Some diversification also occurred towards maize and mint.

Table 6.3

Simpson's Index of Diversification among Contract and Non-contract Farmers

Farm size categories	Contract farmers	Non-contract farmers
Small	-	0.61
Semi-medium	0.67	0.50
Medium	0.46	0.52
Large	0.44	0.52
All	0.44	0.52

The number of crops grown by contract and non-contract farmers is presented in Table 6.4. The average number of crops grown was higher i.e. 5.3 in case of contract farmers compared with 4.6 crops in case of non-contract farmers. However, crop diversification towards non-traditional crops was higher among non-contract farmers as compared to contract farmers due to company's condition of assigning ten acres of potato seed to one farmer but in terms of number of crops grown by contract farmers was higher than among non-contract farmers.

Table 6.4
Average Number of Crops Grown Among Contract and Non-contract Farmers

Farm size categories	Contract farmers	Non-contract farmers
Small	-	4.5
Semi-medium	3	4.6
Medium	4.9	4.7
Large	5.7	4.7
All	5.3	4.6

6.1.2 Comparative analysis of sugarbeet (contract) and wheat (non-contract) farmers

The contract farmers grew sugarbeet and sugarcane under contract with the company. The proportion of GCA under traditional wheat and paddy crop was 27 per cent and 39.6 per cent, respectively. Further, 11 per cent of GCA was under sugarbeet and another 10 per cent was under sugarcane cultivation. The proportion of GCA under sugarbeet was highest among small contract farmers (25 per cent) as compared to semi-medium (19.3 per cent), medium (15.9 per cent) and large farmers (6.3 per cent). Further, GCA under sugarcane was 9.3 per cent in case of semi-medium farmers, 10.4 per cent in case of medium and 10 per cent in case of large farmers. Further, it was also found that 22 per cent of contract farmers did intercropping. Sugarbeet, wheat and cauliflower were successfully intercropped with sugarcane crop by the contract farmers.

“In intercropping we require three times lesser seed for sugarcane along with better income”. Jaspal Singh, Kaler

Tomato, peas, cauliflower, onion and potato were major vegetables grown by the contract farmers. 3.5 per cent of GCA was devoted to peas by the farmers. Further, large farmers had about 12 per cent of GCA under vegetables while it was only 3.8 per cent in medium and 2.4 per cent in semi-medium farmers. Furthermore, overall 1.6 per cent of GCA was under carom, 1.2 per cent under moong and 1 per cent under fodder. The area under paddy was 50 per cent among small farmers as compared to around 41 per cent each in case of semi-medium and medium and 38.4 per cent in case of large farmers. The proportion of area under wheat crop was second highest in all the farmer categories with the largest share among large farmers (28.4 per cent) followed by semi-medium (26.1 per cent), small (25 per cent) and medium farmers (24.8 per cent). Thus, it is evident that with increase in size of operational holding, proportion of GCA under other vegetables had also increased. The resulting cropping intensity was highest in large farmers (203.9) followed by 200 in small, 198.8 in semi-medium and 194.4 in medium farmers (Table 6.5).

In case of non-contract farmers, proportion of GCA under traditional wheat and paddy crop was 42.3 per cent and 46.8 per cent, respectively. The proportion of GCA under paddy was highest in case of semi-medium farmers (49.4 per cent) followed by medium (48 per cent), small (47.7 per cent), marginal (45.2 per cent) and large farmers (43.8 per cent). Similarly, percentage of GCA under wheat was 49.4 per cent in case of semi-medium farmers followed by around 45 per cent each among marginal and medium farmers, 38.6 per cent among small and 32 per cent among large farmers. Surprisingly, large non-contract farmers also had 11.8 per cent GCA under peas, 8.8 per cent under potato and 2.5 per cent under carom crop. The proportion of GCA under sugarcane was just 0.4 per cent. As only semi-medium and medium farmers had small proportion of GCA under annual sugarcane crop (0.6 per cent each). Marginal, small and semi-medium farmers did not grow potato. Marginal and semi-medium farmers grew only traditional crops. The resulting cropping intensity was astonishingly higher among large farmers (225.5) while it was 204.6 among small farmers followed by 200 in case of medium, 197.7 in case of semi-medium and 182.6 in case of marginal farmers (Table 6.6).

Table 6.5
Category-wise Cropping Pattern among Contract Farmers

Category /Cropping pattern	Small		Semi-medium		Medium		Large		All	
	Acres	% of GCA	Acres	% of GCA	Acres	% of GCA	Acres	% of GCA	Acres	% of GCA
Contract crops										
Sugarbeet	2	25	3.1	19.3	5.5	15.9	7.6	6.3	5.3	11
Sugarcane	-	-	1.5	9.3	3.6	10.4	12	10	4.8	9.8
Contract	2	25	4.6	28.6	9.1	26.3	19.6	16.3	10.1	20.8
Non-contract crops										
Carom	-	-	0.1	0.6	0.4	1.2	2.6	2.1	0.8	1.6
Moong	-	-	0.06	0.4	0.2	0.6	2	1.6	0.6	1.2
Maize	-	-	0.2	1.2	0.07	0.2	1.2	1	0.4	0.8
Wheat	2	25	4.2	26.1	8.6	24.8	34.4	28.4	13.1	27
Paddy	4	50	6.6	41	14.3	41.3	46.4	38.4	19.3	39.6
Fodder	-	-	-	-	0.7	2.0	0.4	0.3	0.5	1.0
Tomato	-	-	0.2	1.2	0.2	0.6	3.1	2.6	0.8	1.6
Peas	-	-	0.1	0.6	0.4	1.2	6.6	5.4	1.7	3.5
Others*	-	-	0.1	0.6	0.7	2.0	4.6	3.8	1.4	2.9
Non-contract	6	75	11.5	71.7	25.5	73.9	101.3	83.6	38.6	79.2
GCA	8	100	16.1	100	34.6	100	120.9	100	48.7	100
Net area (acre)	4		8.1		17.8		59.3		24.4	
CI**	200		198.8		194.4		203.9		199.6	

Note: Others* include cauliflower, onion, potato
 CI** is cropping intensity

Table 6.6

Category-wise Cropping Pattern among Non- contract Farmers

Category/ Cropping pattern	Marginal		Small		Semi-medium		Medium		Large		All	
	Acres	% of GCA	Acres	% of GCA	Acres	% of GCA	Acres	% of GCA	Acres	% of GCA	Acres	% of GCA
Wheat	1.9	45.2	3.4	38.6	8.6	49.4	15.5	45.8	27.2	32	10.5	42.3
Paddy	1.9	45.2	4.2	47.7	8.6	49.4	16.2	48	37.2	43.8	11.6	46.8
Fodder	0.4	9.5	0.4	4.5	0.2	1.1	0.6	1.7	0.5	0.6	0.4	1.6
Sugarcane	-	-	-	-	0.1	0.6	0.2	0.6	-	-	0.1	0.4
Potato	-	-	-	-	-	-	0.6	1.8	7.5	8.8	0.8	3.2
Peas	-	-	0.4	4.5	-	-	-	-	10	11.8	0.9	3.6
Maize	-	-	0.1	1.1	-	-	0.6	1.8	-	-	0.2	0.8
Carom	-	-	0.3	3.4	-	-	-	-	2.5	2.9	0.3	1.2
GCA	4.2	100	8.8	100	17.4	100	33.8	100	85	100	24.8	100
Net area (acre)	2.3		4.3		8.8		16.9		37.7		11.9	
CI*	182.6		204.6		197.7		200		225.5		206.7	

Note: CI* is the cropping intensity

Overall, cropping intensity among non-contract farmers was turned out to be higher than contract farmers. The reason behind it was that contract farmers had about 10 per cent of the GCA under sugarcane crop as compared to just 0.4 per cent in case of non-contract farmers. Even with low cropping intensity, the contract farmers had higher diversification towards high value crops. Among contract farmers, around 33 per cent of area was under non-traditional crops as compared to only 9 per cent among non-contract farmers.

The SID has been calculated for both contract and non-contract farmers. The diversification was observed to be relatively more in case of contract farmers than non-contract farmers. The index value was turned out to be 0.33 in case of contract farmers as compared to 0.11 in case of non-contract farmers. The value of SID was highest in medium contract farmers (0.34) followed by large and semi-medium farmers (0.33 each) and small farmers (0.25) (Table 6.7). Among contract farmers, diversification away from traditional wheat-paddy crop was mainly towards cultivation of sugarbeet, sugarcane, carom, moong and vegetables like tomato, peas, cauliflower, etc. In case of non-contract farmers, crop diversification away from traditional crops was lesser than contract farmers across all the farm size categories. Among large non-contract farmers, some diversification towards cultivation of potato and peas was also observed. However, in case of semi-medium non-contract farmers, there was no sign of crop diversification away from traditional crops as about 98.8 per cent of the GCA was found to be under wheat-paddy crop.

Table 6.7
Simpson's Index of Diversification among Contract and Non-contract Farmers

Farm size categories	Contract farmers	Non-contract farmers
Marginal	-	0.10
Small	0.25	0.14
Semi-medium	0.33	0.01
Medium	0.34	0.06
Large	0.33	0.24
All	0.33	0.11

Further, the number of crops grown was also higher in case of contract farmers than in case of non-contract farmers. Thus, contract farmers were not only diversified towards the cultivation of new sugarbeet crop but also in terms of number of crops grown than the non-contract farmers (Table 6.8).

Table 6.8
Average Number of Crops Grown among Contract and Non-contract Farmers

Farm size categories	Contract farmers	Non-contract farmers
Marginal	-	3.2
Small	2.7	2.9
Semi-medium	4.1	2.3
Medium	4.3	3.3
Large	5.2	4.5
All	4.4	2.9

6.1.3 Comparative analysis of chicory (contract) and wheat (non-contract) farmers

The cropping pattern of contract farmers showed that semi-medium farmers had about 19 per cent of GCA under chicory compared to 12 per cent in medium and 5.3 per cent in large farmers; the overall among all contract farmers was 8.2 per cent. Among all the contract farmer categories, medium farmers had highest GCA under traditional crops like wheat, paddy and fodder (79.5 per cent) followed by semi-medium and large farmers (about 72 per cent each). GCA under moong was highest in case of large farmers (5.6 per cent) followed by semi-medium (4.2 per cent) and medium farmers (3.5 per cent). Potato was also grown across all categories of contract farmers. GCA under potato was turned out to be highest among large farmers (10.8 per cent) followed by semi-medium (4.2 per cent) and medium farmers (3.7 per cent). Cauliflower, carrot and peas were also grown by large farmers. Further, cropping intensity was turned out to be highest among large farmers (223) followed by medium (207) and semi-medium farmers (202); the overall for all the farmers being 217 (Table 6.9).

Table 6.9
Category-wise Cropping Pattern of Contract Farmers

Category /Cropping pattern	Semi-medium		Medium		Large		All	
	Acres	% of GCA	Acres	% of GCA	Acres	% of GCA	Acres	% of GCA
Chicory	2.7	19.1	4.2	12.1	5.1	5.3	4.6	8.2
Moong	0.6	4.2	1.2	3.5	5.4	5.6	2.7	4.8
Maize	-	-	0.3	0.9	0.4	0.4	0.3	0.5
Wheat	3.3	23.2	10.7	30.8	27.0	28.2	16.2	29.0
Paddy	6.6	46.5	16.6	47.8	42.5	44.4	25.4	45.5
Fodder	0.4	2.8	0.3	0.9	0.3	0.3	0.3	0.5
Potato	0.6	4.2	1.3	3.7	10.3	10.8	4.7	8.4
Others*	-	-	0.1	0.3	4.7	4.9	1.7	3.1
GCA	14.2	100	34.7	100	95.7	100	55.8	100
Net area (acre)	7		16.7		42.8		25.7	
CI**	202.8		207.8		223.6		217.1	

Note: CI** is the cropping intensity

Others* include vegetables- carrot, cauliflower, peas, etc.

In case of non-contract farmers, GCA under traditional crops like wheat, paddy and fodder was turned out to be highest among marginal farmers (100 per cent) followed by semi-medium (98.6 per cent), small (94 per cent), medium (93.3 per cent) and large farmers (91.3) (Table 6.10). Thus, the analysis reveals that among non-contract farmers, all the farmer categories had more than 90 per cent of GCA under traditional crops. All the marginal non-contract farmers grew only traditional crops as cultivation of wheat crop was essential for domestic purposes, while the alternative of paddy crop was not available in the Moga district. Consequently, they grew only traditional crops. All categories of non-contract farmers grew potato except the marginal farmers. GCA under potato was turned out to be highest among large farmers (4.3 per cent) followed by small (3.6 per cent), medium (3.3 per cent) and semi-medium farmers (0.6 per cent). Medium and large farmers' category also had some area under moong and maize crop. In case of non-contract farmers, cropping intensity was highest among large farmers (206)

followed by medium (203), marginal (194), small (190) and semi-medium farmers (183). The semi-medium used relatively more area for fodder cultivation as they grew it for commercial purpose besides growing it for domestic dairy animals.

Further, cropping intensity was higher among contract farmers than that among non-contract farmers as they had more area under three month crops. Table 6.11 shows that SID value was highest in case of semi-medium contract farmers (0.30) followed by large (0.27) and medium farmers (0.21). In case of semi-medium contract farmers, the crop diversification away from traditional wheat-paddy was mainly towards chicory crop. Further, in case of large contract farmers, diversification towards potato, chicory and moong was observed. However, in case of non-contract farmers, there was some diversification towards potato crop. It can also be seen from the table that semi-medium and medium contract farmers had shown greater crop diversification away from traditional food-grains towards mainly chicory crop as compared to large farmers, which showed diversification towards potato, other vegetables and chicory. The SID was turned out to be 0.26 in case of contract farmers as compared to 0.08 in case of non-contract farmers.

The number of crops grown was 4.6 among contract farmers. However, on the other side, this number was 3 among non-contract farmers. Thus, contract farmers were not only involved in the cultivation of new chicory crop in the state but also in terms of number of crops grown by all categories of contract farmers were more than crops grown by non-contract farmers (Table 6.12).

Table 6.10

Category-wise Cropping Pattern among Non- contract Farmers

Category/ Cropping pattern	Marginal		Small		Semi-medium		Medium		Large		All	
	Acres	% of GCA	Acres	% of GCA	Acres	% of GCA	Acres	% of GCA	Acres	% of GCA	Acres	% of GCA
Wheat	1.7	48.6	3.5	41.7	6.9	44.2	16.3	44.3	34.7	43.0	10.8	43.7
Paddy	1.7	48.6	3.6	42.8	7.9	50.6	17.5	47.5	38.2	47.3	11.8	47.8
Fodder	0.1	2.8	0.8	9.5	0.6	3.8	0.6	1.5	0.8	1.0	0.6	2.4
Moong	-	-	-	-	-	-	0.8	2.2	1.1	1.4	0.3	1.2
Maize	-	-	-	-	-	-	0.5	1.3	1.0	1.2	0.2	0.8
Potato	-	-	0.3	3.6	0.1	0.6	1.2	3.3	3.5	4.3	0.8	3.2
Others*	-	-	0.2	2.4	0.1	0.6	-	-	1.4	1.7	0.2	0.8
GCA	3.5	100	8.4	100	15.6	100	36.8	100	80.7	100	24.7	100
Net area (acre)	1.8		4.4		8.5		18.1		39		12.3	
CI**	194		190.9		183.5		203.3		206.9		200.8	

Note: CI** is the cropping intensity

Others* include vegetables- carrot, cauliflower, peas, radish, etc.

Table 6.11

Simpson's Index of Diversification among Contract and Non-contract Farmers

Farm size categories	Contract farmers	Non-contract farmers
Marginal	-	0.03
Small	-	0.16
Semi-medium	0.30	0.05
Medium	0.21	0.08
Large	0.27	0.10
All	0.26	0.08

Table 6.12

Average Number of Crops Grown among Contract and Non-contract Farmers

Farm size categories	Contract farmers	Non-contract farmers
Marginal	-	2.1
Small	-	3.1
Semi-medium	4.2	2.7
Medium	4.7	3.2
Large	4.6	4.2
All	4.6	3

Contract farmers of RSL and Paras Spices Pvt. Ltd. were more diversified compared to their non-contract farmers. However, potato's contract farmers were less diversified than the non-contract farmers as the company had terms that maximum of ten acres can be assigned to one farmer as the company wanted to proliferate their relation with farmers. The involvement of corporate players in Punjab agriculture has played a significant role to bring about crop diversification in the vicinity of their operations. Thus, along with increase in area under high value crops, private players are expected to help farmers in increasing their farm incomes. Hence, in next section, an attempt has been made to analyze the costs and returns among contract and non-contract farmers.

6.2 Costs and Returns

6.2.1 PepsiCo's potato under contract and non-contract

6.2.1.1 Description of potato

The vegetables in India are grown over an area of 9.54 million hectares with a production of 168.3 million tonnes during 2014-15. Potato has an area of 2.06 million hectares in India during 2014-15 with a production of 44.9 million tonnes. Thus, potato is grown on around 22 per cent of area among vegetables grown in India. On the other hand, area under vegetables and its production in Punjab during 2014-15 is 196.52 thousand hectares and 4054.08 thousand tonnes, respectively. Potato is the leading vegetable of the state with an area of 219.83 thousand acres comprising 45.28 per cent of total area under vegetables in the state (Gol, 2016). Punjab is sixth largest producer of potato in the country and accounts for 5 per cent of the country's production (Table 6.13). Potato crop is grown during September to December in Punjab. According to PepsiCo, 30,000 potato seed are sown in one acre. The tubers are sown on ridges at the gap of 3 inches for Z grade, 4 inches for A and B grade, 5 inches for C grade, while D grade is sown at the gap of 6 to 7 inches. The company strictly recommended cutting of haulms till end December. In case of late sowing of potato, it can be extended till 5th of January. After this, the chances of aphids attack on potato plants increases as aphids start appearing on mustard flowers.

Table 6.13

Top Seven States in the Production of Potatoes in 2014-15

States	Production (thousand tonnes)	Proportionate share in total production
Uttar Pradesh	14315.00	31.89
West Bengal	10200.30	22.72
Bihar	6345.56	14.13
Gujarat	2964.10	6.60
Madhya Pradesh	2425.00	5.40
Punjab	2260.00	5.03
Assam	1706.04	3.80

Source: Gol, 2016

Further, the area and production of potato in various districts of Punjab is presented in Table 6.14. The main potato growing districts are Jalandhar, Hoshiarpur, Ludhiana, Kapurthala, Amritsar, Moga and Bathinda in that order. Jalandhar is the leading district with 22.69 per cent of the state's area under potato.

Table 6.14
District-wise Area and Production of Potato in Punjab in 2014-15

Districts	Area (acres)	%age area under potato	Production (thousand metric tonne)
Jalandhar	50388	22.69	528.0
Hoshiarpur	31122	14.01	310.3
Ludhiana	24700	11.12	256.0
Kapurthala	22230	10.01	235.7
Amritsar	16796	7.56	173.4
Moga	14820	6.67	157
Bathinda	12350	5.56	133.7
Fatehgarh Sahib	10868	4.90	111.6
Patiala	9880	4.45	106.4
S.B.S. Nagar	5928	2.67	40.0
Tarn Taran	4199	1.89	43.1
S.A.S. Nagar	2964	1.33	29.8
Rupnagar	1976	0.89	20.2
Gurdaspur	1729	0.78	16.4
Ferozepur	1235	0.56	12.3
Faridkot	494	0.22	4.6
Shri Muktsar Sahib	247	0.11	4.0
Mansa	247	0.11	3.4
Sangrur	1482	0.67	15.3
Barnala	4199	1.90	28.9

Source: GoP, 2015

6.2.1.2 Economics of potato production

The costs and returns were analyzed for both contract and non-contract farmers to verify the economic viability of contract farming. The cost of production (A1) per acre for potato crop was turned out to be higher for contract farmers (₹ 47,456.5) as compared to that for non-contract farmers (₹ 33,294.1). The major costs incurred for potato cultivation were seed, rent paid for leased-in land, fertilizer and plant protection chemical among contract and non-contract farmers. The seed cost was higher among contract farmers (₹ 23,020.74) as compared to non-contract farmers (₹ 15,100). Seed treatment was done at the cost of ₹ 12/ bag by the workers. The seed cost was higher for contract farmers as they used more quantity of superior quality seed mainly A and B grade, while non-contract farmers used mixed seed of all grades for sowing potato. The total cost of production, cost C for the contract farmers was ₹ 59,757 per acre, whereas for non-contract farmers, it was ₹ 45,872.1 (Table 6.15). Various other studies in Punjab has also confirmed high cost of production in case of contract farmers due to higher input costs (Dhillon and Singh, 2006; Kumar, 2006).

The contract farmers did not incur any marketing costs while selling the produce to the contract firm as the produce was farm-picked by the firm and the gunny bags were also provided by it free of cost to the farmers. On the other side, non-contract farmers had to purchase the gunny bags for packing. The labour charges for grading, packing and sewing of one bag of 50 kg was ₹ 20.17. Each gunny bag costs vary between ₹ 10-18 on the basis of quality requirement for immediate sale or storage. The average cost of gunny bags was turned out to be ₹ 3,249.2 per acre for non-contract farmers. Furthermore, in case of contract farmers, labour for grading along with grader was provided by the company for grading the produce, but in case of non-contract farmers, they themselves had to bear the grading cost, which amounted ₹ 5,349.3 per acre. The contract farmers also did not incur any transportation cost as the contracting firm picked up the produce from the farmers' field (Table 6.16).

Table 6.15

Production Costs among Contract and Non-contract Farmers

Cost component (₹/acre)	Contract farmers	Non-contract farmers
Seed	23020.74 (38.52)	15100 (32.91)
Seed treatment	526.2 (0.88)	543 (1.18)
Machine labour	2474 (4.14)	2576 (5.61)
Dressing up	558 (0.93)	678 (1.48)
Manure	154 (0.26)	120 (0.26)
Fertilizer	7399.6 (12.38)	6588.6 (14.36)
Plant protection	4787.6 (8.01)	3098 (6.75)
Irrigation	632 (1.05)	600 (1.31)
Hired labour	2301 (3.85)	1650 (3.60)
Dehauling	914 (1.53)	966 (2.11)
Digging-up	3704 (6.20)	494 (1.08)
Depreciation on farm implements	288.3 (0.48)	394.3 (0.86)
Interest on working capital	697.1 (1.17)	486.2 (1.06)
Cost A1	47456.5	33294.1
Cost A2	56969	43094.1
Cost B	58325	44714.1
Cost C	59757	45872.1

Note: Figures in parentheses indicate percentage to total cost C.

Table 6.16

Marketing Costs among Contract and Non-contract Farmers (per acre)

Components	Contract farmers	Non-contract farmers
Cost of gunny bags	-	3249.2 (25.23)
Grading, packing and sewing	-	5349.3 (41.53)
Transportation cost	-	748 (5.81)
Marketing cost	-	9346.5

Note: Figures in parentheses indicate the marketing cost in ₹/quintal.

As the cost of production was higher among contract farmers, farmers would likely to indulge in contract farming only if the returns were high enough to alleviate the higher costs effect. The average yield of potato was higher among non-contract farmers (128.8 quintal/acre) than that among contract farmers (85.58 quintal/acre). The reason for lower yield among contract farmers was that the company strictly recommended cutting of haulms till end December. However, non-contract farmers cut haulms till the end of January. The entire produce of the contract farmers was procured by the company. The farmers were not allowed to sell in open market and storage for seed was also not allowed. However, non-contract farmers stored about 17 per cent produce in cold stores for the next season seed. The non-contract farmers sold their table and seed grade produce to the wholesaler, while *goli* in the local vegetable markets. The company procured A and B grade produce at ₹ 10/kg, C grade at ₹ 8/kg, while D and Z grade were procured at ₹ 4.5/kg each. In case of contract farmers, whole potato produce was procured by the company at the pre-fixed price except cut-cross pieces, while in case of non-contract farmers, the *goli* grade remained unsold. Thus, contracted prices for all grades were higher for the contract farmers than the market price for the non-contract farmers. Therefore, returns were higher among contract farmers due to price differentials (Table 6.17). The returns were turned out to be higher among contract farmers as higher prices for the produce compensated for lower yield and high cost of production. Various other studies have also shown similar results that the returns for the contract farmers are profitable as compared to the non-contract farmers (Kumar, 2006; Nagaraj *et al.*, 2008; Singh, 2009).

Table 6.17
Returns of Contract and Non-contract Farmers

Farmers>	Contract farmers					Non-contract farmers		
Grades>	A	B	C	D	Z	Goli*	Table*	Seed
Yield (qtl./acre)	85.58					128.8		
Quantity stored for seed (quintal)	-	-	-	-	-	-	-	22.13 (17.2)
Sold (%)	33	35	22	8	2	7	62.9	30.1
Quantity sold (qtl.)	28.2	29.9	18.8	6.8	1.7	7.5	67.1	32.1
Price (₹/kg)	10	10	8	4.5	4.5	1	6.6	8.2
Gross return (₹/acre)	28200	29900	15040	3060	765	750	44286	26332
Overall return	76965					71368		
Production cost (₹/acre)	59757					45872.1		
Marketing cost (₹/acre)	-					9346.5		
Total cost	59757					55218.6		
Net return (₹/acre)	17208					16149.4		

Note: * Goli grade means the smallest size of the produce and table grade means the largest size of the produce.

Though the returns were slightly higher among contract farmers than the non-contract farmers and the contract farmers also had lower yield and higher input cost for potato cultivation, then also the farmers preferred to involve in contract farming due to stable prices given by the firm over the years. While, the prices received by the non-contract farmers varied during the season and over the years. The prices fell down in open market sharply whenever there was a glut in the market. The contract farmers received same prices in 2016 as in 2015. The non-contract farmers received on average ₹ 160-250/quintal, while the contract farmers received prices as specified in the contract. Thus, in 2015, potato season, contract farmers earned 7-8 times more income than the non-contract farmers. Further, again in 2017 season, due to glut production prices fell down sharply i.e. to ₹ 200/quintal in the open market while contract farmers got pre-fixed price.

6.2.2 RSL's sugarbeet under contract and wheat under non-contract

6.2.2.1 Description of sugarbeet crop

Sugarbeet (*Beta vulgaris*) is a temperate crop. The tentative trials for root and seed crop were approved in India by Indian Institute of Sugarcane Research in 1950's. Its commercial cultivation started in Sri Ganganagar in 1970 and maximum area was over 1200 hectares in 1975-76 (Singh *et al.*, 1985). In 2004, multinational seed companies led by Sygenta announced development of sugarbeet seed for tropical regions. Thus, in 2005-06, Indian council of agricultural research launched new research project along with the partnership of VSI to evaluate the feasibility of new variety seeds. 22 per cent of the world's total sugar production is produced from sugarbeet (Kumar *et al.*, 2013a; Pathak *et al.*, 2014). Sugarbeet has to be supplied to the sugar mill within 24 hours of harvesting as it deteriorates fast after harvesting. Its beet also acts as a highly nutritious cattle-feed and improves the milk yield of cows.

Sugarbeet is a biennial sugar producing tuber crop. It is sown in October-November and harvested in April-May. It was grown as a garden vegetable and for fodder long before it was valued for its sugar content. It has a conical, white, fleshy root and a flat crown. Sugar is formed through a process of photosynthesis in the sugarbeet's rosette of leaves. Sugarbeet requires good sunshine during its growth period. The crop does not prefer high rainfall as high soil moisture or continuous

heavy rain affect development of tuber and sugar synthesis. The optimum temperature for germination is 20-25°C, for growth and development is 30-35°C while sugar accumulation requires a temperature of 25-35°C. Well drained sandy loam and clayey loam soils with fairly good organic status are suitable for its cultivation. The root of the beet contains 75 per cent water and 25 per cent dry matter. The dry matter comprises about 5 per cent pulp. The sugar content in sugarbeet can vary from 12 per cent to 20 per cent. The sugar extraction rate depends on sugar content of the sugarbeet at the moment of its arrival in the processing plant. The standard sugarbeet should have a sugar content of 16 per cent, which would yield 130 kg of sugar per tonne of standard sugarbeet processed at a sugar plant. Sugarbeet pulp and molasses are its processed by-products widely used as feed supplements for livestock. Seeds required for one acre is 1400 gram or about 42,000 seeds. The crop is sown in rows 50-56 cm apart at 15 cm plant to plant spacing. The maximum expected yield of sugarbeet from an acre is about 500 quintal.

Both wheat and sugarbeet are *rabi* crops. The sowing and harvesting time for both crops is same i.e. October-November and April-May, respectively. RSL promoted the sugarbeet as best alternative to wheat crop by claiming to have around ₹ 9500 more income through leaflets (Appendix H). Further, there is no open market for the sugarbeet as such and the firm itself is the sole buyer in the Punjab. Thus, economic analysis of the crop viability is possible only with alternative wheat crop in the vicinity of sugarbeet growers.

6.2.2.2 Description of wheat crop

Wheat in India is grown on an area of 30.97 million hectares with a production of 88.94 million tonnes. In Punjab, wheat is grown over an area of 3.51 million hectares with a production of 15.78 million tonnes. In 2015-16, about 45 per cent of the gross cropped area of the state was under wheat cultivation (GoP, 2015-16). As presented in Table 6.18, Punjab is second largest producer of wheat in India and accounts for 17.74 per cent of the nation's production. Punjab also tops among all the states by contributing 41.5 per cent of wheat to the central pool during 2014-15 (Gol, 2015). Further, district-wise area under wheat in Punjab is

presented in Table 6.19. Wheat is the first major crop in all districts of the state except two districts namely Kapurthala and Fatehgarh Sahib (GoP, 2011).

Table 6.18

Top Seven States in the Production of Wheat in 2014-15

States	Production (million tonnes)	Proportionate share in total production
Uttar Pradesh	25.22	28.36
Punjab	15.78	17.74
Madhya Pradesh	14.18	15.94
Haryana	11.86	13.33
Rajasthan	9.87	11.10
Bihar	4.05	4.55
Gujarat	3.22	3.62

Source: Gol, 2015

Table 6.19
District-wise Area under Wheat in Punjab in 2014-15

Districts	Area (acres)	Proportionate share to total wheat area
Sangrur	701480	8.10
Bathinda	627380	7.25
Ludhiana	624910	7.21
Patiala	575510	6.65
Shri Muktsar Sahib	513760	5.93
Faridkot	508820	5.88
Amritsar	464360	5.36
Ferozepur	464360	5.36
Tarn Taran	464360	5.36
Gurdaspur	461890	5.33
Moga	432250	4.99
Jalandhar	412490	4.76
Mansa	410020	4.74
Hoshiarpur	370500	4.28
Barnala	281580	3.25
Kapurthala	271700	3.14
Fatehgarh Sahib	207480	2.40
S.B.S. Nagar	187720	2.16
Pathankot	103740	1.98
Rupnagar	163020	1.88
S.A.S. Nagar	123500	1.43

Source: GoP, 2015

6.2.2.3 Economics of sugarbeet and wheat production

Costs and returns are expected to be diverse across crops and regions. Various studies affirmed high cost of production for the contract crops, so the farmers will likely to indulge in contract farming only if they will get high net returns. The costs and returns for both the crops are examined to check viability of contract crop. Table 6.20 shows different types of costs of production for sugarbeet and wheat crop, which were observed to be higher in case of sugarbeet contract crop than in

case of non-contracted wheat crop. The total cost of production C for sugarbeet crop was ₹ 38,371 per acre and for wheat crop, it was ₹ 20718 per acre. The major cost components among contract and non-contract farmers were machine labour, fertilizer, weeding (only in case of sugarbeet crop) (Photo 6.1) and harvesting (Photo 6.2). The contract farmers spent about 17 per cent of the total cost only on weeding.

Table 6.20
Production Costs among Contract and Non-contract Farmers

Cost component (₹/acre)	Sugarbeet	Wheat
Machine labour	1998 (5.21)	1752 (8.46)
Seed	1000 (2.61)	1237 (5.97)
Rowing	485 (1.26)	-
Manure	278 (0.72)	130 (0.63)
Fertilizer	3263.6 (8.50)	2065.2 (9.97)
Plant protection	1413 (3.68)	958 (4.62)
Weeding	6592 (17.18)	99 (0.48)
Hired labour	904 (2.35)	753 (3.63)
Irrigation	445 (1.16)	22 (0.11)
Digging-up/Harvesting	4580 (11.94)	1156 (5.58)
Depreciation on farm implements	345.2 (0.90)	308.2 (1.49)
Interest on working capital	628.7 (1.64)	245.2
Cost A1	21932.5	8725.6
Cost A2	36132.5	19885.6
Cost B	37593	20124
Cost C	38371	20718

Note: Figures in parentheses are percentages to the total cost C

Photo 6.1
Manual Weeding in the Sugarbeet Crop



Photo 6.2
Harvesting of Sugarbeet with Harvester



Even during field survey, emergence of weed in the sugarbeet was confirmed by the company officials and the farmers. The contract farmers incurred about 12 per cent of the total cost on harvesting and 8.50 per cent on fertilizers for sugarbeet, while non-contract farmers had to incur about 10 per cent of the total costs on fertilizers followed by 8.5 per cent on machine labour, about 6 per cent on seed, and 5.6 per cent on harvesting.

In sugarbeet, transportation cost was ₹ 1866 per acre, while loading/unloading charges accounted for ₹ 530 per acre. The non-contract farmers had to spend ₹ 483 per acre as transportation cost, ₹ 127.64 per acre as cleaning and ₹ 70.26 per acre as loading and unloading charges (Table 6.21). The transportation cost was higher among contract farmers as they had to deliver their produce at the company but on the other hand, non-contract farmers sold their produce in their own village or nearby villages' focal point.

Table 6.21
Marketing Costs among Contract and Non-contract farmers

Components	Sugarbeet	Wheat
Transportation cost	1866 (6.13)	483 (28.11)
Loading and unloading charges	530 (1.74)	70.26 (4.1)
Cleaning	-	127.64 (7.43)
Marketing cost	2396	680.9

Note: Figures in parentheses indicate the marketing cost in ₹/quintal.

The average yield in sugarbeet was 304.2 quintal/acre and in wheat, it was 17.18 quintal/acre. The contract farmers sold their entire produce to the company. However, non-contract farmers sold 86.7 per cent of the wheat produce and the remaining was stored for domestic use and seed. The average price was ₹ 167.6 per quintal and gross return per acre was turned out to be ₹ 50,967.4 among contract farmers. The average price for non-contracted wheat crop was ₹ 1550 per quintal and gross return was worked out to be ₹ 26,629 per acre. The net return in case of contract farmers was ₹ 10,200/acre as compared to ₹ 5,230/acre in case of non-contract farmers. Therefore, sugarbeet was found to be more remunerative *rabi* crop as compared to wheat crop (Table 6.22). The study by Pathak *et al.*

(2014) also concluded that the sugarbeet crop is more profitable than other *rabi* crops such as wheat and mustard.

Table 6.22
Returns of Contract and Non-contract Farmers

Farmers>	Sugarbeet	Wheat
Yield (quintal./acre)	304.2	17.18
Sold (%)	100	86.7
Quantity sold (quintal)	304.2	14.9
Price (₹/quintal)	167.6	1550
Gross return (₹/acre)	50967.4	26629
Production cost (₹/acre)	38371	20718
Marketing cost (₹/acre)	2396	680.9
Total cost (₹/acre)	40767	21398.9
Net returns (₹/acre)	10200.4	5230.1

6.2.3 Paras Spices Pvt. Ltd.'s chicory under contract and wheat under non-contract

6.2.3.1 Description of chicory crop

Chicory is a root crop, dates back 5000 years referred to in the days of Cleopatra and Napoleon. It is not only used as beverage, but also as a vegetable. It is also known to have high medicinal value. During 1785, it was a common household product- served as herb beverage and as a hot or cold vegetable at mealtime in American colonies. In India, it is presently used as a coffee additive or as its substitute. It is a caffeine-free herb; therefore it is used as a popular coffee substitute as well as an ingredient of many coffee recipes around the world. The chicory not only increases the bulk and keeping quality of coffee but it also provides special flavour and taste and thus, improves the quality of puree coffee. The current interest in chicory has emerged due to its worldwide use in the manufacturing of coffee and its related products such as coffee like beverages, powdered dried extract or paste. Sometimes, it is also used as a flavouring ingredient for various other food products such as desert mixes, confectionery composition, etc. It is also used by tea making companies in India as being a cheaper source. The maximum expected yield of chicory crop is 250 quintal/ acre.

In India, chicory cultivation is not popular as farmers are not much aware about the marketability of the crop. During 1974, chicory cultivation started in India. It is appraised as both complementary as well as supplement to coffee. During 2014, Gujarat and Uttar Pradesh accounts for the 97 per cent of the total production of crop in India (Haque and Ahmad, 2014). In 2005, Nestle introduced chicory in Punjab. Chicory is a six month crop. It's sowing starts during second week of October and it is harvested in end-March or by the first week of April. A chicory seedling is done at 8-9 inches apart allowing 8 inches between rows (Photo 6.3). Chicory roots are the most common source of inulin as its roots contain 15-16 per cent of sugar content.

6.2.3.2 Economics of chicory and wheat production

The total cost of production/acre, cost C for chicory crop was worked out to be ₹ 45,048. The major costs in chicory cultivation were on labour for harvesting, weeding, fertilizer and machine labour. Further, the farmers had to spent ₹ 1312/acre on plant adjustment after the sapling of seeds. The total cost of production, cost C in wheat was turned out to be only ₹ 20,856 per acre. The major costs of farmers in wheat were rental value of land, fertilizers, machine labour, pesticides, seed and harvesting cost (Photo 6.4). The rental value of land was higher among chicory farmers (₹ 12630/acre) than that among wheat farmers (₹ 9690/acre) (Table 6.23).

The transportation cost was ₹ 2856/acre among chicory farmers, while wheat farmers incurred only ₹ 242/acre as transportation cost. The transportation cost was higher among contract farmers as they had to deliver their produce at the company and per acre produce quantity was also higher in case of contract crop as compared to non-contract crop that ultimately required more machinery to transport the produce. The loading of chicory was done by hired harvesting labour, while unloading was done with lift-trolley at the company. The loading and cleaning charges accounted for ₹ 66.7/acre and ₹ 118.6/acre respectively among wheat farmers (Table 6.24). The central government extends price support to wheat through FCI and state agencies. The procurement at MSP is open-ended i.e., whatever food-grains are offered by the farmers, are purchased at MSP by the government agencies within the stipulated procurement period, provided that the

food-grains conform to the quality specifications prescribed by the procurement agencies.

Table 6.23
Production Cost among Contract and Non-contract Farmers

Cost component (₹/acre)	Chicory	Wheat
Machine labour	2476 (5.49)	1786 (8.56)
Seed	1700 (3.77)	1160 (5.56)
Plant adjustment	1312 (2.91)	-
Manure	120 (0.27)	70 (0.33)
Fertilizer	4727 (10.49)	2329.3 (11.17)
Plant protection	1998 (4.43)	1193 (5.72)
Weeding	7420 (16.47)	130 (0.62)
Hired labour	630 (1.40)	1054 (5.05)
Irrigation	88 (0.19)	50 (0.24)
Digging-up/Harvesting	7910 (17.56)	1104 (5.29)
Depreciation on farm implements	154.8 (0.34)	176 (0.84)
Interest on working capital	851.4 (1.89)	266.2 (1.28)
Cost A1	29387.2	9318.5
Cost A2	42017.2	19008.5
Cost B	44312	20136
Cost C	45048	20856

Note: Figures in parentheses are percentages to the total Cost C.

Table 6.24
Marketing Costs among Contract and Non-contract Farmers

Components	Chicory	Wheat
Transportation cost	2856 (14.41)	242 (14.49)
Loading and unloading charges	-	66.7 (4.0)
Cleaning	-	118.6 (7.1)
Marketing cost	2856	427.3

Note: Figures in parentheses indicate the marketing cost in ₹/quintal.

The average yield in chicory crop was 198.1 quintal/acre, while in wheat, it was 16.7 quintal/acre in Moga district. The contract farmers sold their entire chicory produce to the company. The non-contract farmers sold 84 per cent of wheat produce as the farmers retained the remaining for domestic use and seeds. The average price received in chicory was ₹ 340 per quintal and gross returns per acre were turned out to be ₹ 67,354 among contract farmers. In wheat, the farmers received average price ₹ 1550 per quintal and gross return was only ₹ 25,885 per acre. The net return in case of contract farmers was ₹ 19,450/acre as compared to only ₹ 4601.7/acre in case of non-contract farmers. Thus, chicory was more remunerative *rabi* crop as compared to wheat crop (Table 6.25). During the field survey, the farmers also argued that three acres of chicory cultivation gives return equal to five acres of wheat cultivation.

Table 6.25

Returns in Chicory among Contract and Wheat among Non-contract Farmers

Farmers>	Chicory	Wheat
Yield (quintal/acre)	198.1	16.7
Sold (%)	100	84
Quantity sold (quintal)	198.1	14.01
Price (₹/quintal)	340	1550
Gross return (₹/acre)	67354	25885
Production cost (₹/acre)	45048	20856
Marketing cost (₹/acre)	2856	427.3
Total cost (₹/acre)	47904	21283.3
Net returns (₹/acre)	19450	4601.7

Photo 6.3
Chicory Crop at Paras Spices Pvt. Ltd.'s Contract Farm



Photo 6.4
Harvesting of Chicory under Contract with Paras Spices Pvt. Ltd.



6.3 Summary

The analysis in this chapter reveals that contract farming in the study areas has largely been able to diversify the cropping pattern in favour of non-traditional vegetable crops except in the case of potato, where the company had an agreement for 10 acres of land and preferred farmers of medium category. The analysis rejects the fifth hypothesis and claims that farmers are accepting new crops even without any government roles for the promotion of new crops. The contract farmers had not only put more area under non-traditional crops, but also produced higher number of crops as compared to non-contract farmers that helped them to manage risk. The potato contract farmers had higher cost of production as compared with non-contract farmers since contract farmers had to sow the seeds provided by the company, which were costlier than the seeds available in local market. Both new sugarbeet and chicory crops had higher cost of production as compared to traditional wheat crop. However, the net income of the contracted crops such as potato, sugarbeet and chicory was turned out to be higher in comparison with the potato and wheat which were either grown as such or as substitute.