



## Impact of Crop Diversification on Farmers Socio-economic Conditions of the Farmers: A Case of Himachal Pradesh

K C Gummagolmath\*, R S Bhawar, S B Ramya Lakshmi and Priyanka Patra

National Institute of Agricultural Extension Management, Rajendranagar, Hyderabad - 500 030, Telangana, India

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### ABSTRACT

The present study on impact of crop diversification was conducted in the state of Himachal Pradesh considering various parameters like socio-economic conditions of farmers, change in cost cultivation, change in income and self-sufficiency of the farmers. Both, primary data and secondary data were used for the study. The study revealed that after the implementation of the project, area under vegetables cultivation increased by 232 per cent and 328 per cent in *rabi* and *kharif* season, respectively. Whereas area under paddy, wheat, maize and barley declined by 16.28 per cent, 23.05 per cent, 22.70 per cent and 76.89 per cent, respectively. After the intervention of the project, the crop diversification index increased from 0.48 to 0.62 on the scale. Yield performances of vegetable crops has been impressive with 100 to 150 per cent increase in both *rabi* and *kharif* seasons before and after implementation project. Of the total respondents, 73.62 per cent, 74.08 per cent and 63.76 per cent of have attained self-sufficiency in production of vegetables, milk and food grain production. About 77.06 per cent of the respondents opined that their annual income has increased due to diversification. Crop diversification has great potential in improving yield, reducing the cost of cultivation and finally increase the net income realized by the farmers.

**Key words:** Crop diversification, Yield, Income, Cost, Vegetables

Agriculture has been the backbone of the Indian economy and it will continue to remain so for a long time. Agriculture is pivotal for socio-economic development of the country as it employs about 48 percent of total work force despite the fact that share of agriculture in India's GDP has declined from 48.7 per cent in 1950 to around 13 per cent in 2016 (GOI 2016). The growth in agriculture no doubt has helped in achieving self-sufficiency in food security but with changing socio-economic scenario, rise in per capita income and demand for high-value products, farmers are required to diversify their cropping pattern from food grains to high value crops such as fruits and vegetables. In the post green revolution period, the quest of achieving food security and the policy measures like support price programme have resulted in over focus of food crops, mainly rice and wheat combination, leading to mono-cropping, depletion of resources and host of diseases.

In the meantime, the high-value segment of agriculture

offers considerable opportunities to farmers for improvement in their livelihood as the food basket is undergoing a significant change (Birthal *et al.* 2007). The consumption of food items is moving away from food grains and changing towards horticultural products like fruits and vegetables, food items of animal origin like milk, eggs, meat, fish, etc. This shift in consumption pattern to some extent resulted in diversification towards high value food and change in income and taste and preferences of consumers (Mittal 2007, Reddy 2004, Reddy 2009).

Under the present dispensation of demand for high value crops, addressing the constraints faced by small holders is vital for their inclusion in the development process of Indian agriculture and rural India. Hence, there is a need to diversify the cropping pattern from the traditional cereal crops to high value crops such as fruits and vegetables. In addition to production, improving the access of small holders to market is vital in improving their income

\*Corresponding author: Dr. K. C. Gummagolmath, Director (Monitoring and Evaluation), National Institute of Agricultural Extension Management (MANAGE), Rajendranagar, Hyderabad - 500 030, Telangana  
e-mail: kcgum123@gmail.com | Contact: +91- 9666000724

realization.

The state of Himachal Pradesh enjoys the congenial conditions for diversification towards vegetables, cash crops and other high value crops from the present situation of mono-cropping. Further, there is immense scope for harnessing potential for cultivation of off-season vegetables through crop diversification programmes in the state. In line with the development policies of the State, conditions prevailing in the low hill areas of the state and with focus on increasing agricultural income, crop diversification is deemed to relevant option to be include in state agriculture policy by involving the various stakeholders.

One of such joint effort is the Himachal Pradesh Crop Diversification Promotion Project, being implemented by Government of Himachal Pradesh in collaboration with the Japan International Cooperation Agency- Official Development Assistance (JICA-ODA) during 2011-2021 (Anonymous 2016). The project aims at promoting crop diversification in the target area of five districts of Himachal Pradesh namely, Bilaspur, Hamirpur, Kangra, Mandi and Una through rehabilitation and development of infrastructure such as irrigation facilities, farm access roads, capacity building programme for farmers on vegetable cultivation, improving yield of food grains, post-harvest management, strengthening of extension services of Department of Agriculture and allied sectors. As against this backdrop, an attempt has been made in the present study to analyze the Impact of Crop Diversification on Farm income due to intervention in the form of project funded by JICA.

The study was conducted by using the primary data with the help of well-structured schedule in five district of Himachal Pradesh namely, Hamirpur, Una, Bilaspur, Kangra and Mandi of Himachal Pradesh. Data have been collected for the two periods i.e. during 2010-11 (baseline survey) and 2018-19. Stratified sampling technique was adopted to draw the sample beneficiaries from the selected districts. Selection of sample is done in proportionate to the total beneficiaries in the selected districts. Total sample size comprised 436 respondents in the study districts. Along with the primary survey, MANAGE also conducted 12 Focus Group Discussion (FGD) to collect the qualitative information from the selected respondents. The collected data was statistically analyzed by using suitable simple descriptive statistics (mean, percentage change, growth rate), pivot tables. The analysis is carried out by using of the following formulae:

$$\text{Change in cropping pattern (\%)} = \frac{\text{Crop area after implantation of project} - \text{Crop area before implantation of project}}{\text{Crop area before implantation of project}} \times 100$$

$$\text{Change in crop yield performance (\%)} = \frac{\text{Crop yield after implantation of project} - \text{Crop yield before implantation of project}}{\text{Crop yield before implantation of project}} \times 100$$

$$\text{Crop diversification Index} = 1 - \frac{\sum x^2}{\sum(x)^2}$$

## MATERIALS AND METHODS

Table 1 Socio-economic conditions of the sample respondents (n=436)

Particulars	Holding <1ha	Holding 1-2 ha	Holding >2 ha	Total
No. of respondents	364 (83.49)	56 (12.84)	16 (3.67)	436 (100)
Sex				
Male respondents	171 (39.22)	42 (9.63)	11.00 (2.52)	224.00 (51.38)
Female respondents	193 (44.27)	14 (3.21)	5.00 (1.15)	212.00 (48.62)
occupation				
Farming	335 (76.83)	50 (11.47)	12 (2.75)	397.00 (91.06)
Non-farm	24 (5.50)	4 (0.92)	3 (0.69)	31.00 (7.11)
Agriculture labour	5 (1.15)	2 (0.46)	1 (0.23)	8.00 (1.83)
Land holding size	364 (83.49)	56 (12.84)	16 (3.67)	436 (100)
Head of the family	232 (53.21)	44 (10.09)	14.00 (3.21)	290.00 (66.51)
Marital status	351 (80.50)	55 (12.61)	16 (3.67)	422.00 (96.79)
Average age of the respondents (Years)	49.56	56	57.43	50.24
Average family size (No.)	5.23	5.94	5.75	5.34
Average education level of the respondents (Years)	7.72	8.35	9.81	7.88
Respondents stay in the village	355 (81.42)	56 (12.84)	16 (3.67)	427 (97.94)

Figures in the parenthesis indicates the percent of the respondents to total

## RESULTS AND DISCUSSION

### *Socio-economic profile of the respondents*

From (Table 1) it is revealed that, of the total 436 sample house holds, about 83.50 per cent of the respondents have land holding less than one ha, 12.84 per cent of the responders have 1-2 ha land holding and only 3.67 per cent of the respondents have land holding of more than 2 ha of

the sample respondents, 51.38 per cent of them are male and remaining 48.62 per cent are female respondents. Major proportion of the respondents are farmers by profession (91.06), followed by non-agriculture (7.11%) and hardly two per cent of them are agricultural labour. Almost 96.79 per cent of the respondents were married and found to have attained middle age. Average age of the respondents was in the range of 49.56 to 57.43 yrs. This age group is an

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experienced section of the project beneficiaries and thus, are able to adopt new technologies and various other components of the intervention. Irrespective of the land

holding size, average family size is 5-6 members per family and average education level is 7 to 10 years. Almost all the respondents i.e. 97.94 per cent are staying in village.

Table 2 Cropping pattern in the study area prior to project implementation

Crops cultivated	Rabi (Ha)	Percent share in total area	Kharif (Ha)	Percent share in total area	Total area (Ha)	Percent share in total area
Paddy	0.00	0.00	56.25	32.87	56.25	16.14
Wheat	112.35	63.31	0.00	0.00	112.35	32.23
Maize	0.00	0.00	62.02	36.24	62.02	17.79
Barley	9.65	5.44	0.00	0.00	9.65	2.77
Pulses	1.34	0.76	2.44	1.43	3.78	1.08
Vegetables	30.76	17.33	17.77	10.38	48.53	13.92
Fruits	3.08	1.74	2.12	1.24	5.2	1.49
Grass/ fodder	18.20	10.26	26.47	15.47	44.62	12.81
Others	2.09	1.18	4.06	2.37	6.15	1.76
Total	177.47	100	171.13	100.00	348.60	100

### Cropping pattern followed in the study area

A peep into the (Table 2) revealed that cereal based cropping pattern is predominantly noticed before the intervention of the HPCDP project. In *rabi* season, wheat crop constituted a major share in total cropped area (63.31%) followed by vegetable crops (17.33%) and grass/ fodder crops (10.26%). Vegetables are mainly cultivated in *rabi* season, while, allocation of area in *kharif* season is less (10.38%) as compared to *rabi* season. Cultivation of pulses, fruits and barley was confined to very limited area in both the seasons. Maize and paddy constituted major share in

total cultivated area in *kharif* season. The cereals based production on fragmented land holding is not economically viable due to low marketable surplus. Irrespective of the land holding size, cereals dominated the cropping pattern and same area was allowed to vegetable cultivation. In all, out of total cultivated area of 348.60 ha about 70.01 per cent of the area is under cereals based crops (Table 2). This cropping pattern clearly indicates that there was a wide scope for crop diversification i.e. shift from cereal based production to commercial crop (vegetables) production in the study area for enhancing the farmer's income.

Table 3 Shift in cropping pattern after HPCDP implementation

Crop	Before the project implementation			After the project implementation			Change in area (%)		
	Rabi	Kharif	Total	Rabi	Kharif	Total	Rabi	Kharif	Total
Paddy	0	56.25	56.25	0.00	47.09	47.09		-16.28	-16.28
Wheat	112.35	0	112.35	86.45		86.45	-23.05		-23.05
Maize	0	62.02	62.02	0	47.94	47.94	0.00	-22.70	-22.70
Barley	9.65	0	9.65	2.23	0	2.23	-76.89	0.00	-76.89
Pulses	1.34	2.44	3.78	1.24	3.7	4.94	-7.46	51.64	30.69
Vegetables	30.76	17.77	48.53	102.19	76.13	178.32	232.22	328.42	267.44
Fruit crops	3.08	2.12	5.2	4.72	4.34	9.06	53.25	104.72	74.23
Grass/ fodder	18.2	26.47	44.67	18.03	22.83	40.86	-0.93	-13.75	-8.53
Others	2.09	4.06	6.15	4.41	3.72	8.13	111.00	-8.37	32.20
Total	177.47	171.13	348.60	219.27	205.75	425.02	23.55	20.23	21.92

### Change in cropping pattern: Before and after implementation of the project

From the (Table 3) it can be observed that prior to the implementation of the project, area under cereals was predominant both in *kharif* and *rabi* season. Whereas, after implementation of the project, area under vegetables has increased significantly. Area under paddy, wheat, maize and barley declined by 16.28%, 23.05%, 22.70% and 76.89 per cent, respectively after implementation of the project. While, it was noticed that area under pulse crops increased by 30.69 per cent mainly to meet the demand for self-consumption. There has been tremendous increase in the area under vegetables after the intervention of the project. The area under vegetables increased by as high as 267 per cent.

### Change in crop share in total cropped area

It can be observed from the (Table 4) that the share of wheat and paddy in the total cropped area declined from 32.23 per cent and 16.14 to 20.36 per cent and 11.07 percent, respectively during the comparative period. Whereas, share of area under maize has declined from 17.79 per cent to 11.29 per cent and share of barley crop declined from 2.77 per cent to 0.53 per cent. Shift in the area allocated to pulses *vis-a-vis* other crops is not significant. While in the case of vegetable crops, significant shift in area is noticed before and after implementation of the project. The area under vegetable crops has drastically increased from 13.92 per cent before the project to 41.94 percent after the project period in the total cropped area. The share of area

under fruits crops has marginally increased i.e. from 1.49 percent to 2.04 per cent.

Table 4 Share of the crops in total area cultivated before and after implementation of the project

Crops	Absolute value (Ha)		% share in total area (X <sub>1</sub> ) (Before)	% share in total area (X <sub>2</sub> ) (After)
	Before	After	(X <sub>1</sub> ) (Before)	(X <sub>2</sub> ) (After)
Wheat	112.35	86.45	32.23	20.32
Paddy	56.25	47.09	16.14	11.07
Maize	62.02	47.94	17.79	11.27
Barley	9.65	2.36	2.77	0.55
Pulses	3.78	4.96	1.08	1.17
Vegetables	48.53	178.43	13.92	41.94
Fruits	5.2	9.06	1.49	2.13
Grass/ fodder	44.67	40.88	12.81	9.61
Others	6.15	8.13	1.76	1.91
Total:		425.44	100.00	100.00

#### Index of crop diversification

Data in (Table 5) revealed that after the intervention of the project, the crop diversification index increased from 0.48 to 0.62 on the scale, and thus indicated that the crop diversification has taken place by shifting the cultivated area from cereals based cropping system to vegetables and orchard crops. This finding is supported from the previous analysis of shift in the acreage allocation from cereal crops to vegetable crops.

Table 5 Crop group-wise diversification index

Crops	% share in total area (X <sub>1</sub> )	% share in total area (X <sub>2</sub> )	x <sub>1</sub> <sup>2</sup>	x <sub>2</sub> <sup>2</sup>
	Before the project	After the project	Before the project	After the project
Cereals	69.00	43.28	4760.53	1872.78
Pulses	1.08	1.14	1.17	1.31
Vegetables	13.90	41.98	193.12	1762.56
Fruits	1.49	2.13	2.22	4.55
Fodder	12.77	9.63	163.18	92.67
others	1.76	1.91	3.10	3.67
Total	100.00	100.08	5123.32	3737.54
Changes in the diversification index				
Particulars	Before the project		After the project	
Sum of x <sub>1</sub> <sup>2</sup>	5123.32		3737.54	
Sum of (x <sub>1</sub> ) <sup>2</sup>	10000		10015	
Index of crop diversification	0.488		0.626	

#### Change in of yield performance of different crops before and after implementation of the project

From the (Table 6) it can be observed that wheat yield increased by 30.17 per cent, paddy (17.06%), maize (21.17%), barley (22%) and pulses (64%). Similarly, vegetable yields increased by 108% and fruit yields increased by 11.52%. Finally, fodder crops also registered positive growth in yields in both the seasons. On comparing

yield across the different land holding sizes, in the case of wheat, the incremental yield was in the range of 18 to 30 per cent across the categories of farmers, while incremental yield in the case of paddy was in the range of 15 to 43 per cent. In the case of maize crop yield has increased in the range of 17 to 27% across the categories. Pulse crops in *rabi* have shown an impressive growth in yield (manifolds) after receiving the technical support and training from the officials/experts under crop diversification project. Among the entire crops cultivated in the study area, yield performances of vegetable crops has been impressive with 100 to 150% increase in both *rabi* and *kharif* seasons. Even in the case of fodder crops also yield improvement was noticed i.e. 37% growth as compared to yield before the project. Overall, the results of the study indicated it may be concluded that the interventions by the project not only have helped in crop diversification towards vegetables, but also have resulted in improvements in the yield of all the crops.

Table 6 Change in yield of different crops before and after the project

Crops cultivated	Land holding <1 ha					
	Rabi		Kharif		Rabi	Kharif
	Prior to project	After project	Prior to project	After project	% change in yield	% change in yield
Paddy	-	-	19.93	22.98	-	15.304
Wheat	17.28	22.16	-	-	28.24	-
Maize	-	-	18.34	21.64	-	17.993
Barley	16.34	19.97	0.00	-	22.22	-
Pulses	1.32	5.14	5.87	6.49	289.39	10.562
Vegetables	188.53	386.08	139	328.83	104.78	136.568
Fruits	75	89	62.5	71.75	18.67	14.8
Grass/fodder	46.78	77.1	58.8	78	64.81	32.653
Others	52.31	82.5	82.5	70.1	57.71	-15.03
Land holding 1-2 ha						
Paddy	-	-	17.5	19.88	-	13.6
Wheat	15.57	20.28	-	-	30.25	-
Maize	-	-	16.7	21.21	-	27.01
Barley	14.14	17.66	-	-	24.89	-
Pulses	1.64	3.34	5	10.03	103.66	100.6
Vegetables	147.09	344.03	170.86	378.88	133.89	121.75
Fruits	112.5	107.33	67.5	81.25	-4.6	20.37
Grass/fodder	46.92	71.5	65.07	61	52.39	-6.25
Others	78	87.5	40	73.33	12.18	83.33
Land holding >2 ha						
Paddy	0.00	0.00	17.85	25.64	-	43.64
Wheat	14.87	18	0.00	0.00	21.05	0.00
Maize	-	-	18.43	22	-	19.37
Barley	17.5	19.97	-	-	14.11	-
Pulses	1.25	6	0	6	380.00	100
Vegetables	304.33	320.21	362.85	389.06	5.22	7.22
Fruits	40	50	45	82.5	25.00	83.33
Grass/fodder	57.25	99.85	63.66	137.85	74.41	116.54
Others	-	220	0	86	-	-

#### Change in farm income of sample respondents on intervention of HPCDP

It can be observed from the (Table 7) that, the average net annual crop income per household was in the range of ₹

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41, 786 to 1, 14054 and vegetables income ranging from ₹ 32, 728.52 to 82, 706.25 in the study area. In total average net crop income, the share of income earned from food grain crops is around 8-9 per cent, vegetables 72-80 per cent and non-food crops 12 to 18 per cent. This trend is more or less same irrespective of the landholding size. The average farm income including the livestock income aggregated to around ₹ 74131.20 to ₹ 137309.69 per household. In the study area majority of the sample respondents are engaged in

agriculture and horticulture followed by livestock rearing for their livelihood. Farmers were able to earn higher income due to crop diversification for two reasons. Firstly, the cereals were not fetching more income and secondary vegetables cultivation fetched higher income as most of the vegetables are harvested in the off season more. The other reason is that there was a decline in cost of cultivation of crops due to intervention of this project.

Table 7 Annual income of the respondents

Particulars	< 1 ha	1-2 ha	<2 ha	Grand total
Total food crops	3512.29 (8.41)	7920.92 (8.16)	10426.00 (9.14)	4383.48 (8.47)
Veg. - Total	32728.52 (78.32)	77373.21 (79.74)	82706.25 (72.51)	40296.75 (77.83)
Non-food crops	5545.24 (13.27)	11735.71 (12.09)	20922.22 (18.34)	7096.12 (13.71)
Total crop income	41786.06 (100)	97029.85 (100)	114054.47 (100)	51776.35 (100)
Milk/ Livestock	32345.14	40279.84	18700.00	33609.22
Total farm income	74131.20	137309.69	132754.47	85385.57

Table 8 Input wise average cost of cultivation of the crops cultivated in sample districts

Inputs cost in agriculture	Baseline survey				After project implementation				
	Paddy	Wheat	Maize	Vegetable	Paddy (124)	Wheat (168)	Maize (122)	Pulses (23)	Vegetable
Seeds	2478	2564	1250	3600	1134.02	1168.35	800.25	928	3900
Fertilizers	2337	3918	3801	3500	1594.76	1401.38	1176.76	1410	4500
Organic	5630	4772	5000	3600	978.26	1650	1546.53	2850	5000
Pesticides	NA	NA	NA	NA	1495.92	1077.62	1768.94	4812.5	6000
Irrigation cost	2100	4200	2848	3500	322.12	1252.84	763.87	200	2500
Cost on	2013	2929	2565	600	1539.86	1886.56	1415	654.55	800
Labor costs	3041	2013	2865	5000	2037.8	2112.07	6049.39	325	8000
Packing/Warehouse	NA	NA	NA	NA		2379.17	2733.33	340	NA
Transport					4725				
Others					1270	2163.64	1846.19	500	1000
Total	17599	20396	18111	20000	15097.74	15091.18	18100.02	12020.96	31700

### Change in cost of cultivation of different crop groups before and after the project

On comparing the cost of cultivation of the different crops between base line and after the project implementation period, considerable reduction in the cost of cultivation is noticed in the case of paddy and wheat crop. The decline in the cost of cultivation of paddy and wheat crop is attributed for the supply of inputs such as seed, fertilizers and

irrigation at reasonable prices at community level (Table 8). These results are in line with (BIRTHAL and JOSHI 2007). Cost of production also declined in the case of vegetables, due to increased productivity on practice of the good package of practices and use of optimum level of quality seed and fertilizers. Cost of cultivation of vegetables in aggregate is giving a clear picture that after intervention of the project, there is a decline in the cost of cultivation.

Table 9 Details of Self-Sufficiency and Marketable Surplus in Food Grains, Vegetables and Milk production

Products	No. of respondents producing only for their self consumption	No. of respondents having marketable surplus	Total no. of respondents having self sufficiency	No. of respondents not having self sufficiency
Vegetables	50 (11.47)	271 (62.16)	321 (73.62)	115 (26.38)
Milk	74 (16.97)	249 (57.11)	323 (74.08)	113 (25.92)
Food grains	78 (17.89)	200 (45.87)	278 (63.76)	158 (36.24)

### Self sufficiency

The self-sufficiency in agricultural produce is referred to the number of months for which the production of certain crops is sufficient to meet the household consumption. (Table 9) revealed that about 11.47 per cent of the respondents are producing the vegetable only to meet their consumption demand, whereas in milk and food grains also

16.97 per cent and 17.89 per cent of the respondents producing only for self-consumption, around 62.16 per cent of the respondents are able to have marketable surplus in vegetables, 57.11 per cent in milk and 45.87 per cent of respondents have surplus of food grains after implementation of the project in the study area. On the whole, 73.62 per cent, 74.08 per cent and 63.76 per cent of

the respondents have attained self-sufficiency in production of vegetables, milk and food grain production in the study area. Out of total respondents, about 26.38 per cent, 25.92 per cent and 54.13 per cent of the respondents are not having sufficient production to meet the consumption demand, so they are dependent on local open markets to meet the consumption demand. The finding results suggest that, self-sufficiency and marketable surplus of vegetables, and food grains have considerably increased from the base line study period to after implementation of the project.

*Impact of support received by the respondents under the HPCDP project*

From the (Table 10) it can be observed that around

80.56 per cent of respondents have participated in training programme and remaining 19.49 per cent respondents have not participated in training on technical issues of the crop production. About 29.35 per cent respondents received inputs for demonstration. Around 15.13 per cent respondents received technical support in farm mechanization, post-harvest technology, organic farming etc. about 31.65 per cent respondents revealed various services provided in the project. The participation in the project also helped the respondents in acquiring assets, as 21.10 per cent respondents have acquired the assets on account of increase in the farm income. The proportion of beneficiaries was higher from the general category compared to the other social categories in the study area.

Table 10 Impact of support received by the respondents under the HPCDP project

Particulars		< 1ha	1-2 ha	>2ha	Total
Participated in any training programme	Yes	290 (79.70)	49 (87.50)	12 (75)	351 (80.50)
	No	74 (20.30)	7 (12.50)	4 (25)	85 (19.49)
Various support received					
	Inputs for Demo	101 (27.70)	19 (33.90)	8 (50)	128 (29.35)
	Equipment's	83 (22.80)	14 (25)	4 (25)	101 (23.16)
	Training	290 (79.70)	49 (87.50)	12 (75)	351 (80.50)
	Technical support	50 (13.70)	9 (16.10)	7 (43.80)	66 (15.13)
	Others	109 (29.90)	25 (44.60)	4 (25)	138 (31.65)
Assets acquired after participating in the project	Yes	74 (20.30)	15 (26.80)	3 (18.80)	92 (21.10)
	No	290 (79.70)	41 (73.20)	13 (81.30)	344 (78.89)

*Opinions of the respondents on impact of crop diversification project on their socio-economic conditions*

Peep into the (Table 11) revealed that around 56.19 per cent of the respondents opined that after implementation of the project, new crops have been introduced in the study area. About 77.06 per cent of the respondents opined that their annual income increased. About 22.94 percent of the respondents opined that cost of cultivation of the crop increased, whereas, 41.28 per cent of the members reported that there was a reduction in the cost of cultivation. Majority of the respondents opined that annual production of the crop has increased. About 88.99 per cent of the respondents opined that with the project intervention, the accessibility of the inputs has increased. Almost all i.e. 91.51 per cent of the respondents opined that vegetable production has increased in the study area after the intervention of the project. With regard to acquisition of assets, about 20.18 per cent of the respondents reported construction of new house, 14.68 per cent of the respondents purchased vehicles and about 63.07 per cent and 74.54 per cent of the respondents opined that they are able to provide education to their children and able

to bear the family health expenses respectively due to increase in their income.

The study concluded that after implementation of different components of the project the access to the irrigation facilities has increased considerably. In addition, facilitating the farmers with the other input services and capability building programme on various improved technologies motivated the farmers to shift from the cereals based cropping systems to vegetables and fruits based cropping system. These interventions surely made a great change in increasing the farmer's income which indirectly reflected in the change of their lifestyle and increase in economic status. The increase in income has helped them by educating their children, access to health services, construction of houses, purchase of vehicle and livestock. Many changes were also observed in crop cultivation methods and practices such as crop rotation, integrated farming, and introduction of organic practices which reduced the investments on inputs to some extent. The findings from the primary survey are in line with the observation made during the focus group discussions.

**Crop Diversification on Farmers Socio-economic Conditions of the Farmers**

Table 11 Opinions of the respondents on impact of crop diversification project on their socio-economic conditions

Particulars	Opinion	Figures indicate the % of the respondents			Total (n=436)
		< 1ha (n=364)	1-2 ha (n= 56)	>2ha (n=16)	
New crop introduced	Yes	56.32	60.71	37.50	56.19
	No	43.68	39.29	62.50	43.81
Annual income	Increased	77.20	82.14	56.25	77.06
	Decreased	0.00	1.79	0.00	0.23
	No change	22.80	16.07	43.75	22.71
Cost of production	Increased	21.98	28.57	25.00	22.94
	Decreased	43.13	37.50	12.50	41.28
	No change	34.89	33.93	62.50	35.78
Annual production	Increased	71.43	75.00	43.75	70.87
	Decreased	2.47	1.79	0.00	2.29
	No change	26.10	23.21	56.25	26.83
Accessibility to inputs easier and better	Yes	88.19	94.64	87.50	88.99
	No	11.81	5.36	12.50	11.01
Vegetables produced for self-consumption	Yes	92.31	91.07	75.00	91.51
	No	7.69	8.93	25.00	8.49
Constructed a House	Yes	17.86	33.93	25.00	20.18
	No	82.14	66.07	75.00	79.82
Purchased a Vehicle	Yes	13.46	25.00	6.25	14.68
	No	86.54	75.00	93.75	85.32
Children are educated	Yes	62.64	66.07	62.50	63.07
	No	37.36	33.93	37.50	36.93
Able to meet family health expenses	Yes	74.45	78.57	62.50	74.54
	No	25.55	21.43	37.50	25.46

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### LITERATURE CITED

- Anonymous. 2016. *A Report on Status of Agriculture in India*. Ministry of Agriculture and Farmers Welfare, Govt. of India.
- Birthal P S and Joshi P K. 2007. Institutional innovations for improving smallholder participation in high-value agriculture: A case of fruit and vegetable growers' associations. *Quarterly Journal of International Agriculture* **46**(1): 49-68.
- Mittal S. 2007. *Can Horticulture be a Success Story for India?*, Working Paper, No.197, Indian Council for Research on International Economic Relations (ICRIER), New Delhi.
- Reddy A. 2004. Consumption pattern, trade and production potential of pulses. *Economic and Political Weekly* **39**(44): 4854-4860.
- Reddy A. 2009. Pulses production technology: Status and way forward. *Economic and Political Weekly* **44**(52): 73-80.