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Extent of Diversification and Constraints in Adoption of Different Farming Systems in Chamba District of Himachal Pradesh

Divya Sharma and Virender Kumar

Department of Agricultural Economics, Extension Education and Rural Sociology
College of Agriculture, CSKHPKV, Palampur (Himachal Pradesh)

ABSTRACT

The existing farming systems have been studied for their profitability and extent of diversification in Chamba district of Himachal Pradesh. The study is based on the primary data collected from 160 farmers. The diversification index was computed to capture the extent of diversification in the district. The lowest value of diversification index implied that extent of diversification was highest and vice versa. In cereals based farming system (FS-I), lowest diversification was observed with a value of 0.77. The higher diversification was noted in livestock based (FS-III) and fruits based (FS-IV) farming systems having values 0.55 and 0.58, respectively. The fragmentation of land holdings, lack of cold storage facilities, monkeys, stray animals and wild animals menace were found as major problems in the study area and the scope for agro-processing unit, diversification towards cash crops, developing commercial livestock unit, herbal, aromatic and medicinal plants were major opportunities reported in the study area.

Key Words: Constraints, Diversification, Farming systems, Opportunities.

INTRODUCTION

Growing rural population and constrained employment opportunities in the non-farm sector have caused sub-division of land holdings in India to the extent that these cannot provide an adequate livelihood to a majority of farm households. To have sustainable livelihood security and improve the standard of living, the farm families need to generate additional income in a sustainable manner from the available farm resources. A shift is needed from the prevalent cereals-based farming system to a diversified commercialized farming system (Kumar *et al*, 2006; Priyadarshini *et al,* 2018).

Agriculture continues to be the main livelihood option of rural households in Himachal Pradesh. The net sown area in the state is about 550 thousand hectares (Anonymous, 2018_a). About 69 per cent of the main workers are engaged in agricultural pursuits but, the contribution of agriculture and allied sector is only 9.7 per cent in GSDP during 2017-18 (Anonymous, 2018_b). The agriculture in the state is beset with the disadvantage of small holdings. In the hilly regions, the area under plough is always a cause of serious concern and it is impossible to bring more area under cultivation due to colossal costs involved (Kumar, 2011). The farming system approach seems to be profitable by reducing the input cost and probable solution to meet the increased demand for food stability (Banerjee and Barat, 2013). The present study was carried out to explore farming system diversification in Chamba district of HP and identify problems in undertaking this system approach in the study area. The study also emphasized the opportunities available to the households under different farming systems.

MATERIALS AND METHODS

The study was conducted in Chamba district of Himachal Pradesh. Stratified two stage random sampling technique was employed for selecting the sample households. A total sample of 160 farmers was drawn from the selected villages through

Corresponding Author's Email: divyasharma331@rediffmail.com

proportional allocation technique. Income approach was used for the identification of farming systems. The farmers who derived more than 50 per cent income from cereals were categorized under FS-I (Cereals based FS), similarly, from vegetables were put under FS-II (Vegetables based FS), from livestock were grouped as FS-III (Livestock based FS) and from fruits were named as FS-IV (Fruits based FS). By porting all the samples it was found that in cereals based FS there were 46 famers, in case of vegetables based FS there were 40 farmers, in livestock based FS total farmers were 18 and in case of fruits based FS, 56 farmers were identified. The study was based on primary data. The average Returns to Fixed Farm Resources (RFFR) from different farm enterprises across different farming systems have been worked out by using the formula:

Returns to Fixed Farm Resources (RFFR) = Value of main product - total cash variable expenses.

The cash variable expenses included the value of seeds, fertilisers, hired labour, value of pesticides and chemicals, etc. For dairying, sheep/goat and poultry activity, RFFR were calculated by deducting cash variable expenses such as of concentrate, minerals, feed, medicines, hired labour from gross income of dairy, sheep/goat and poultry activity. In order to generate RFFR values for mushroom, cash variable expenses were deducted from gross value of the products for a particular unit size of these enterprises.

Diversification index was computed to know the extent of diversification among different farming systems:

$$D_i = 1 - \frac{(\sum Si)^2}{(\sum S)^2}$$

Di = Diversification index

S_i = Share of net income of the i^{th} crop enterprise in per farm net income

S = Per farm net income of a farming system

To meet the objective of analysis of problems and opportunities in different farming systems Garrett's ranking technique was employed.

RESULTS AND DISCUSSION

In the farming system approach different enterprises can be undertaken meaningfully and based on the available resources, location specific systems can be developed which will result into sustainable agricultural development. In view of this, the paper has studied the diversification of existing farming systems. In case of cereals based farming system (FS-I), per farm RFFR were observed to be Rs. 49,311/-. In this farming system (FS-I), the maximum returns were from cereals (28.07%) followed by livestock (26.23%) and vegetables (26.26%). Further, in case of vegetables based farming system (FS-II), per farm RFFR were Rs. 82,040/- and vegetables accounted maximum (59.84%), followed by livestock (16.13%) and fruits (9.42%). In livestock based farming system (FS-III), per farm RFFR were Rs. 80,432/-. Livestock contributed maximum (63.34%) in this farming system (FS-III) followed by vegetables (14.76%) and fruits (10.63%). In fruits based farming system (FS-IV), per farm RFFR were Rs. 1,23,290/-. In this farming system maximum income was observed from fruits (58.31%) followed by livestock (27.12%). Millets also showed their contribution by providing 0.45 per cent returns in fruits based farming system. Pulses contributed maximum (8.76%) in fruits based farming system. In FS-II, the RFFR from mushrooms were found about 0.40 per cent. The share of poultry in FS-I was 2.04 per cent average RFFR. The enterprise with the lowest value of diversification index implied that extent of diversification was highest. In FS-I, lowest diversification extent was found with value 0.77. The higher diversification was found in livestock (FS-III) and fruits based (FS-IV) farming system 0.55 and 0.58, respectively (Table 1).

A number of factors were found to influence the returns from farming systems in the study area. These included infrastructural, financial, production, marketing and miscellaneous factors. On the basis of opinion survey, various problems faced by the farmers in different farming systems

Extent of Diversification and Constraints

Table 1. Extent of diversification and per farm contribution of different farm enterprises in total Returns to Fixed Farm Resources. **(Per cent)**

Sr. No.	Particular	FS-I	FS-II	FS-III	FS-IV
1	Cereals	28.07	8.17	6.54	1.15
2	Millets and pseudo cereals	-			0.45
3	Oilseeds	4.80	0.91	0.35	0.05
4	Pulses	9.48	4.15	4.11	8.76
5	Vegetables	26.26	59.84	14.76	3.84
6	Livestock	26.23	16.13	63.34	27.12
7	Fruits	3.12	9.42	10.63	58.31
8	Poultry	2.04	0.98	0.27	0.32
9	Mushroom	-	0.40	-	-
Total (Rs)		49311	82040	80432	123290
Farming system diversification index		0.77	0.60	0.55	0.58

were identified. The survey was analyzed by using Garrett's ranking technique to identify the problems faced by the farmers under different farming systems. The constraints encountered by the respondents were categorized into five categories namely, infrastructural, financial, production, marketing and miscellaneous (Table 2). In case of problems related to the infrastructure and extension constraints, fragmentation of land-holdings was the most severe problem in cereals based farming system and lack of cold storage facility was most prominent problem in vegetables based farming system with an average Garrett score 71.31 and 58.10, respectively. In livestock based farming system, lack of suitable cattle shed and veterinary facilities was most severe problem having a Garrett scores 68.38 whereas, in fruits based farming system lack of cold storage was more severe problem with Garrett score 80.25. In case of financial problems, formalities in getting bank credit was more severe problem in cereals, livestock and fruits based farming system having the Garrett scores 58.80, 57.28 and 57.80, respectively. While, in vegetables based farming system (FS-II), non-availability of credit in time was major problem. Further, in case of production problems, lack of irrigation facilities was major problem of cereals, livestock and fruits based farming system and in vegetables based farming system higher wage rate of labour was the main problem. Further in case of marketing, lack of regulated market problem ranked at first position in cereals based farming system and in vegetables based farming system, higher marketing cost was main problem with Garrett score 64.13. In livestock and fruits based farming system, exploitation by commission agents was the major problem having the Garrett score 59.28 and 64.13, respectively.

As far as miscellaneous constraints were concerned, monkeys/ wild animals and stay animals menace ranked at first position in cereals based farming system. In vegetables and fruits based farming system higher insect pest and diseases attack was the main problem with Garrett score 57.20 and 68.50, respectively. In case of livestock based farming system lower risk-taking capacity was the major problem followed by lack of know-how problem.

Further, the opportunities available to the households under different farming systems were analysed (Table 3). In cereals based farming system (FS-I) the scope for agro-processing unit ranked first with average Garrett score 79.51. In vegetables based farming system (FS-II) the area was suitable

Table 2 Constraints in adoption of farming systems in Chamba district of Himachal Pradesh.

Sr. No.	Particular / Score	Cereals based farming systems		Vegetables based farming system		Livestock based farming system		Fruits based farming system	
		Rank	Score	Rank	Score	Rank	Score	Rank	Score
1	**Infrastructure/ Extension**								
i)	Package of practices not available	47.70	7	62.58	3	60.08	3	53.30	5
ii)	Fragmentation of land-holdings	71.31	1	40.28	7	50.21	7	58.45	3
iii)	Lack of extension or training	58.28	5	57.78	5	57.78	5	53.03	6
iv)	Lack of field demonstrations	61.68	3	61.90	4	62.10	2	64.00	2
v)	Lack of suitable cattle shed and veterinary facilities	57.75	6	40.83	6	68.38	1	57.40	4
vi)	Lack of processing facilities	68.60	2	69.82	2	52.93	6	44.10	7
vii)	Lack of cold storage facilities	60.60	4	75.60	1	58.10	4	80.25	1
2	**Financial**								
i)	Lack of credit to purchase improved inputs	51.70	3	54.80	2	55.75	3	56.80	3
ii)	Formalities in getting bank credit	58.80	1	53.75	3	57.28	1	57.80	1
iii)	Non availability of credit in time	55.71	2	60.75	1	55.18	2	57.70	2
3	**Production**								
i)	Non-availability of good quality seeds	59.68	6	66.55	3	62.53	2	67.03	2
ii)	Chemicals/pesticides/ fertilizers not timely available	63.70	4	63.50	5	63.85	1	65.20	1
iii)	High cost of chemicals and fertilizers	61.73	5	64.70	4	61.38	4	64.38	4
iv)	Lack of irrigation/ shortage of irrigation water	67.70	1	68.20	2	63.85	1	67.03	1
v)	Improved breeds of livestock not available	58.90	7	56.68	7	58.38	5	58.38	5
vi)	Shortage of fodder	52.00	8	52.30	8	52.48	7	54.33	7
vii)	High wages	66.40	2	68.23	1	62.25	3	65.88	3
viii)	High cost of production	64.70	3	58.55	6	57.55	6	64.38	6
4	**Marketing**								
i)	Lack of regulated markets	61.40	1	61.00	3	51.93	5	60.10	5
ii)	Non remunerative prices	58.13	4	57.95	5	52.58	3	60.75	3
iii)	Exploitation by commission agents	59.83	2	61.43	2	59.28	1	64.13	1
iv)	High marketing cost	58.58	3	64.13	1	53.83	2	59.63	2
v)	Price fluctuations	55.95	5	58.75	4	51.95	4	58.88	4
5	**Miscellaneous**								
i)	Monkeys/wild animals/stray animals menace	62.38	1	52.85	2	55.75	4	52.13	4
ii)	Higher insect/pests /disease attack	59.23	2	57.20	1	58.50	3	68.50	1
iii)	Lack of know-how	47.29	4	50.32	3	60.71	2	63.22	2
iv)	Lower risk-taking capacity	56.78	3	47.60	4	62.00	1	58.37	3

Extent of Diversification and Constraints

Table 3. Opportunities for sample households.

Sr. No.	Particular	Cereals based farming system		Vegetables based Farming system		Livestock based farming system		Fruits based farming system	
		Score	Rank	Score	Rank	Score	Rank	Score	Rank
1	Climate suitability for allied activities (mushroom, poultry, etc.)	65.49	3	57.83	2	53.20	6	55.20	4
2	Product famous (basmati, kidney beans, apple)	75.23	2	46.00	9	50.32	7	69.38	1
3	Organic farming	56.00	4	49.02	6	55.08	5	59.50	3
4	Practicing herbal, aromatic and medicinal cultivation	55.75	6	52.10	4	59.65	4	67.19	2
5	Scope of agro processing unit	79.51	1	54.13	3	40.45	9	42.55	8
6	Potential of snow water conservation on a watershed management basis to enhance the cultivable area	47.00	9	48.60	7	63.77	3	50.11	6
7	Developing commercial livestock unit	55.90	5	49.17	5	71.33	1	53.95	5
8	Trade with Jammu and Kashmir	47.30	8	47.18	8	65.50	2	42.43	9
9	Growing high value agricultural crops to earn better income	49.38	7	66.86	1	45.90	8	46.83	7

for diversification towards cash crops through the utilization of created irrigation potential in vegetables. The climate conditions of the study area were congenial for taking up of agriculture related enterprises such as mushroom cultivation, which is an ideal option specifically for those without much land (Sharma, 2018) and also to supplement the farm income. Also, there was a good scope for backyard poultry which is a need to increase the availability of protein food source in rural areas to alleviate protein malnutrition (Kumari *et al*, 2018). In livestock based farming system the opportunity of developing commercial livestock unit ranked first having Garrett score 71.33. In fruits based farming system kidney beans and apple were of great importance and there was full opportunity to make these products more fetching. Also there was good scope for developing herbal, aromatic and medicinal plants in the study area. Huge demand of milk, meat and egg was there in the local and distant markets and the incentives were also available for establishment of dairy, poultry and sheep & goat units. There was plenty of scope for educating the farmers on organic farming because fertilizer consumption was very low especially in livestock based and horticulture based farming system and it required fewer efforts to adopt organic farming.

CONCLUSION

Agricultural diversification has emerged as an important alternative to attain the output growth and sustainability in the developing countries. With farming system approach, diversification of farm by adopting ancillary, horticulture and other high value enterprises like mushroom, poultry etc. should be promoted to increase farm income. Specific policy intervention is needed to deal with significant promotional and extension activities. Low level of awareness was great hurdle in the dissemination of technical know-how and application of improved techniques in production process. Therefore, there is a need to improve the awareness level of farmers through extension personnel of different departments related to agriculture and allied activities. The problem of timely availability of quality seed, fertilizers, pesticides and other inputs held back the farmers for making agriculture a profitable enterprise. For this government should regulate the registered seed suppliers/ input dealers and make them accountable for providing quality seed and other inputs along with technical know-how. There was lack of irrigation facilities in the study area. Incentives should be given for the management of irrigation schemes.

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