

## **Agricultural Diversification – An Opportunity for Smallholders (A Case Study of Sonipat District of Haryana)**

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**Abstract :** The present study focused on the nature and extent of diversification of small farmers owning land below two hectares. For the present study, district Sonipat of Haryana state was purposively selected. Further, for the empirical analysis; three villages were selected for conducting household survey of farmer. All data pertaining to study like area, production, input use and user perception were analyzed to identify the constraints and potential of small farmers while producing High Value Commodities (HVC) like fruits, vegetables, dairy and poultry product etc. The extent of diversification was assessed using “Herfindahl Index Method”. The study revealed that the extent of diversification amongst small farmers is high as compared to larger farmers. It is found that Small farmers have abundant family labour and they tend to put more area under HVC crops of their total land availability. However, Farmers owning land between 2 to 4 acres are more flexible & access to required facility like credit, formal agricultural training etc. which shows their positive impact on diversification.

**Keywords:** Constraints, Diversification, High Value Commodities, Household Survey, Small Farmer.

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### **I. INTRODUCTION**

Diversification is an important part of the changing economy. Conceptually the term “diversification” has been derived from the word ‘diverge’ which means to move or extend in the direction different from a common point (Jha, Kumar and Mohanty, 2000). In Agriculture, diversification can be defined as shift from the regional dominance of one crop (like rice) to another crops (like oilseeds), or from one enterprise (like crop based) to another enterprise (like livestock) or to engage in other complimentary activities (Vyas, 1996). From the theoretical point of view agricultural diversification may be consider as diversification of resources from low income generating crops to high income generating crops. In developing countries like India starts with a gradual shift towards diversification. At the time independent, India was suffering with serious problem of food insecurity and with less developed market and primitive technology was responsible for low growth and high variability in agricultural sector (N.P. Singh, 2006; Rudra, 1982). But after 1990s with emergence of World Trade Organization (WTO) and liberalization of trade create new opportunity for growth in the agricultural sector and major emphasis was given to the production of high value commodities crops (Joshi, 2005). India, in context of rural areas the percent share of HVCs in the total food spending has increased up to 39 percent in 1991-2000 from 31 percent in 1983 and in urban area it has increased up to 50 percent in 1991-2000 from 41 percent in 1983 (Kumar and Mruthyunjaya, 2002; (Yoginder K. Alagh, 2008)). High growth of urbanization with increase in per capita income is the main reason behind the shift in the consumption pattern towards HVC like fruits and vegetables (Joshi et al., 2004). However, technological advances in communication, logistics, and marketing system have induced supply-side growth of non-food crops (Joshi, 2005). This is showing that the consumption towards high value commodities is growing with a high rate both in rural and urban areas. Therefore, diversification of agricultural sector towards HVCs is recommended as most feasible way to increase employment opportunity, raise income at farm level and to maintain the sustainability for long term conservation of natural resources (Vyas, 1996 and Joshi, 2005). It is observed that the demand and supply of these HVCs have increased faster than those of food grains (Kumar et al. 2003; Joshi et al. 2004). The share of these commodities in the total expenditure on food increased from 23.8 percent in 1977-78 to 35 percent in 2003 for rural consumers and from 32.2 percent to 41.55 percent for urban consumers (NSSO, 2005) which show a shift in the consumption pattern from cereal crops to these HVCs crops (State of Indian Agriculture, 2012-13). Due to urbanization and per capita rise in income the consumption pattern of people in India has been showing a continuous increase in the demand for these HVCs crops. The per capita consumption of fruits was estimated at

25 kg which increased to approximately to 40 kg in 2001, an increase of 60 percent in the last two decades. Besides, the annual per capita consumption of vegetables increased from 47 kg in 1983 to 76 kg in 1999 (Jha, 2001; Singh et al., 2004). No doubt, diversification has picked up movement in the recent past in the developing countries in south Asia. However, there are several other factors which promote diversification. These factors can be divided into two different parts of the same phenomena of agricultural diversification; one of them is supply side factors like infrastructure specially road and market and technology (Joshi et al., 2004).

## **II. NEED OF THE STUDY**

The present research work focus on the state of Haryana as one of the leading states in the country in producing wheat and rice. About 51 percent of the state population is engaged directly in agriculture activity (Haryana State Agricultural Policy, 2010). Apart from meeting its own requirement for food grains, Haryana also contributes about 40 to 45 lakh tons of food grains to the Central Pool annually. After green revolution the growth of wheat and rice based agriculture in Haryana is very high. Assured market and enumerative price makes the farmers well-endowed with high per capita income as compared to farmers in other states. But in Haryana and even in India the percent of small and marginal is so high and they are not getting the benefit of green revolution because under Green Revolution the emphasis was on the expansion of chemical fertilizers, HYV seeds and high farm level technology. So the small and marginal farmers were not the target group and another reason is small land holding and the cost of cultivation would not match with what they will get. These groups of farmers are unable to meet with the other requirements of the family because the less profit margin from per unit of area as compared to large farmers. But there is great potential in term of good infrastructure like road connectivity and nearness to the biggest market for horticulture crops in Delhi and hardworking manpower. By mean of diversification these farmers can actually harvest the benefit. So there is a need to understand the extent of diversification of this group of farmers and what problems or constraints they faced due to their diversifying nature of production.

### **2.1 Objective And Methodology**

In the present study authors have tried their best to understand the current extent of agricultural diversification and to what extent this affect the famers specially focused on small farmers. These are three objectives as following:

1. To examine the extent of agricultural diversification in the study area
2. To analyze the constraints and potential of agricultural diversification which affects the famers
3. To give appropriate suggestion for the sustainable growth of smallholders in the study area.

## **III. METHODOLOGY**

For the following research a preliminarily study has been carried for understanding the topic and to find out the research problems. After the research problems identification a detailed outline was prepared for conducting research. As study is based on field investigation; Haryana state was purposively selected. Further, one district was selected based on the criteria of small land holdings and maximum area under vegetables at district level. After district selection, one block and three villages were purposively selected based on the intervention regarding agricultural diversification with the consultation of district and block level horticulture officers. All data as per study requirement were collected from the field. Secondary data at district, block and village level were collected from departments/offices like District Agriculture and Horticulture, Block Development Office (BDO) and patwari office at village level. other important data were collected from various publications like reports on horticultural sector by national and state government and Statistical Abstract Book of Haryana 2006-07, 2009-10 year and others online publication. The primary data were obtained by conducting household survey of selected farmers with major proportionate from the small farmers. Household surveys were conducted in three villages namely Aterna, Pabsra and Manoli in Rai block of Sonipat district. Sample households were selected through the process of stratified random sampling technique based on the list of farmers obtained from the village patwari. Furthers farmers were categorized into different sub-categories as marginal farmers (less than one hectares), small (between 1-2 hectares), medium (2-4 hectares) and larger (above 4 hectares). Then out of the list, total size of 90 samples which includes 30 samples in each village was taken. Furthers, as the study is being carried out in the context of small and marginal farmers; maximum proportion of the total samples was holed by these group of farmers. After that all data were compiled and analyze with certain method to arrive at a conclusion. These methods are following:

- I. Herfindahl Index Method
- II. Perception based method

- To analyze the very first objective of the study a method called “Herfindahl Index Method” [14] has been used to measure the horizontal extent of diversification or diversification of crops. The main characteristic

of this method is there value which is bounded by zero to one. If the value is one, it denotes the perfect concentration and if it is zero then there is perfect Diversification.

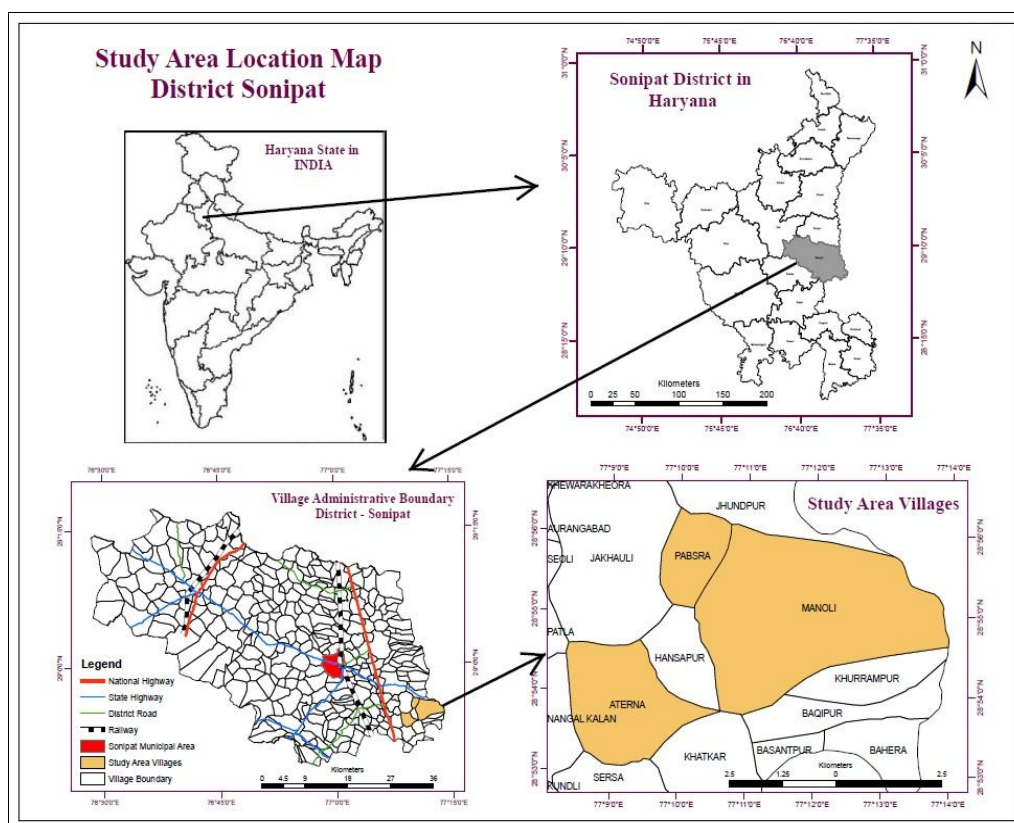
$$HI = \sum_{i=1}^N P_i^2$$

- Where N is the total number of crops and Pi represents area proportion of the i<sup>th</sup> crop in total cropped area.

For the second objective a perception based method was adopted to analyze the constraints of the farmers during their diversified nature. For this purpose some parameters were selected based on the data collected through primary survey. After that a score matrix was prepared of the selected parameters and the different results were obtained through some values to visualize the data in a more understanding way.

### Study Area

The geographical location of Haryana makes it one of the most prominent states of the country. It is located in the northern region of the country with their geographical location between 27°3' to 31°9' north latitude and 70°5' to 77°6' east longitude. Haryana possess a location where there are Shiwalik Hills in the northern part and in the southern part it covers some part of the Aravali Hills. The river Yamuna which is the only perennial river lies at the eastern edge of the state and the district on the western side of the state namely Bhiwani, Hisar, Sirsa, Rewari and Mahendergarh are consider as part of the Thar desert. At the regional level it is bound by Punjab in the North West, Uttar Pradesh and Delhi in the east, Rajasthan in south and Himachal Pradesh in the North. The studied villages namely Aterna, Pabsra and Manoli are the part of Rai Block which is located on the south east of the district. The villages are well connected with National Highway-1 and very close to Delhi with huge market opportunity.



**Fig. 1:** Study Area Location Map

### III. RESULT AND DISCUSSION

Table 1 shows the cropping pattern of the selected farmer's household of three villages namely Aterna, Pabsra and Manoli. In Aterna village farmers are more diversified toward baby corn crop with an area of 22.67 hectares whereas in Pabsra and Manoli village farmers are diversified towards the production of vegetables crops mainly for daily uses. The main advantage of these crops is their cultivation in both Rabi and Kharif season with maximum profit gain than wheat and rice. While on the other hand, table 2 shows the socio-

economic characteristics of surveyed household's in Aterna, Pabsra and Manoli village. It is found that the farmers owning land above 2 acres are more access to formal training and update information related to agricultural activity which might have direct impact on their area under HVCs. Further, the farmers who are more literate are more access to formal credit, agricultural training programmes and update information. However, in Manoli Village where the average age of diversified farmers is low as compared to Pabsra and Aterna which indicates that young farmer are more diversified toward HVCs as compared to other category of farmers. The Horizontal extent of diversification or diversification within crops was gauged with the help of "Herfindahl Index Method" across different categories of farmers. This method consist a value which is bounded with zero to one. It means if the value is one that would show complete concentration and if it is zero that would show perfect diversification. However, it may or may not be one of the good tools for measuring the extent of diversification but it is useful to know the horizontal diversification or diversification within the cropping pattern. In this regard the figure 1 (attached in Annexure) shows that the farmers who owned land between 2 to 4 acres are more diversified and grow two or more than two HVCs crops; whereas, the farmers below two acre of land are less diversified with only one HVCs crop. The figure 2 indicates that in all three selected villages, the farmers who owned land below two acres put maximum percent of their gross cropped area (GCA) under HVCs, but their horizontal extent of diversification is not so high because they put maximum percent of their GCA under only one commercial crop. The main reason for that is their small land holding size and if they put more area under more than one or two commercial crops then the total surplus would be very less and they would be deprived from the market chain. Whereas in case of farmers who owned land above two acres generally grow more than one or two high value commodities crops because they are more flexible in terms of the size of their land holding. However there percent of GCA under HVCs are less in comparison to farmers below two acres of land in all the selected villages. The figure 4 indicates that the average family labour per household is highest amongst farmers who owned land below two acres and put more portion of their land under HVCs crops. So, this indicates the positive relationship between area under HVCs crops and family labour availability. The figure 5 shows the intensity of benefit variation under different crops. The graph indicates that the proportion of income from HVCs like baby corn, bhindi and sweet corn are very high amongst the smallholders owning land below 4 acres as compared to larger farmers where the high proportion of income comes from wheat and paddy crops. Moreover, the farmers owning land between 2 to 4 acres are getting higher proportion of their total income at farm level from HVCs which vary from 70 percent in Aterna (from baby corn crop), about 44 percent in Pabsra (from crops like Bhindi, Bakla and Sem) and around 70 percent in Manoli village (from crops like sweet corn, Bhindi).

### **Diversification & Possible Constraints**

Though in all these three villages farmers are being diversified and try to harvest more benefit but these farmers also faced some constraints during the whole process of diversification which start from the cultivation of HVCs till their arrival at the market. In all three villages some of the constraints have been identified through direct conversation with the farmers who are practicing the cultivation of these HVCs and a score matrix were generated on the bases of the farmer's responses. A village wise description of all possible constraints across different categories of farmers was analyzed in the paper. The main constraints observed from the figure 5 are mainly high market risk, lack of quality input availability and expensive labour which are mostly face by the farmers owning land between 2 to 4 acres and above the 4 acres of land. Mostly the larger farmer's faces the risk associated with the market price fluctuation and that's why they restrict their land to put in the cultivation of HVCs and follow the wheat and paddy cultivation pattern which is more secure in nature. However the farmer owning land between 2 to 4 acres also faces the market risk but the main constraints faces by them are associated with the lack of quality input like hybrid seed and the expensive labour which is required all time during the cultivation of HVCs. Whereas the marginal farmers owning land below 2 acres mostly faces the constraints of being marginal in term of their land holding which may restrict their further growth. The figure 6 shows that in Pabsra village the cultivation of HVCs is mainly practices by smallholders. It may be one of the reasons behind that most of the constraints are faced by farmers below 4 acres of land. Moreover, the constraints associated with the small land holding, high cost of cultivation and high market risk are the most frequent amongst these group of farmers. The biggest constraints face by the marginal farmers (owning land below 2 acres) is their tiny pieces of land which restrict them to put more area under HVCs. However the marginal farmers don't afraid of the cost of cultivation because they have abundant family labour availability as compared to larger farmers. Whereas the farmers owning land between 2 to 4 acres observed high cost of cultivation and the risk associated with market are their biggest constraints. However, lack of quality input availability is also one of the major constraints observed in all the three villages. The figure 8 indicates that in Manoli village the constraints associated with small farmers are mainly high cost of cultivation and small land holding. Whereas the farmers owning land between 2 to 4 acres and above four acres are mainly afraid of the risk of fluctuating market price which sometimes cause a massive fall in price and the net benefit is below the

cost of cultivation. However, the larger farmers mostly suffer from the risk of expensive labour on hired basis which sometimes exceed the benefit out of these HVCs.

#### IV. FIGURES AND TABLES

**Table 1:** Cropping Pattern of Sample Households

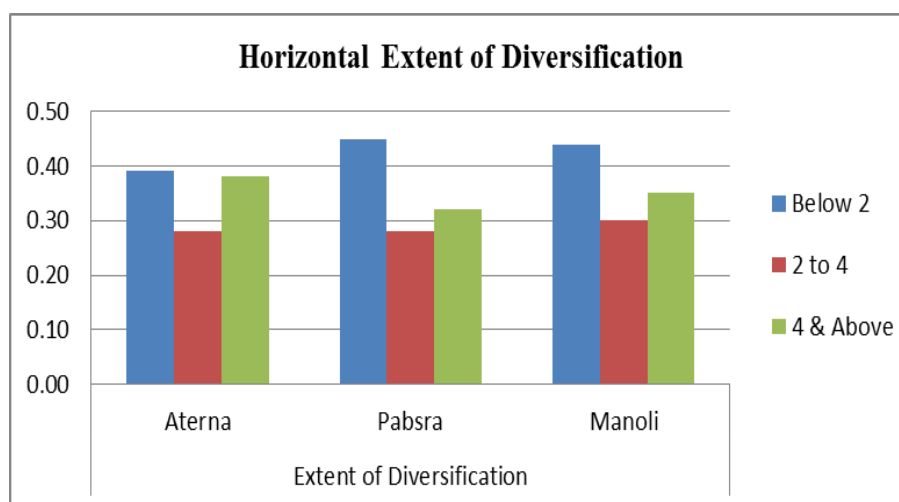
Cropping Pattern	Unit	Village Name		
		Aterna	Pabsra	Manoli
No. of Farm Household Selected	Number	30	30	30
Total Cultivated Area	ha	34.01	36.48	52.59
Total Gross Cropped Area	ha	69.30	72.06	104.37
<b>Area Under Different Crops</b>				
Wheat	ha	22.11	27.73	46.03
Paddy	ha	22.15	21.58	30.97
Baby Corn	ha	<b>22.67</b>	0.00	0.00
Sweet Corn	ha	0.00	0.00	<b>14.17</b>
Vegetables	ha	1.00	<b>21.94</b>	<b>12.55</b>
Fodder Crops (Jowar)	ha	1.38	0.81	0.65

Source: Primary Data

**Table 1:** Socio-economic Characteristics of Sample Households

Socio-Economic Variables	Aterna			Pabsra			Manoli		
	< 2	2 to 4	> 4	< 2	2 to 4	> 4	< 2	2 to 4	> 4
Land Holding (in Acre)	< 2	2 to 4	> 4	< 2	2 to 4	> 4	< 2	2 to 4	> 4
Age	53	48	53.4	52.28	55.27	48.2	45.61	44.44	49.62
Education	8	12	9	9	10	11	10	10	9
Family Size	6	5	5	6	6	5	5	5	6
Access to Formal Credit (%)	21.43	18.18	20	21.43	54.55	60	30.77	77.78	62.5
Training on agricultural Practice (%)	21.43	36.36	40	14.29	18.18	40	15.38	55.56	25
Update Information of Agriculture Practice (%)	28.57	45.45	40	35.71	54.55	60	38.46	22.22	87.5

Source: Primary Data



**Fig. 2:** Horizontal Extent of Diversification (Area in Acre)

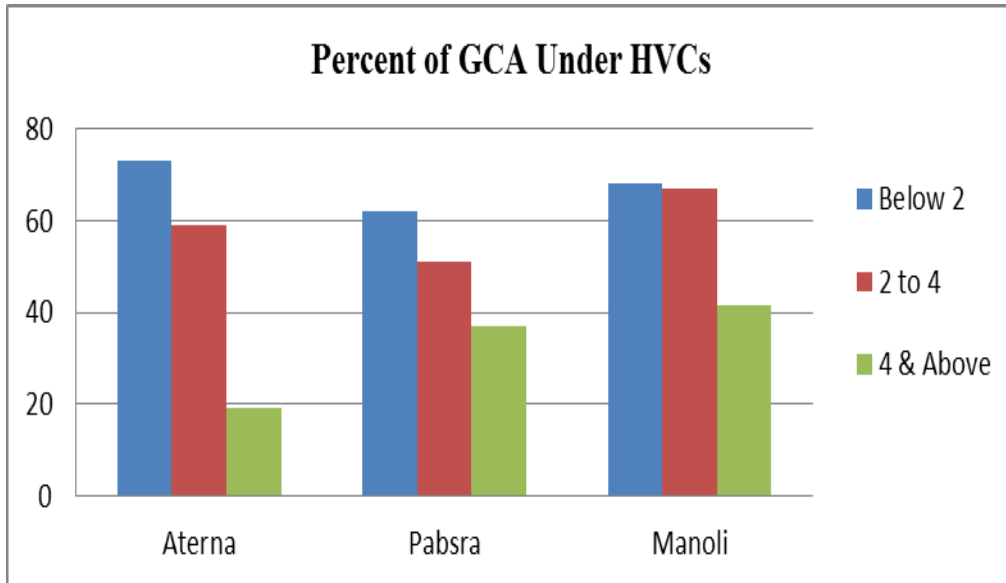


Fig. 3: Extent of Diversification by Proportion of Area under HVC Crops (Area in Acre)

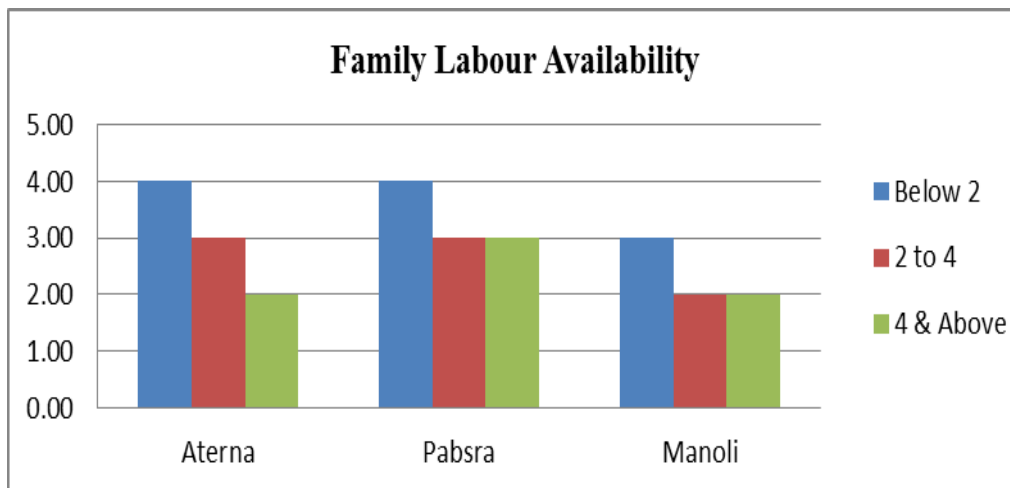


Fig. 4: Family Labour Availability at Farm Level (Area in Acre)

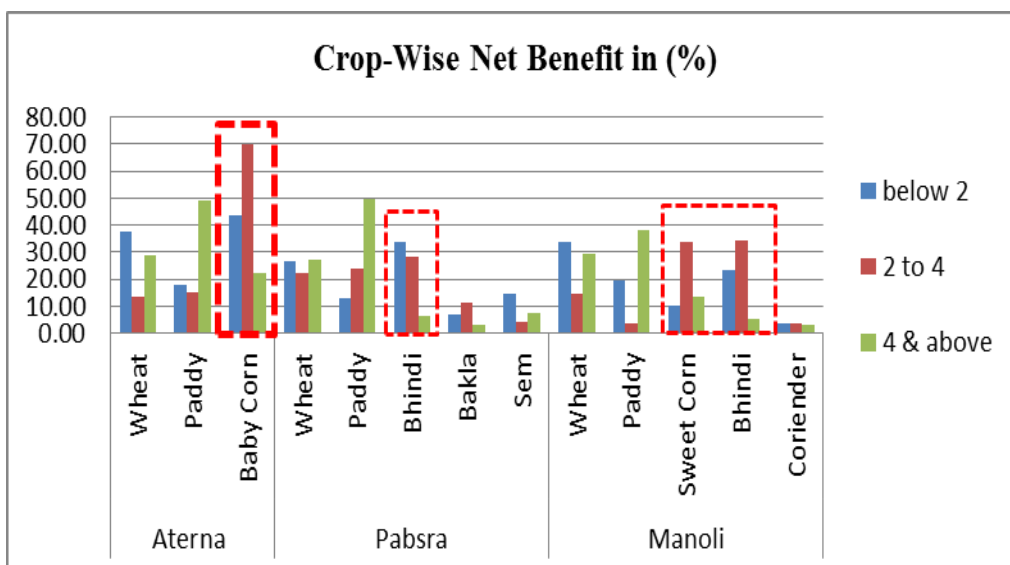
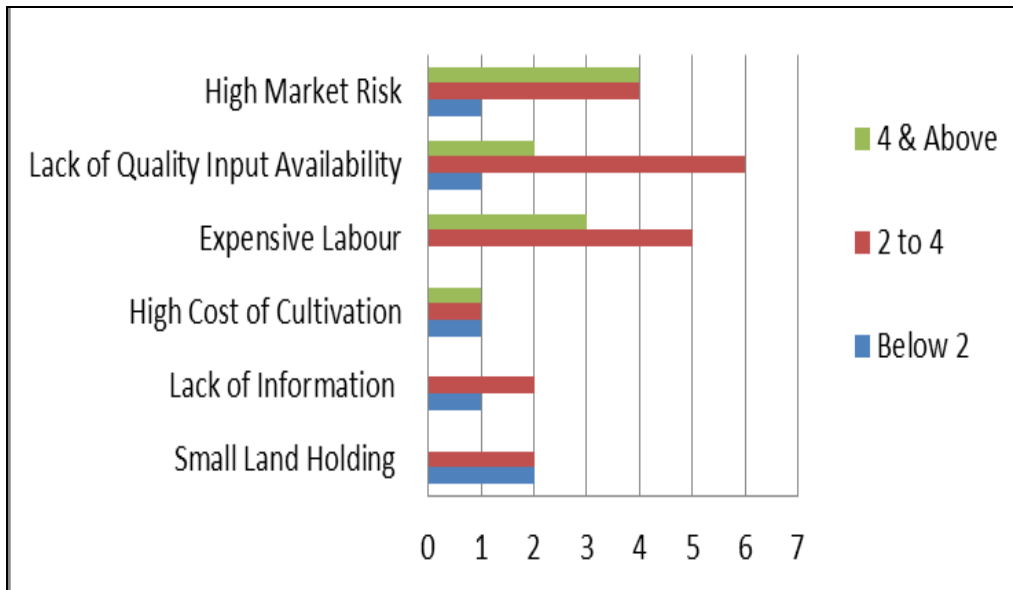
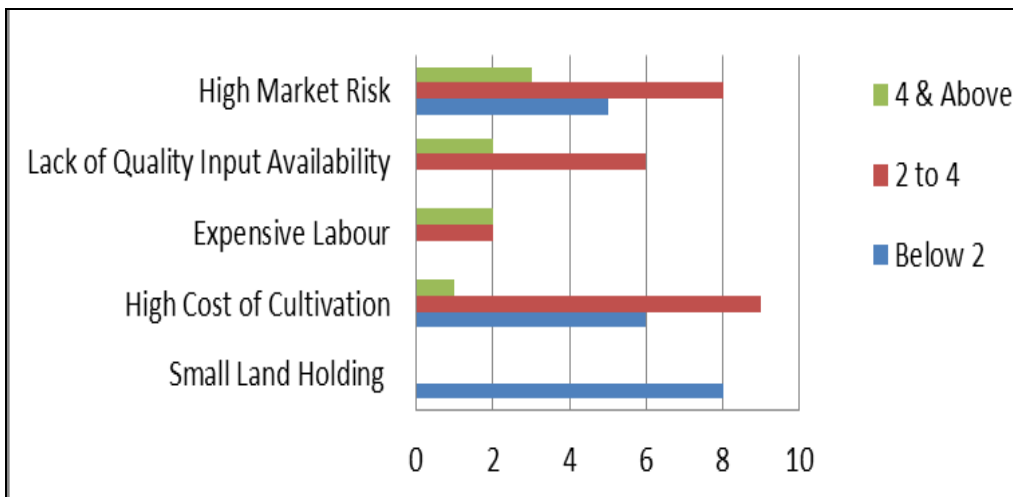


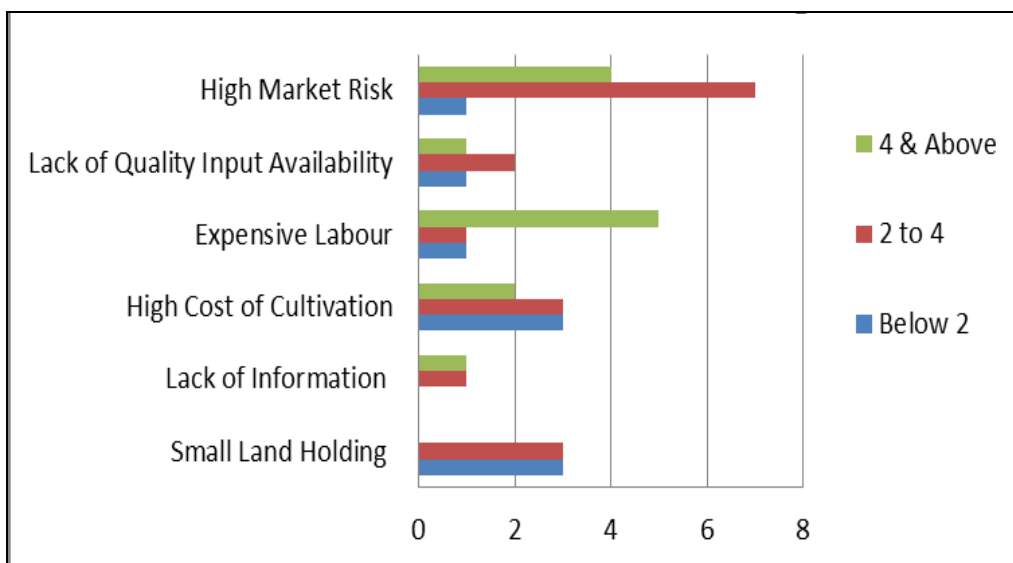
Fig. 5: Percent Share of Different crops in Total Income (Area in Acre)



**Fig. 6:** Identified Constraints - Aterna Village (Area in Acre)



**Fig. 7:** Identified Constraints - Pabsra Village (Area in Acre)



**Fig. 8:** Identified Constraints - Manoli Village (Area in Acre)

## **V. CONCLUSION & RECOMMENDATION**

It is found that the nature of diversification in the studied villages are more in a generalized way as most of the farmers are either diversified or in the process of being diversified. However, there is neither complete diversification nor complete concentration. Whereas, the farmers owning land between two to four acres are more access to facilities like formal credit, agricultural training programme and showing more horizontal extent of diversification which means that these kind of facilities have their crucial role in the process of diversification. Moreover, it can be observed that the net income per household at farm level is much better of diversified farmers than that of non-diversified farmers. The high relative profitability may be one of the reasons for being diversify their cropping pattern. However, the farmers who owned land between two to four acres are more flexible across different categories of farmers in using their land for commercial crops because of the size of land holding and the choice regarding the crop selection. The larger farmers don't take risk and follow the traditional cultivation pattern because they lack man power and the hired labour are more expensive which sometimes exceeded the benefit out of the cultivation of these HVCs . On the other hand, small farmers have the crop choice but they don't have abundant land to make their choice fulfill. And small amount of surplus may be one of the reason of being deprived either by direct elimination from the market chain or by indirect way like unsatisfied price for their small produce in the market. But the small farmers possess one of the required strength like abundant labour which helps them in reducing the cost of cultivation in term of labour requirement and in putting maximum proportion of their area under commercial crops. Although in all those three villages all farmers either small or large who are practicing the cultivation of various commercial crops faces many constraints which may restrict their growth in the whole process of diversification. The most frequent constraints observed are mainly associated with high market risk of price fluctuation, high cost of cultivation and lack of quality input availability. However, the biggest constraints observed by the small farmers is their small land holding which put restriction on them for putting maximum area under commercial crops.

## **VI. RECOMMENDATION**

1. There is a need to motivate farmers through regular "Kisan Mela" with the support of local agricultural institution where farmers should be trained or advice for practicing the cultivation of HVCs.
2. There is a need to stabilize the market price to make farmer's decision in favour of putting more areas under HVCs because in case of HVCs
3. Technological development in terms of providing low cost good quality of hybrid seeds which can restrains the risk of weeds and other disease in case of HVCs like baby corn, bhindi, and other vegetables etc.
4. There is a need to establish linkages between the producer and the end consumer via establishment of agro-processing unit. For this purposes government need to support the public private partnership (PPP) with some compensation to attract the private players.
5. Small farmers own very small amount of land which restrict their horizontal diversification so they are needed to diversify their economy by vertical diversification which includes poultry & dairy farming, fishing etc.
6. There is a need to replicate some successful models of agri-business like the concept of producer company and framer market centre like Rythu Bazaar in Andhra Pradesh

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