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## Estimation of factors affecting and major constraints in practicing farm diversification: A study of Ayodhya District of UP

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### Abstract

Farm Diversification is important strategy for diversification of farmers' income. The study was conducted in Ayodhya district of Uttar Pradesh to analysis of factors affecting and major constraints of the farmers in practicing diversification in the study area. The results revealed that farming experience of the farmers is positively related to farm diversification and it is non-significant. The coefficient for off farm income is inversely related to farm diversification and it is non-significant and so on. In similar lines, lack of technical knowledge lack of start-up capital, lack of market related information were analyzed as major constraints of crop diversification.

**Keywords:** Diversification, factors, constraints, income, farm

### Introduction

Crop Diversification transition from subsistence farming to some extent commercial farming, a change from low value food/non food crops to high value food/non food crops, and a change from native varieties to high yielding varieties with the integration of animal husbandry, fisheries, horticulture, etc. Diversification is a time-honored method of reducing risk and achieving steady agricultural revenue. To improve the revenue base of farmers and hence boost employment, productivity, and income, farm diversification involves both the diversification of crops and farm-based industries. Diversification is defined as the growth of a broader diversity of agricultural activities as crops raising, livestock and fish rearing across time and place, as well as the re-allocation of farm productive resources such as land, capital, farm equipment, and hired labour into other activities. It happens in conjunction with rising population and declining cropland per person. In scenario of fragmentation of land agriculture diversification can optimize the land utilization and generate the income of marginal farmers. Crop diversification becomes increasingly important to adapt to new conditions and reduce vulnerability to extreme weather conditions. Crop diversification also conserving the biodiversity and maintains the ecological balance in ecosystem. Government policies and support can play a significant role in encouraging farmers to embrace diversified cropping systems. The Department of Agriculture and Farmers Welfare (DA & FW) is implementing the Crop Diversification Program (CDP) since 2013-14 as a sub-scheme of Rashtriya Krishi Vikas Yojana (RKVY) in green revolution states viz. Haryana, Punjab and Western Uttar Pradesh to diversify the area under water intensive paddy crop to pulses, oilseeds, coarse cereals, millets, nutri cereals etc. There are several factors like land holding of the respondents, age, education, farming experience, off-farm income, distance of farm from the main road, distance of farm from the main market, dummy of farm machinery affecting the diversification. Nahar *et al.*, (2024) <sup>[4]</sup> conducted a study on effects of crop diversification on food security of farmers of Bangladesh suggestions on emphasis on education, training, and of farm activities by providing financial support. Basantaray *et al.*, (2024) <sup>[1]</sup> revealed that literacy, access to market, access to irrigation, agricultural training, farming experience, and household size positively affects crop diversification at the household level.

In similar sense, many constraints as lack of technical knowledge, lack of start-up capital, and lack of market related information can be important constraints of the study area. Dalal and Shankar (2022) [2] inferred that technology holds a key to agricultural diversification. The present level of development in technology for some high value fruits and vegetable crop is not only inadequate but also does not suit various agro climatic situations. Devi (2018) [3] conducted a study on "Growth and Diversification of Agriculture in Mountain areas" and the results revealed that Farmers in the study region experienced a significant output barrier due to a lack of irrigation facilities. Price variations and remote markets played a part in the marketing limitation that prevented agricultural diversification. Concerns with the availability of water resources, disease occurrence, and insect pest attack were regarded as key problems in the ecological constraint. There were also reports of a small processing facility, poor application skills for herbicides, fertilisers, and insecticides, as well as expensive planting supplies. The current research is conducted in Ayodhya district of UP to estimate the factors affecting the diversification in the region and to identify the constraints faced by the farmers in practicing the farm diversification.

### Research Methodology

The research is conducted in Uttar Pradesh state of India. Out of the 75 district of Uttar Pradesh, the present investigation was carried out in Ayodhya district. There are 11 blocks in the district Ayodhya. Milkipur block was selected purposely. Two villages namely (Bawan and Akma) was selected randomly through chit method following Simple Random Sampling without Replacement. Out of the two villages 100 farmers were selected through PPS (probability proportionate size). Sampling and selection of respondent was done using systematic random sampling method. For determining the effect of different factors on diversification a multiple regression model was used. The values of Entropy index computed for measuring horizontal diversification were taken as dependent variable and different factors affecting diversification were taken as

independent variables. The following econometric model was used to analyze the data.

$$D(\text{index}) = 0s + 01 \text{ Hold} + 0s \text{ Age} + 03 \text{ Edu} + 04 \text{ Exp} + 0s \text{ Off-Income} + 06 \text{ D-Road} + \text{\$t D-Market} / 8 \text{ DT} + c$$

Where,

D (index) = Value of diversification index

Hold = Land holding of the respondent (Acres)

Age= Age of the respondent (Years)

Edu= Education level of the respondent (Years)

Exp= Farming experience of the respondent (Years)

Off-income = Off-farm income of the respondent (Rs.)

Frequency is calculated to find out the number of respondents in a particular cell.

Percentage values were calculated to make simple comparisons. These were calculated by dividing the frequency of a particular cell by total number of respondents and then multiplying the result by 100.

$$P = (n/N) \times 100$$

Where,

P = Percentage

N = Frequency of a particular cell

N = Total number of respondent

### Results and Discussion

#### To estimate the factors affecting the diversification in the study area

The factors like Land holding of the respondents, age of the respondents, education level of the respondents (years), farming experience (year), off-farm income of the respondents, Distance from the main road (km), distance of the farm from the main market (km), dummy of the farm machinery (Tractor) are responsible for the farm diversification in the study area. For determining the effect of different factors on diversification a multiple regression model was used.

**Table 1:** Factors affecting crop diversification

S. No.	Factors	Coefficient	t-stat	Significance
1.	Intercept	0.39	7.00	00
2.	Land holding of the respondents	0.001	2.08	0.03
3.	Age	-0.002	-1.61	0.10
4.	Education	0.005	2.23	0.02
5.	Farming experience	0.003	1.80	0.07
6.	Off farm income	-1.4	-1.17	0.24
7.	Distance of farm from the main road	-0.020	-2.24	0.02
8.	Distance of farm from the main market	-0.00	-0.59	0.55
9.	Dummy of farm machinery	0.03	2.02	0.04

F-Value = 4.564, R2 = 0.18

\*Significant at 95 percent confidence level

\*'Significant at 99 percent confidence level

The results revealed that the coefficient of farming experience of the farmers is positively related to farm diversification and it is non-significant. It means that experienced farmers more likely to diversify as compared to less experienced farmers, this result is also consistent with the finding of Pope and Prescott (1980). The coefficient for off farm income is inversely related to farm diversification and it is non-significant. Because of low farm income and better off farm income opportunities, farm operators pay

less attention to farming and diversification ultimately. The coefficient for distance of farm from main road is inversely related to diversification and significant at 95 percent confidence level. The coefficient for distance of it is evident from results that holding size is positively related to diversification (E Index), an increase in holding size increases the diversification and it is significant at 95 percent confidence level. It shows that diversification is more common among large farmers as compared to small

and medium farmers, because large farmers have more land resources to divide among various crops and pay more attention to farming than any other off farm enterprise. The coefficient of age is negative and non-significant. It means that older farmers are less likely to be diversified as compared to young farmers. The reason is that older farmers cannot manage farm properly and usually stick with old farming practices. The coefficient of education is positively related to diversification and it is significant at 95 percent confidence level. Results show that farm from main market is also negative but non-significant. It means that farms near main roads and main markets are more diversified as compared to those which are away, because it provides better opportunity to the farmers to market their farm produce. The coefficient for farm machinery (tractor) is positively related to diversification but it is non-significant. It shows that farmers, which have tractors, are more likely to diversify, because they can properly perform different farming operations on time and can market their produce easily, therefore they are more likely to diversify.

### Constraints faced by farmers in practicing farm diversification

The practice of farm diversification can be beneficial for farmers, consumers as well as consumers as for environment, yet it was noted that medium extent of diversification was not fetching higher returns to farmers and practice of diversification was limited mostly to marginal farmers.

The probable problems were listed with the pilot study and farmers were asked to rank them. The results are shown in the given table Lack of technical knowledge (97%) was reported as the major constraints by the farmers in the study

area and ranked I followed by lack of start-up capital (96%). Lack of market related information (92%) and low risk ability (84%) was analyzed as III and IV rank by the farmers in the region. In similar lines, lack of training on techniques and skills (80%) and lack of time management skills (80%) are ranked V by the farmers. Other constraints faced by the farmers were reported as unavailability of storage facilities (79%), Inadequate extension services (76%), lack of credit facilities (76%), lack of interest and motivation (73%), non-availability of labor (73%), non-availability of Govt. Subsidies (72%), Lack of awareness about agricultural diversification (69%), high input cost (66%), unavailability of inputs (57%), small size of holding (55%), lack of transportation facility and Un-availability of irrigation water (27%). Singh (2001), Kumar (2015) [6] and Bhardwaj (2019) also find similar results from various study practicing farm diversification.

Through informal discussion with the respondents it was found that lack of technical knowledge plays major role in adoption of enterprises such as poultry, sericulture, vermicomposting and other allied agriculture activities because these allied enterprises required basic scientific knowledge and training for its beneficial practice. Due to lack of startup capital people don't start enterprises with heavy initial investment such as piggeries and fisheries. Also, due to lack of market related information, producers get low price of their producers such as mushrooms and vegetables. Field Crops+ vegetables+ dairy is the most practiced combination in the research area because this mix needs less technical knowledge, moderate startup capital and farmers had its market related information as they sold their vegetables, food grains and milk in nearby city markets, dairies and village itself.

**Table 2:** Distribution of respondents on the basis of different constraints faced by them

Sr. No.	Constraints	Respondents (n=100)		Rank
		Frequency	Percentage	
1.	Lack of technical knowledge	97	97	I
2.	Lack of start-up capital	96	96	II
3.	Lack of market related information	92	92	III
4.	Low risk ability	84	84	IV
5.	Lack of training on techniques and skills	80	80	V
6.	Lack of time management skills	80	80	V
7.	Un-availability of storage facility	79	79	VI
8.	Inadequate extension services	76	76	VII
9.	Lack of credit facility	76	76	VII
10.	Lack of interest and motivation	73	73	VIII
11.	Non-availability of labor	73	73	VIII
12.	Non-availability of Govt. Subsidies	72	72	IX
13.	Lack of awareness about agricultural diversification	69	69	X
14.	High input cost	66	66	XI
15.	Unavailability of inputs	57	57	XII
16.	Small size of land holding	55	55	XIII
17.	Lack of transportation facility	42	42	XIV
18.	Un-availability of irrigation water	27	27	XV

### Conclusion

Crop diversification is important is strategy to increase the income of the farmers. There several factors affecting the diversification. The results reveal that the coefficient of farming experience of the farmers is positively related to farm diversification. The experienced farmers more likely to diversify as compared to less experienced farmers. The coefficient for off farm income is inversely related to farm diversification. The coefficient for distance of farm from

main road is inversely related to diversification and significant at 95 percent confidence level. Land holding size is positively related to diversification. The coefficient of age is negative and non-significant. The reason is that older farmers cannot manage farm properly and usually stick with old farming practices. In similar lines, Lack of technical knowledge, lack of share capital and lack of market related information were the important constraints revealed in the study.

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