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# Factors Affecting Farm Diversification in Wheat, Pearl millet and Gram

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## ABSTRACT

This article aims to identify the factors that affect crop diversification in the Ajmer district of Rajasthan. Multiple regression analysis was performed to determine the effect of socio-economic factors on-farm diversification in the wheat-pearl millet- Gram. The results showed that land area, qualification level of respondents, farming-related experience, and income other than farming positively impact farm diversification. In contrast, the age of the farmers negatively impacts diversification.

**Key words:** Diversification, Farmers, Income, Wheat, Pearl millet, Gram

Agriculture is the primary source of income for the vast majority of rural households in India. The agricultural sector contributes approximately 20.19% of the GDP in India [1]. Various types of risk are involved in agriculture. The first one is weather condition risk and the second one is market risk [2]. The uncertainty in agriculture occurs due to the variable productions or returns of farmers and income variability in the farmer [2]. In the Ajmer division of the Rajasthan, the cereals and pulses cropping pattern is mainly adopted by the farmer for an increase in income and employment. In this division of the Rajasthan, the people have particularly preferred the produce cereals. In cereals, wheat is the most profitable main crop for increasing the levels of income of consumers in both urban and rural areas. The crop sector of this division is also facing the type of the problems like crop production variations in the last few years. The farmers and the farm managers face the issues such as price variability and yield variability; the farmers select those combinations of enterprise that decrease the variability of farm income [3]. The sector of agriculture is characterized by inadequate and obsolete technology, as well as a severe shortage of farm inputs, especially fertilizers. Significant reasons for shortage in this sector are poor infrastructure and inefficient marketing systems [4]. Crop diversity is considered as one of the strategies for dealing with food insecurity, production, and market concerns [5]. According to FAO and World Bank 2001, diversification is considered as one of the risk management strategies that involves producing different crops in mitigating the price risk and the output risk. The level

of diversification determines the benefit of soil and optimum use of land resources within the farm and biological and economic considerations [2]. Diversification may be executed by the many skills required to manage a broad group of entrepreneurs [6]. Diversification in agriculture includes crop, livestock, fisheries, farm forestry and horticulture, etc. Farmers of Ajmer division is significantly capable of providing different individual consumption and market requirements, endure price fluctuation, and mitigate income risks because of the complexity of agro-ecological, social, and economic circumstances. Crop diversification is an integral part of the transition from subsistence to commercial agriculture. Smallholder income can be strengthened by shifting from food production for personal consumption to cash crop production [7]. Through crop diversification risks can be mitigated, reducing inconsistent output and improving food security. Crop diversification is aided by high-value crops, cash crops, spices, medicinal plants, and a rise in profit and production stability, which motivates farmers to improve crop production. For example, sugarcane might be use to replace rice and wheat. In crop diversification, farmers grow many crops in the rain-fed fields to minimize the risk of production. It is termed as crop failures risk. These arise due to drought and less rain [2]. Crop diversification and shift are also varying in regions with specific soil issues. Crop diversification has various advantages [8-9], which can be summarized as:

- Crop net returns are relatively high.
- Increases net profits per unit of work.
- Utilization and optimization of resources
- Increases efficiency in the use of land.
- Job opportunities have increased.

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The wheat production in 2015-16 was 116787 (MT) which increased to 185014 (MT) in 2016-17; 128011 (MT) in 2017-18 which increase to 120782(MT) in 2018-19; 120782(MT) in

2018-19 which increased to 274738(MT) in 2019-20. The gram production 2015-16 was 16423(MT) which increased to 125353(MT) in 2016-17; 185014(MT) in 2017-18 which increase to 861299(MT) in 2018-19; 86129(MT) in 2018-19 which increase to 244106 (MT) in 2019-20. The Pearl-millet production in 2015-16 was 47211 (MT) which increase to 60528(MT) in 2016-17; 69633(MT) in 2017-18 which increase to 61482(MT) in 2018-19; 61482(MT) in 2018-19 which increase to 94122(MT) in 2019-20.

Table 1 Crop production in the Ajmer district of the Rajasthan (MT)

Year	Wheat production (MT)	Gram production	Pearl-millet production
2015-16	116787	16423	47211
2016-17	185014	125353	60528
2017-18	128011	185014	69633
2018-19	120782	86129	61482
2019-20	274738	244106	94122

Sources: Rajasthan agriculture statistics at a glance 2015-2020

## MATERIALS AND METHODS

It is a cross-sectional study conducted through a structured questionnaire. Primary data was collected from the Ajmer districts of Rajasthan. From district Ajmer, two tehsils i.e., Ajmer and Bhinay are selected and then out of each tehsil two villages are selected. The selected villages from Ajmer tehsil are “somalpur” and “badiya ka bala” and from tehsil Bhinay, “bhinay” and “rooppura” villages are selected. Tehsils and Villages are selected on the basis of the population (Table 2).

Table 2 Criteria for selecting tehsils and villages

District: Ajmer		
Tehsils	Highest populated village	Lowest populated village
Ajmer	Somalpur	Badiya ka bala
Bhinay	Bhinay	Rooppura

The size of sample for the study was 100 respondents. The 50 farmers are selected from each tehsil, and 25 farmers are selected from each village. The multiple regression models were used for determining the factors that affect diversification. The following regression line was set.

$$D(\text{index}) = a + bx_1 + bx_2 + bx_3 + bx_4 + bx_5$$

Here,

D (Index) = Value of diversification index

X<sub>1</sub>= Respondent Land holding (Acres)

X<sub>2</sub>= Respondents Age (Years)

X<sub>3</sub>= Respondents education level (Years)

X<sub>4</sub>= Respondent Farming experience (Years)

X<sub>5</sub>= Off-income = respondent off farm income (Rs)

## RESULTS AND DISCUSSION

Most of the respondents (72%) were having the age group of below 45 year and the only 28% of the respondents were having the age group of above 45 years. And in the education characteristics the 68% of respondents were below metric [10]. And the 32% were having the education of above metric. Most of the respondents (71%) were having income below than 25000 and only 21% of the respondents having the income group of more than 25000. With respect to a land size

majority (65%) of the respondents having a land size below small-medium [11-12].

Table 3 Socio-economic characteristics

Characteristics	Percentage
Age group	
Below 25	15
25-35	25
35-45	32
45-55	18
>55	10
Education	
Primary	22
Metric	19
Graduate	17
Post graduate	15
Illiterate	27
Income	
<10,000	26
10,000-15,000	23
15,000-25,000	22
25,000-40,000	19
40,000-50,000	10
Land size	
Marginal	23
Small	22
Small-medium	20
Medium- large	18
Large	17

Table 4 Factors affecting diversification

	Standardized B values	t- Stat	Significant
Intercept	1.716		
Holding size	0.456	18.115	.000**
Age	-0.312	-15.019	.000**
Education	0.598	24.011	.000**
Farming experience	0.442	17.901	.000**
Off farm income	0.420	17.101	.000**

\*\*Significant at 1% level

The (Table 4) shows the values of standardized coefficients for the regression line. The Standardized coefficient between landholding size and extent of diversification is 0.456, and the p-value is less than 0.05 (0.000). Therefore, it can be inferred that land size holding significantly impacts the extent of diversification. The value of standardized beta implies that an increase of land size holding by 1 unit will cause an increase of 0.456 units in the extent of diversification [13]. The standardized coefficient between age and the extent of diversification is -0.312, and the p-value is less than 0.05(0.000). Therefore, it can be inferred that age significantly impacts the extent of diversification. The value of standardized beta implies that an increase of age by 1 unit will cause an increase of -0.312 units in the extent of diversification. The standardized coefficient between education and the extent of diversification is 0.598, and the p-value is less than 0.05(0.000). Therefore, it can be inferred that education significantly impacts the extent of diversification. The value of standardized beta implies that an increase of education by 1 unit will cause an increase of 0.598 units in the extent of diversification [14-15]. The standardized coefficient between farming experience and the extent of diversification is 0.442, and the p-value is less than 0.05(0.000). Therefore, it can be

inferred that farming experience significantly impacts the extent of diversification. The value of standardized beta implies that an increase of farming experience by 1 unit will cause an increase of 0.442 units in the extent of diversification. The standardized coefficient between off-farm income and the extent of diversification is 0.420 and the p-value is less than 0.05(0.000). Therefore, it can be inferred that farming experience significantly impacts the extent of diversification. The value of standardized beta implies that an increase of off-farm income by 1 unit will cause an increase of 0.420 units in the extent of diversification [16].

## CONCLUSION

This study explores the effect of various factors (aspects)

such as land area, age of respondents, qualification level of the respondents, farming-related experiences, and the income other than farming on-farm diversification with special reference to Ajmer division of Rajasthan state, India. The study found that factors that are land area; qualification level of the respondents, farming-related experiences, and the income other than farming positively impacts the farm diversification, while the age of the farmers negatively impacts the diversification. In particular, it indicates that old age farmers tend to avoid farm diversification; however, experienced and large holding size farmers prefer to do farm diversification more than less experienced and less holding size farmers. Therefore, to promote farm diversification, the government and policymakers should primarily focus on educating farmers and demoting fragmentation of lands.

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