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FACTOR AFFECTING CROP DIVERSIFICATION

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ABSTRACT

Diversification is introduction of alternate crops, may give good scope to break the monotony of the traditional system of cultivation. Crop diversification provides better conditions for food security and enables farmers to grow surplus products for sale at market and thus help to obtain increased income to meet other needs related to household well-being. The present study was an attempt to identify the factors affecting crop diversification in Junagadh district of Saurashtra region. The present study is based on primary data and multistage stratified random sampling technique was followed to select 120 respondents spread over six villages of three talukas of Junagadh district. The major factors responsible for the change in crop diversification were family size, size of landholding, income of the family, distance to market and education level of the farmer were found significant. Whereas, age of the farmer and experience in farming was found non-significant. This study also found that the key socio-economic variables such as the age of the farmer, family size, size of landholding, income of the family, education level of the farmer and experience in farming were shown positive influence on the crop diversification in the study area. Distance to market was negatively influenced the diversification in crop.

Keywords: *crop diversification, factors affecting, simpson index, regression*

INTRODUCTION

The Indian farm economy is largely crop based (Sipai *et al.,* 2020). Nearly 79.20 per cent of the holdings were used for raising crops, 8.20 per cent for livestock, 1.50 per cent for poultry, 3.90 per cent for plantation / horticulture and the balance of 7.10 per cent for other purposes. Food grains are the main crops, however, some changes are taking place in the cropping pattern. The cropping pattern changes shows some movement towards international trade orientated crops and improvement in farmer's price response and net income.

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, 1996). Agricultural diversification can be described in terms of the shift from the regional dominance of one crop towards the production of a large number of crops to meet the increasing demand of those crops. It can also be described as the economic development of non-agricultural activities (Minot, et al., 2006). The crop diversification imparts farm income stability and there by addresses the issue of depeasantization (Vinaya *et al.,* 2015).

There are numerous physical-agroclimatical, technological, economic and institutional factor constituted on changing the area, production and productivity of crops growing in any particular area or region. Acreage shifts of crops due to these factors is clearly visible both at micro and macro level. As a consequence of advance technology in agriculture, production and income levels of the farmers have experienced a change towards higher level, depending upon the market factor like demand and supply.

Crop diversification is affected by a number of factors. The important factors are price, water availability, productivity, input availability, market availability, cost of cultivation, risk etc. It is difficult to measure the rate at which an individual factor affects the cropping pattern, however, their cumulative effect can hardly be ignored. Keeping the above in view, the present study is undertaken in Junagadh district of Saurashtra region with following objectives.

OBJECTIVES

(1) To study the socio economic characteristic of farmers

(2) To examine the factors influencing crop diversification in the study area

METHODOLOGY

The Gujarat state comprises of 33 districts, among them Amreli, Bhavnagar, Botad, Devbhumi Dwarka, Gir Somnath, Junagadh, Jamnagar, Morbi, Porbandar,

Surendranagar and Rajkot are covered under the Saurashtra region. The crops which are mainly commercially grown in these districts viz., groundnut, cotton, castor, pigeon pea, chick pea, sesamum, wheat, coriander, cumin, onion, garlic and sugarcane. The study is confined to Junagadh district of Saurashtra region.

Junagadh has a total area of 8,831 km^2 (3,410 sq. mile). Junagadh district had total population of 27,43,082. The district is comprised of 9 talukas *viz* Junagadh, Bhesan, Keshod, Malia, Manavadar, Mangrol, Mendarda, Vanthali and Visavadar (Anon., 2019a).

Junagadh district was purposively selected keeping in the view the extent of diversification in terms of area under different crops. Further, three talukas were selected randomly and two villages were selected randomly from each of the selected talukas. Through random sampling 20 farmers from each of the selected villages were selected as ultimate sample. Thus, in all, 120 respondents spread over six villages of three talukas of Junagadh district was comprise as the ultimate sample for the study.

To identify the factors affecting crop diversification multiple linear regression analysis was carried out to identify the important factors affecting crop diversification at district as well as in farm household level (Acharya *et al*., 2011).

Multiple linear regression analysis

It was used to examine the factors influencing crop diversification in the study area, using following functional equation.

$$Y=a_0+a_1X_1+a_2X_2+a_3X_3+a_4X_4+ a_5X_5+u$$

Where, Y = crop diversification (Herfindahl index); X_1 = family size (no.); X_2 = size of holding (ha); (Herfindahl index); X_1 = family size (no.); X_2 = size of holding (ha); X_3 = income of family (Rs/annum); X_4 = irrigated land (ha); X_5 = distance to market (km); X7 = experience in farming (year); u = random error-term; a_0 = constant term.

RESULTS AND DISCUSSION

Socio economic characteristics of sample farmers

Age of sample farmers

Table 1: Age of sample farmers (n=120)

Sr. No.	Age group (years)	Junagadh taluka		Mendarda taluka		Keshod taluka	
		No.	Per cent	No.	Per cent	No.	Per cent
1	**Young** (21-35)	07	17.50	04	10.00	06	15.00
2	**Middle** (36-50)	15	37.50	20	50.00	19	47.50
3	**Old age** (51 and above)	18	45.00	16	40.00	15	37.50
	Average age	48.20		52.40		51.30	

The age of the sample farmers in all the talukas under study were elicited from them and the results are presented in Table 1. The average age appears to be more in Mendarda taluka (52.4 years) as compared to Keshod taluka (51.3 years) and Junagadh taluka (48.2 years). Further, the proportion of old people was more (45 %) in Junagadh taluka than Mendarda taluka (40 %) and Keshod taluka (37.5 %)

Literacy level of sample farmers

Table 2: Literacy level of sample farmers (n=120)

Sr. No.	Education status	Junagadh taluka		Mendarda taluka		Keshod taluka	
		No.	Per cent	No.	Per cent	No.	Per cent
1	**Illiterate**	04	10.00	05	12.50	07	17.50
2	**1-5th std.**	12	30.00	09	22.50	12	30.00
3	**6th-10th std.**	11	27.50	14	35.00	10	25.00
4	**11th-12th std.**	09	22.50	07	17.50	09	22.50
5	**Degree**	04	10.00	05	12.50	02	5.00

The results on literacy status (Table 2) indicated that the illiteracy was more in Keshod taluka compared with Mendarda and Junagadh talukas. The proportion of higher education was more in farmers of Mendarda taluka than Junagadh and Keshod talukas. However, farmers having educational degree were slightly more in Mendarda and Keshod talukas compared to Junagadh taluka.

Labour availability of sample farmers

Table 3: Labour availability of sample farmers (n=120)

Sr. No.	Particulars	Junagadh taluka		Mendarda taluka		Keshod taluka	
		No.	Per cent	No.	Per cent	No.	Per cent
1	**Average family size**	4.25	100.00	3.80	100.00	4.75	100.00
2	**Average on-farm labour size**	3.53	71.58	3.33	62.93	3.50	58.45
3	**Average off-farm labour size**	0.60	9.47	0.20	4.65	0.75	10.50

It is evident from Table 3, that the average family size ranged from 3.80 to 4.75 members and the average on- farm labour available was around 3.45 members per household (HH) in the study area. The proportion of average off-farm labour size was more in Keshod taluka implying the family income from other sources (other than agriculture).

Size of land holding of sample farmer

Table 4: Size of holding of sample farmers (n=120)

Sr. No.	Land holding	Junagadh taluka		Mendarda taluka		Keshod taluka	
		Area (ha)	Per Cent	Area (ha)	Per cent	Area (ha)	Per cent
1	**Dry-land**	0.75	28.40	0.46	17.70	0.80	31.01
2	**Irrigated land**	1.89	71.59	2.14	82.30	1.78	68.99
3	**Total land holding**	2.64	100.00	2.60	100.00	2.58	100.00

The land holding details of the sample farmers (Table 4) indicated that the average total land holding was more in Junagadh taluka (2.64 ha) compared to Mendarda taluka (2.60 ha) and Keshod taluka (2.58 ha). However, farmers of Mendarda had higher area under irrigation (2.14 ha) compared with Junagadh (1.89 ha) and Keshod talukas (1.78 ha).

Factors affecting crop diversification in study area

To determine the factors influencing crop diversification, multiple linear regression analysis was performed. The values of diversification indices as per the Simpson index were regressed on Family size, Size of landholding, Income of the family, Distance to market, Age of the farmer, Education level of the farmer, Experience in farming. Results of regression analysis for all three talukas are presented in Table 5.

Table 5: Factors affecting crop diversification in study area (n=120)

Sr. No.	Variables	Regression Coefficient (b)		
		Junagadh taluka	Mendarda taluka	Keshod taluka
	Simpson index	0.65	0.62	0.58
X_1	**Family size**	0.01472**	0.02103***	0.01854**
X_2	**Size of landholding**	0.02569**	0.02489*	0.02582*
X_3	**Income of the family**	0.0000056*	0.0000063*	0.0000049*
X_4	**Distance to market**	-0.01294*	-0.01656*	-0.01498*
X_5	**Age of the farmer**	0.00978	0.00539	0.00729
X_6	**Education level of the farmer**	0.00353***	0.00450**	0.00305**
X_7	**Experience in farming**	0.00626	0.00263	0.00881
	R^2	0.77	0.87	0.81
	(Adjusted R^2) $\bar{R}^2$	0.69	0.82	0.76

*, ** and *** indicates 10%, 5% and 1% probability level of significant respectively.

Family size was one of the important factors among the identified influencing factors. From the result of the regression analysis it was found that increased in family size had positive influence on crop diversification and its

coefficient was found to be significant at five per cent level of significance in Junagadh and Keshod talukas. While, in case of Mendarda taluka its coefficient was found significant at 1 per cent level of significance. This result indicated that if the size of family increased by one unit then the crop diversification increased by 0.014 units in Junagadh taluka. The regression analysis results revealed that the landholding of farmer had positive influence on crop diversification. Its coefficient was significant at 5 per cent level of significance in Junagadh taluka and at 10 per cent per cent level of significance in Mendarda and Keshod talukas. These results show a matter of concern for policy makers to prevent land fragmentation.

Net annual income from crop enterprise was one of the major influencing factor for crop diversification. The regression analysis inferred that the net annual income of farmers from crop production had positive influenced on crop diversification. The coefficient for this factor was found significant at 10 per cent level of significance in all the three talukas.

From the regression analysis it could be stated that market distance was one of the negatively influencing factor in crop diversification. The coefficient for the distance to market was found to be significant at 10 per cent level of significance in all three study talukas.

The results also revealed that the age of farmer was found to have positive influence on crop diversification, but its coefficient was non-significant in all three study talukas. It is well known that the aged farmers are more risk averters than risk takers. So elder prefers diversification other than specialization.

The education level of farmers was found to have positive influence on crop diversification. The coefficient of this factor was significant at 1 per cent level of significance in Junagadh taluka and at 5 per cent per cent level of significance in Mendarda and Keshod talukas.

For the factor of experience in farming, the results of regression analysis revealed that it had positive influence on crop diversification, but its coefficient was found to be non-significant in all three study talukas.

The obtained value of R^2 and adjusted R^2 from the analysis was 0.77 and 0.69 respectively in Junagadh taluka. In case of Mendarda taluka the value of R^2 and adjusted R^2 obtained from the analysis was 0.87 and 0.82 respectively. The value of R^2 and adjusted R^2 from the analysis was 0.81 and 0.76 respectively in Junagadh taluka. This indicated that around 81 per cent of the variation in dependent variable (crop diversification) was explained by selected independent variables. Manjunatha *et al.* (2019) have also reported that farm size, net irrigated area and net return per acre were found to significantly influencing the crop diversification activities in eastern dry zone of Karnataka.

CONCLUSION

Among the important factor influencing crop diversification in the study area, family size, size of landholding, income of the family, and education level of the farmer were found to have positive and significant effect while distance to market negatively influenced the crop diversification. Whereas, remaining variables *viz;* age of the farmer, family size, size of landholding, income of the family, education level of the farmer and experience in farming were shown positive influence on the crop diversification in the study area.

POLICY IMPLICATION

Market development has direct bearing on number of crops grown and there is a need to develop more number of markets in the study area. An appropriate policy measures to encourage diversification will help to address the issue of depeasantization.

CONFLICT OF INTEREST

No conflict of interest among researchers.

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