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Correlates of cop diversification among small and medium farmers

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Abstract
The present study entitled, 'Correlates of Cop diversification among small and medium farmers 'was conducted in Sakoli and Lakhani tehsils of Bhandara district of Eastern Vidarbha Zone with an aim to study the crop diversification among small and medium farmers as well as to find out the relationship between selected profile of small and medium farmers and crop diversification. The descriptive research design of social research was used and 120 respondents were selected by proportionate random sampling. Findings of the study revealed that maximum number of the respondents (47.50%) were middle aged group with (38.33%) had education up to secondary school level, (65.83%) engaged in agriculture as their main occupation, majority of the respondents (45.00%) had medium level of scientific orientation, with regard to crop diversification most of the farmers 53.33 per cent respondents start to grow vegetable crop followed by sugarcane crop (40.00%). With regard to relational analysis instead of age all other selected variables under the study had shown positive and highly significant relationship with crop diversification at 0.01 level of probability.

Keywords: Crop diversification, small, medium, descriptive, vegetable, sugarcane, proportionate

Introduction
In India, the agriculture and allied activities contributed significantly in the development of country as well as ensure the food security. Crop diversification is a strategy to maximize use of available land, water and other resources. It provides opportunity to the farmers to grow different crops on available land as well as helps to reduce the risk in unfavourable climatic condition. Government has taking immense efforts by implementing crop diversification programme since 2013-14 to divert the area of water intensive crops to alternative crops like pulses, oilseeds, coarse cereals, cotton etc. Crop diversification enhance the farm productivity and help the farmers to obtain additional income in event of crop failure. Rice (*Oryza sativa* L.) is important crop grown in Eastern Vidarbha Zone i.e. study area, crop diversification in rice based cropping system helps to minimize the use of judicious use of fertilizers and other natural resources. Intensive cultivation of rice result in deficiency of nutrients in the soil. Keeping this in view the present study was conducted with following objectives.
1. To study the crop diversification among small and medium farmers
2. To study the relationship between selected profile of small and medium farmers and crop diversification

Materials and Methods
The present study was carried out in with an aim to assess the crop diversification among small and medium farmers, the descriptive design of social research was used in the present study. The study was conducted in Sakoli and Lakhani tahasils of Bhadara district of Eastern Vidarbha Zone of Maharashtra state. From the paddy growing villages where crop diversification happened under the selected tahasil, five villages from each tahasil were selected randomly, five farmers from each selected village constituted a sample of 120 famers for the present study. The structured interview schedule consisting relevant question designed to collect the information in line with objectives of the study.

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The data were collected by personally contacting the selected farmers. Appropriate statistical methods such as arithmetic mean, standard deviation and coefficient of correlation were used in the present study.

Results and Discussion
Profile

Table 1: Distribution of the respondents according to their profile

Sr. No.	Category	Respondents (n=120)	
		Frequency	Percentage
A	**Age**		
1	Young	29	24.17
2	Middle	57	47.50
3	Old	34	28.33
B	**Education**		
1	Illiterate	0	0.00
2	Primary school	3	2.50
3	Middle school	7	5.83
4	Secondary school	46	38.33
5	Higher secondary school	40	33.33
6	College and above	24	20.00
C	**Family size**		
1	Small	66	55.00
2	Medium	38	31.67
3	Large	16	13.33
D	**Occupation**		
1	Agriculture + Labour	04	3.33
2	Agriculture	79	65.83
3	Agriculture + Other allied occupation	28	23.34
4	Agriculture + Services	09	7.50
E	**Annual income**		
1	Up to Rs. 2,66,667/-	72	60.00
2	Rs. 2,66,668 to 4,33,334/-	31	25.83
3	Above Rs. 4,33,334/-	17	14.17
F	**Material Possession**		
1	Low	53	44.17
2	Medium	40	33.33
3	High	27	22.50
F	**Social participation**		
1	Low	34	28.33
2	Medium	57	47.50
3	High	29	24.17
G	**Credit seeking behaviour**		
1	Low	33	27.50
2	Medium	55	45.83
3	High	32	26.67
H	**Information seeking behaviour**		
1	Low	18	15.00
2	Medium	75	62.50
3	High	27	22.50
I	**Scientific behaviour**		
1	Low	39	32.50
2	Medium	54	45.00
3	High	27	22.50
J	**Risk preference**		
1	Low	41	34.17
2	Medium	50	41.67
3	High	29	24.16
K	**Economic motivation**		
1	Low	30	25.00
2	Medium	64	53.33
3	High	26	21.67

The age wise distribution of the respondents presented in Table 1 showed that, relatively higher proportion (47.50%) of the respondents were in the middle age group of 36 to 50 years. This was followed by 28.33 per cent of respondents who were observed to belong to old age group of above 50 years. Whereas little less than one fourth (24.17%) of the respondents were in young age group i.e. up to 35 years.

Thus, it could be concluded that maximum number of the respondents (47.50%) were from middle age i.e. 36 to 50 years of age. Similar findings were reported by Rai (2015) [11], Bagri (2020) [1] and Payal (2020) [8].

It could be seen from the Table 1 that 38.33 per cent of the respondents were educated up to secondary school level. The percentage of respondents educated up to higher secondary school (33.33%) and college above level was 20.00 per cent, middle school (5.83%), primary school (2.50%) and none of the farmer was illiterate.

Thus, it can be said that, maximum percentage of the respondents had formal schooling up to secondary school level (38.33%). This finding supported the observations of Payal (2020) [8].

The family size wise distribution of the respondents presented in Table 1 shows that, more than half (55.00%) of the respondents belonged to small family size having up to 6 members in the family, followed by 31.67 per cent of the respondents belong to medium family size (7 to 9 members) and 13.33 per cent of the respondents were of large category of family size (above 9 members).

It was concluded that maximum (55.00%) respondents were of small family size (up to 6 members). Similar findings were reported by Pawar (2014) [10] and Shobha (2015) [13].

It could be seen from table 1 that, majority i.e. 65.83 per cent of respondents were involved in the agriculture as main occupation whereas, 23.34 per cent of the respondents engaged in agriculture with other allied occupation, 7.50 per cent agriculture and service and only 3.37 per cent respondents were having agriculture and labour occupation.

Thus, it can be said that, 65.83 per cent of the respondents had agriculture as their occupation. These findings are in line with the observations of Santhos (2013) [15] and Bharadwaj (2019) [2].

From the distribution of the respondents according to annual income, data presented in Table 1 revealed that majority of respondents (60.00%) had annual income of up to Rs. 2,66,667/-, followed by 25.83 per cent had annual income ranging from Rs. Rs. 2,66,668/- to 4,33,334, whereas, 14.17 per cent of them had annual income of above Rs. 4,33,334/-.

Thus, it is concluded that majority (60.00%) of the respondents having annual income up to Rs. 2,66,667/-. The above findings are in consonance with the findings of Jagruti (2021) [6].

The result from the Table12 shows that higher proportion of the respondents (44.17%) had low level of material possession followed by 33.33 per cent had medium level of material possession whereas, more than one fifth (22.50%) per cent of them had high level of material possession.

Thus, from result, it can be concluded that maximum number (44.17%) of the respondents had low level of material possession. This finding is in line with the findings of Saha and Bahal (2010) [14] and Bagri (2020) [1].

The data presented in Table 1 revealed that, maximum percentage of the respondents (47.50%) had medium level of social participation. Whereas (28.33%) of the respondents had low level of social participation and little less than one fourth (24.17%) of the respondents were having high level of social participation.

Thus, from this result it can be concluded that higher proportion of the respondents (47.50%) had medium level of social participation. This finding is in line with those reported by Pankaj (2014) [7] Rathod (2017) [12] and Bagri (2020) [1].

The data presented in the Table 1 shows that relatively higher proportion of the respondents (45.83%) had medium credit seeking behavior followed by 27.50 per cent and more than one fourth i.e. 26.67 per cent of them had low and high credit seeking behaviour, respectively.

Thus, from this result it can be concluded that higher proportion of the farmers (45.83%) had medium level of credit seeking behaviour and this finding is in line with Bharadwaj (2019) [2].

The result presented in the Table 11 shows that majority of the respondents (62.50%) had medium information seeking behaviour followed by 22.50 per cent of them had high and 15.00 per cent of them had low information seeking behaviour.

Therefore, from the above result it can be inferred that majority of the respondents (62.50%) had medium to high information seeking behaviour. The result of present study is in accordance with Patidar (2015) [9] and Dudhatra (2021) [5], who observed that majority of the respondents had medium level of information seeking behaviour.

From the Table 1, it is observed that, higher proportion of the respondents (45.00%) had medium orientation towards scientific farming followed by 32.50 per cent of them were having low orientation and (22.50%) respondents belonged to high orientation towards scientific farming.

Thus, it could be inferred that majority of the respondents had medium level of scientific orientation. The similar findings were reported by Rai (2015) [11] and Chandangiriwar (2020) [3].

Distribution of the respondents according to risk preference in Table 1, showed that maximum number of the respondents (41.67%) oriented to take medium risk involved, followed by 34.17 per cent and 24.16 per cent oriented to take low and high risk involved in cultivation of different crop respectively. Thus, it could be concluded that, majority of the respondents (41.67%) had medium level risk preference. Similar findings were reported by who observed that majority of the respondents possessed medium risk are Rai (2015) [11] and Rathod (2017) [12].

From Table 1, it is found that, more than half of the respondents (53.33%) had medium economic motivation followed by one fourth (25.00%) of them were having low economic motivation and more than one fifth (21.67%) respondents belonged to higher economic motivation.

Thus, it could be concluded that, maximum number (53.33%) of the respondents had medium economic motivation. The findings of the present study was corroborated with the findings of Dhenge (2013) [4], Bharadwaj (2019) [2] and Chandangiriwar (2020) [3].

Dependent variable
Crop diversification
It is operationally defined as the change in area under paddy and diverted for cultivation under other crops.

Table 2: Distribution of respondents according to area wise diverted crops

Sr. No.	Name of the crop	Area (Ha)	Frequency	Percentage
	Respondents (n= 120)			
1	Sugarcane	33.02	48	40.00
2	Vegetables crop	26.31	64	53.33
3	Maize	7.30	16	13.33
4	Mulberry cultivation	1.21	02	1.67
5	Spices	5.68	13	10.83
6	Fruit crop	7.90	11	9.17
	Total	81.42		

From the Table 2, it was found that most of the farmers in study area diverted their paddy area to sugarcane crop (33.02 ha), followed by vegetable crop (26.31 ha). Fruit crop and maize consist 7.90 and 7.30 ha area respectively. Some farmers diverted to spices also (5.68 ha) and only 1.21 ha area under the mulberry cultivation.

It was also observed from Table 2 that, out of the 120 respondents most of the respondents start to growing vegetable crops (53.33%), followed by 40.00 per cent respondents growing sugarcane crop. There are some farmers (13.33%) who grow maize crops. 10.83 per cent respondents grow spices and 9.17 per cent respondents grow fruit crops. Only 1.67 per cent respondents diverted their area in mulberry cultivation. Thus, it could be concluded that, most of the respondents grow both sugarcane and vegetable crops.

The logical reasoning behind this could be that most of the area diverted to sugarcane crop and from the collected data, it was observed that most of the sugarcane crop area was founded in Sakoli tehsil. In case of vegetable crop, diversification is done in both i.e. Sakoli and Lakhani tehsil.

Beside investigation of crop diversification, the researcher had also categorized the respondents on the basis of crop diversification from paddy under other crops. In following tables, the respondents were categorized on the basis of land holding and overall respondents categorization on the basis of crop diversification also done.

Table 3: Distribution of small and medium farmers according to their crop diversification.

Sr. No.	Category	Small farmers (n= 90)	Category	Medium farmers (n= 30)
		(N= 120)		
1	Low	32 (35.56)	Low	14 (46.67)
2	Medium	40 (44.44)	Medium	10 (33.33)
3	High	18 (20.00)	High	06 (20.00)
	Total	90	Total	30

The data presented in the Table 3 showed that, in case of small farmers, higher proportion of the respondents (44.44%) were in medium category, followed by 35.56 per cent in low category and 20.00 per cent of them in high category of crop diversification.

In case of medium farmers, maximum number of the respondents i.e. 46.67 per cent were in low category followed by 33.33 per cent in medium category and only one fifth (20.00) of them were in high category of crop diversification. Logical reasoning behind this could be that the farmers with small land holding are more engaged in taking multiple crops in their field. Similar findings were reported by Kumar and Surbhi (2003) [16] and concluded that, farmers with small holdings make frequent changes in the crop choices to increase their income and employments.

Table 4: Distribution of respondents according to their of level of crop diversification

Sr. No.	Category	Frequency	Percentage
		Respondents (n= 120)	
1	Low	63	52.50
2	Moderate	43	35.83
3	High	14	11.67
	Total	120	100.00

From Table 4, it is found that according to their crop diversification more than half (52.50%) of the respondents had low diversification of paddy under other crops, followed by 35.83 per cent of the respondents had moderate

diversification of paddy while only 11.67 per cent of respondent had high diversification of paddy under other crops.

Thus, it could be concluded that majority of respondents (52.50%) had low diversification under other crops.

Table 5: Distribution of respondents according to area wise diverted crops

Respondents (n= 120)				
Sr. No.	Name of the crop	Area (Ha)	Frequency	Percentage
1	Sugarcane	33.02	48	40.00
2	Vegetables crop	26.31	64	53.33
3	Maize	7.30	16	13.33
4	Mulberry cultivation	1.21	02	1.67
5	Spices	5.68	13	10.83
6	Fruit crop	7.90	11	9.17
	Total	81.42		

From the Table 5, it was found that most of the farmers in study area diverted their paddy area to sugarcane crop (33.02 ha), followed by vegetable crop (26.31 ha). Fruit crop and maize consist 7.90 and 7.30 ha area respectively. Some farmers diverted to spices also (5.68 ha) and only 1.21 ha area under the mulberry cultivation.

It was also observed from Table 5 that, out of the 120 respondents most of the respondents start to grow vegetable crops (53.33%), followed by 40.00 per cent respondents growing sugarcane crop. There are some farmers (13.33%) who grow maize crops. 10.83 per cent respondents grow spices and 9.17 per cent respondents grow fruit crops. Only 1.67 per cent respondents diverted their area in mulberry cultivation. Thus, it could be concluded that, most of the respondents grow both sugarcane and vegetable crops.

The logical reasoning behind this could be that most of the area diverted to sugarcane crop and from the collected data, it was observed that most of the sugarcane crop area was founded in Sakoli tehsil. In case of vegetable crop, diversification is done in both i.e. Sakoli and Lakhani tehsil.

Beside investigation of crop diversification, the researcher had also categorized the respondents on the basis of crop diversification from paddy under other crops. In following tables, the respondents were categorized on the basis of land holding and overall respondents categorization on the basis of crop diversification also done.

Table 6: Distribution of small and medium farmers according to their crop diversification

(N= 120)				
Sr. No.	Category	Small farmers (n= 90)	Category	Medium farmers (n= 30)
1	Low	32 (35.56)	Low	14 (46.67)
2	Medium	40 (44.44)	Medium	10 (33.33)
3	High	18 (20.00)	High	06 (20.00)
	Total	90	Total	30

(Figure in parenthesis indicates percentage)

The data presented in the Table 6 showed that, in case of small farmers, higher proportion of the respondents (44.44%) were in medium category, followed by 35.56 per cent in low category and 20.00 per cent of them in high category of crop diversification.

In case of medium farmers, maximum number of the respondents i.e. 46.67 per cent were in low category followed by 33.33 per cent in medium category and only one fifth (20.00) of them were in high category of crop diversification.

Logical reasoning behind this could be that the farmers with small land holding are more engaged in taking multiple crops in their field. Similar findings were reported by Kumar and Surbhi (2003) [16] and concluded that, farmers with small holdings make frequent changes in the crop choices to increase their income and employments.

Relational analysis

Table 7: Coefficient of correlation of selected characteristics of respondents with crop diversification

Sr. No.	Variables	'r' values
1	Age	0.059NS
2	Education	0.189*
3	Family size	0.184*
4	Annual income	0.442**
5	Occupation	0.313**
6	Material possession	0.194*
7	Social participation	0.405**
8	Credit seeking behaviour	0.420**
9	Information seeking behaviour	0.514**
10	Risk preference	0.610**
11	Scientific orientation	0.374**
12	Economic motivation	0.602**

*= Significant at 0.05 level of probability
**= Significant at 0.01 level of probability
NS = non-significant

It is evident from Table 7, that among the selected characteristics namely annual income, occupation, social participation, credit seeking behaviour, information seeking behaviour, risk preference, scientific orientation and economic motivation were found positively and significantly correlated with crop diversification at 0.01 level of probability whereas, education, family size and material possession were found positive and significantly correlated with crop diversification at 0.05 level of probability. It is therefore null hypothesis was rejected for these variables.

The only one variable namely age did not show any significant association and positively non-significant with the crop diversification. Therefore, null hypothesis for this variable was accepted.

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