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Relationship between the profile of farmers and cropping pattern followed by farmers of Marathwada region in relation to climate change

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Abstract

The study was conducted find out the relationship between the profile of farmers and cropping pattern followed by the farmers of Marathwada region in relation to climate change. Total 120 respondent farmers were selected from 12 villages of four tehsils of two districts. Data were collected by using a well-structured interview schedule. Ex post facto research design was used for the study. Data were analysed by using frequency, percentage, mean, Pearson's coefficient of correlation and standard deviation.

The study revealed that education, farming experience, extension contacts, risk orientation and economic motivation had positive and significant relationship with cropping pattern. Whereas land holding, irrigation potential, annual income had positive and highly significant relationship with cropping pattern. Family type and social participation had positive and non-significant relationship with cropping pattern.

Keywords: Cropping pattern, climate change, sequential cropping pattern, Marathwada region

1. Introduction

Agriculture in India is not merely a means of livelihood but a cultural and economic cornerstone. It sustains nearly half of the country's population and contributes significantly to national GDP. Indian agriculture has made significant progress in the past and currently facing many challenges like stagnating net sown area, plateauing yields levels, deterioration of soil quality, reduction of agricultural land, and adverse effect of climate change. The consequences of climate change manifested through erratic rainfall, prolonged dry spells, rising temperature, and extreme weather events are profoundly altering agricultural systems across various regions.

Cropping pattern refers to the portion of land under cultivation of different crops at different points of time. This indicates the time arrangement of crops in particular land area or field. Cropping pattern represents a key factor in determining the level of agricultural production.

The Marathwada region, located in the central part of Maharashtra. Geographically, it lies in the rain shadow zone of the Western Ghats, making it naturally semi-arid with limited water resources. The region is heavily, reliant on agriculture with traditional and modern crops with focus on rainfed agriculture. Historically, the region's agricultural practices have revolved around rainfed farming, and cropping patterns were adapted to the region's agro-climatic conditions. However, over the past few decades, due to climatic variability, increasing instances of drought, and economic pressures, there has been a significant shift in the cropping pattern. Farmers are increasingly moving away from traditional crops such as millets and pulses toward more water-intensive and high-risk cash crops like cotton and sugarcane.

Understanding the relation between cropping pattern and profile farmers. It revealed the sustainability or lack off current agricultural practices, provide insight into the effectiveness of existing government interventions and the gaps therein. By analysing relationship between the profile of farmers of Marathwada region and cropping pattern it is possible to derive meaningful conclusions about the adaptive capacity of farmers and the resilience of the agricultural system in Marathwada.

2. Materials and Methods

Ex-post facto research design was used to conduct the investigation. The study was conducted in two districts of Marathwada region of Maharashtra state i.e. Hingoli and Parbhani districts. Two tehsils were selected from each district. From Hingoli district Basmat and Aundha tehsils selected and from Parbhani district Jintur and Parbhani tehsils were selected. Three villages were selected from each tehsils selected. Ten farmers selected was selected form each villages total 120 farmers was selected for study. There was one dependent variable namely "Cropping pattern" and ten independent variables family type, education, land holding, irrigation potential, farming experience, annual income, social participation, extension contact, risk orientation and economic motivation.

To measurement of the dependent and independent variables, appropriate scientific tools were used in the study. The data was collected from the respondents through interview schedule by personal interview technique. They were analysed by using frequency, percentage, mean, standard deviation and Pearson's coefficient of correlation.

3. Results and Discussion

Table 1: The Profile of Farmers of Marathwada Region

Sr. No.	Category	Frequency	Percentage
A. Family type			
1	Nuclear	73	60.83
2	Joint	47	39.17
B. Education			
1	Illiterate	2	1.67
2	Can read only	3	2.50
3	Can read and write	6	5.00
4	Primary school (Up to 4th std)	22	18.83
5	Middle school (5th std to 10th std)	26	21.67
6	Higher secondary (11th std and 12th std)	53	44.17
7	Graduate	8	6.67
C. Land Holding			
1	Marginal (Up to 1.00 ha)	16	13.33
2	Small (1.01 to 2.00 ha)	19	15.83
3	Semi medium (2.01 to 4.00 ha)	65	54.17
4	Medium (4.01 to 10.00 ha)	20	16.67
5	Large (10.01 ha and above)	1	0.83
D. Farming Experience			
1	Low (Up to 11)	24	20.00
2	Medium (12 to 24)	80	66.67
3	High (Above 24)	16	13.33
E. Annual Income			
1	Low (Up to 104851)	19	15.83
2	Medium (104852 to 355732)	78	65.00
3	High (Above 355732)	23	19.17
F. Irrigation Potential			
1	Low (Up to 23)	28	20.00
2	Medium (24 to 83)	81	70.83
3	High (Above 83)	11	9.17
G. Social Participation			
1	Low (Up to 4)	37	30.83
2	Medium (5 to 9)	62	51.67
3	High (Above 9)	21	17.50
H. Extension Contact			
1	Low (Up to 5)	21	17.50
2	Medium (6 to 11)	76	63.33
3	High (Above 11)	23	19.17
I. Risk Orientation			
1	Low (Up to 19)	25	20.83
2	Medium (20 to 23)	81	67.50
3	High (Above 23)	14	11.67
J. Economic Motivation			
1	Low (6 to 12)	25	20.83
2	Medium (13 to 25)	75	62.50
3	High (Above 25)	20	16.67

Table 2: Distribution of the farmers according to their cropping pattern

Sr. No.	Category	Frequency	Percentage
1	Poor (Up to 3)	27	22.50
2	Fair (3 to 9)	75	62.50
3	Good (Above 9)	18	15.00
Total		120	100.00

Relationship between profile of farmer and cropping pattern followed

Table 3: Relationship between profile of farmer and cropping pattern followed by farmer

Sr. No.	Independent Variable	Correlation coefficient (r)
1	Family Type	0.099^{NS}
2	Education	0.206*
3	Land Holding	0.696**
4	Farming Experience	0.239*
5	Annual Income	0.822**
6	Irrigation Potential	0.732**
7	Social Participation	0.190^{NS}
8	Extension Contact	0.205*
9	Risk Orientation	0.247*
10	Economic Motivation	0.233*

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

Family type and cropping pattern

The data in the table 3 revealed that, there was positive and non-significant correlation between family type and cropping pattern.

Family type shows a positive but non-significant relationship with cropping patterns because joint or nuclear setups may slightly affect labour availability and decision-making. However, these effects are not strong enough to influence crop choices consistently. Other factors like land size, income, and education play a more dominant role.

The above findings are in line with the findings of Keer (2020) [8].

Education and cropping pattern

The data in the table 3 revealed that, there was positive and significant correlation between education and cropping pattern.

Education has a positive and significant relationship with cropping patterns as it improves farmers understanding of modern agricultural methods and resource management. Educated farmers are more likely to adopt diverse and efficient cropping systems. This leads to better crop planning and increased productivity.

The findings of this investigation are aligned with those of a previous study done by Gadge (2003) [2] and Keer (2020) [8].

Land holding and cropping pattern

The data in the table 3 revealed that, there was positive and highly significant correlation between land holding and cropping pattern.

Land holding has a positive and highly significant relationship with cropping patterns in relation to climate change because larger areas allow farmers to adopt adaptive strategies more easily. They can diversify crops, implement water-saving techniques, and shift to climate-resilient varieties. This flexibility helps them respond better to changing climate conditions.

The above findings are in line with the findings of Kale (2016) [5] and Mergewar (2017) [6].

Farming experience and cropping pattern

The data in the table 3 revealed that, there was positive and significant correlation between farming experience and cropping pattern.

Farming experience has a positive and significant relationship with cropping patterns as it enables farmers to draw on past knowledge to make informed crop decisions. Their practical understanding of local conditions helps in selecting suitable and timely crops. This contributes to more effective and adaptive cropping practices.

The findings of this investigation are aligned with those of a previous study done by Kale (2016) [5] and Mergewar (2017) [6].

Annual income and cropping pattern

The data in the table 3 revealed that, there was positive and highly significant correlation between annual income and cropping pattern.

Annual income has a positive and highly significant relationship with cropping patterns because higher earnings allow farmers to afford better inputs like quality seeds, fertilizers, and equipment. This financial capacity supports crop diversification and improved farming methods. Consequently, it leads to more productive and varied cropping patterns.

The above findings are in line with the findings of Mergewar (2017) [6].

Irrigation potential and cropping pattern

The data in the table 3 revealed that, there was positive and highly significant correlation between irrigation potential and cropping pattern.

Irrigation potential has a positive and highly significant relationship with cropping patterns because it allows farmers to grow a wider range of crops beyond seasonal limitations. Reliable water access encourages the adoption of high-yield and water-sensitive crops. This results in more diverse, stable, and productive cropping systems.

The findings of this investigation are aligned with those of a previous study done by Nga *et.al* (2019) [7].

Social participation and cropping pattern

The data in the table 3 revealed that, there was positive and non-significant correlation between social participation and cropping pattern.

Social participation shows a positive and non-significant relationship with cropping patterns because, while it encourages knowledge sharing and community engagement, it may not directly influence individual crop choices. Factors like land size, income, and climate conditions have a stronger impact. Therefore, its effect on cropping decisions remains limited.

The findings of this investigation are aligned with those of a previous study done by Keer (2020) [8].

Extension contact and cropping pattern

The data in the table 3 revealed that, there was positive and

significant correlation between extension contact and cropping pattern.

Extension contact has a positive and significant relationship with cropping patterns as it connects farmers with updated agricultural knowledge and techniques. These interactions help them choose suitable crops, improve resource use, and adopt better farming methods. As a result, cropping patterns become more efficient and diversified.

The above findings are in line with the findings of Gadge (2003) [2] and Bakang *et al*. (2011) [3].

Risk orientation and cropping pattern

The data in the table 3 revealed that, there was positive and significant correlation between risk orientation and cropping pattern.

Risk orientation has a positive and significant relationship with cropping patterns because farmers who are open to taking risks are more likely to try new crops and innovative practices. This willingness supports diversification and adaptation in farming. Consequently, cropping patterns become more dynamic and responsive to changing conditions.

The findings of this investigation are aligned with those of a previous study done by Gandhi (1993) [1].

Economic motivation and cropping pattern

The data in the table 3 revealed that, there was positive and significant correlation between economic motivation and cropping pattern.

Economic motivation has a positive and significant relationship with cropping patterns because farmers focused on income generation are more likely to choose high-value and profitable crops. This drive leads them to adopt efficient and market-oriented farming practices. As a result, cropping patterns become more diversified and economically viable.

The above findings are in line with the findings of Gandhi (1993) [1] and Gadge (2003) [2].

4. Conclusion

It is evident from table 3 that, the results of correlation coefficient showed that independent variables namely education, farming experience, extension contact, risk orientation and economic motivation had positive and significant relationship with cropping pattern. Whereas land holding, irrigation potential, annual income had positive and highly significant relationship with cropping pattern. Family type and social participation had positive and non-significant relationship with cropping pattern.

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