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Farmers' perception about climate change on agriculture

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Abstract

The present study was conducted in Ahmednagar and Pune districts of Maharashtra state during the year 2022-23. The districts were purposively selected for the present study as they have highest area under crop cultivation. The village-wise list of the farmers for the selected tahsils was prepared. 30 farmers from each selected village were selected randomly. Thus, total 360 farmers were selected for this study. The research design ex post facto were used.

The result revealed that 47.50 percent of farmers were middle aged; nearly half of the farmers i.e. 40.00 percent had educated up to higher secondary level, 60.27 percent had medium farming experience, 48.34 percent had small size of land holding, 47.78 percent had well as a source of irrigation, 73.34 percent had medium annual income, 53.38 percent had medium awareness about crop insurance, 55.55 percent had medium level of extension contact, 58.61 percent had medium mass media exposure, 73.89 percent had medium level of access to weather forecast, 49.16 percent had medium awareness about climate change, 47.48 percent had medium innovativeness and 49.16 percent had medium level of scientific orientation. The collected data were processed through primary and secondary tables and statistically analysed. The Karl Pearson's correlation coefficient method was computed to find out the relationship between the selected independent and dependent variables.

Keywords: Perception, farmers, agriculture, climate change

Introduction

The industry most exposed to climate change is agriculture. The frequency of climate-related disasters is increasing, and because India has a variety of agro- ecological zones, it is vulnerable to a wider range of climatic shocks. Farmers are more vulnerable because of the frequency of droughts, cyclones, floods, hailstorms, frost, high winds, and extreme temperatures. Climate change can affect agriculture in a variety of ways. Beyond a certain range of temperatures, warming tends to reduce yields because crops speed through their development, producing less grain in the process. And higher temperatures also interfere with the ability of plants to get and use moisture. Agriculture is very sensitive to weather and climate. It also relies heavily on land, water, and other natural resources that climate affects. While climate changes (such as in temperature, precipitation, and frost timing) could lengthen the growing season or allow different crops to be grown in some regions, it will also make agricultural practices more difficult in others.

In 2022, the Intergovernmental Panel on Climate Change (IPCC) released its 6th Assessment Report on climate change. It warned that greenhouse gas emissions must peak before 2025 at the latest and decline 43% by 2030 to have a good chance of limiting global warming to 1.5 °C. Now it is widely accepted that though climate change is a natural process, its pace of change has increased over the last 150-

200 years, especially after industrial revolution in western world during 1970's. The International food policy Research Institute's (IFPRI) Global food policy 2022 report has warned that climate change may push 90 million Indians towards hunger by 2030. The effects of climate change on agriculture can result in lower crop yields and nutritional quality due to drought, heat waves and flooding as well as increases in pests and plant disease. The effects are unevenly distributed across the world and are caused by changes in temperature, precipitation and atmospheric carbon dioxide levels due to global climate change. In 2019, millions were already suffering from food insecurity due to climate change. Further, the predicted decline in global crop production is 2% to 6% with each decade. In 2019, it was predicted that food prices would rise by 80% by 2050. This will likely lead to increased food insecurity, disproportionately affecting poorer communities.

Objective

To study the personal, socio-economic and psychological characteristics of farmers.

Methodology

The Objective of the present research aimed to determine the perception of farmers about climate change on agriculture. The present study was conducted in

Ahmednagar and Pune districts of Maharashtra state. The districts were purposively selected for the present study as they have highest area under crop cultivation. The village-wise list of the farmers for the selected tahsils was prepared. 30 farmers from each selected village were selected randomly. Thus, total 360 farmers were selected for this study. The perception scale was designed for the present study. The data were collected with the help of well constructed and pretested interview schedule. The independent variables namely Age, education, farming experience, land holding, total annual income, crop insurance, irrigation, extension contacts, mass media exposure, awareness, innovativeness, scientific orientation. The perception as a dependent variable has been selected for this study. The collected data were processed through primary and secondary tables and statistical methods and testes such as frequency, percentage, mean, standard deviation, Karl Pearson's correlation coefficient method was used for the analysis of the data ex-post facto research design was used in this research and computed to find out the relationship between the selected independent and dependent variables.

Results and Discussion

1. Age

As per as age concern majority of respondents i.e. (47.50%) were in middle age group (36 to 55 years) followed by 33.88 percent and 18.62 percent belonging to the old age and young age categories, respectively. Hence, it is concluded from the table that majority of the respondents were of middle age i.e. 36 to 55 years farmers. The present findings are similar to the findings of Parganiha (2016) ^[1] and Kalamkar (2022) ^[2].

2. Education

As per as concern majority 40.00 percent had completed their secondary education, 26.67 percent had completed their higher secondary education, 16.67 percent had completed their graduation and above education, only 8.34 percent had completed their middle education and only 7.77 percent of farmers had completed their primary education and 0.55 percent were illiterate. According to the data, it can be inferred that the majority of respondents had completed their secondary and higher secondary education and only a small percentage of them were being illiterate. The findings are similar to the findings of Sangeetha (2013) ^[3], Parganiha (2016) ^[1], Prasad (2016) ^[4], Nayak (2018) ^[5] and Kalamkar (2022) ^[2].

3. Farming experience

As per as concern two third of the respondents i.e. 60.27 percent had a medium level of farming experience, followed by 21.67 and 18.06 percent of respondents who had a low and high level of farming experience, respectively. The majority of respondents had medium levels of farming experience.

These findings of present study are supported by the finding Hingonekar (2011) ^[6], Sangeetha (2013) ^[3], Dhodia *et al.* (2014) ^[7], Laxman (2016) ^[8], Chadachal (2017) ^[9], Kalamkar (2022) ^[2].

4. Land holding

It clearly indicates in the Table 1 that 48.34 percent of the

respondents were possessing up to 1.01 to 2.00 ha of land and belonged to small farmers category, while, 26.38 percent of the respondents were possessing 2.01 to 4.00 ha of land and belonged to medium farmers category and 19.16 percent of the respondents were having marginal land holding category. Only 6.12 percent of the respondents were possessing above 4.01 ha of land and belonged to big category.

The results were in consonance with the findings of Laxman (2016) ^[8], Parganiha (2016) ^[1], Prasad (2016) ^[4], Chadachal (2017) ^[9], Raghuvanshi (2017) ^[11] and Bidve (2021) ^[10].

5. Irrigation

It can be concluded that majority of respondents (47.78%) had well as irrigation source, followed by 27.78 percent had river as irrigation facility, while, 10.55 percent respondents depend upon the tube well as source of irrigation. Only 7.23 percent respondents had canal as irrigation facility and 6.66 percent of respondents were pond as source of irrigation. The results were supported by the finding Subramaniam (2010) ^[13] and Mutandwa *et al.* (2019) ^[14].

6. Total annual income

It is found from that majority of respondents (73.34%) had medium annual income (Rs 403356 to 747828) followed by 13.33 percent of respondents belongs to low (Up to Rs 403355) annual income category per year, whereas, 13.33 percent respondents had high annual income (Rs. 747829 & above) category, respectively. The findings of the present study are in line with the findings of Rathod *et al.* (2014) ^[15] and Chadachal (2017) ^[9].

7. Crop insurance

It is observed that majority of the farmers i.e. more than half of the respondents i.e. 53.88 percent had medium level of awareness about crop insurance, followed by 28.34 percent and 17.78 percent who had higher and low level of awareness about crop insurance, respectively. The data thus indicated that large proportion of respondents had medium awareness about crop insurance. These findings were in line with the finding of Pande and Akermann (2010) ^[16].

8. Extension contacts

The data presented in the table 1 that 55.55 percent of the respondents were having medium level of extension contacts, whereas, 25.56 and 18.89 percent of them were found in high and low level of extension contacts; respectively.

Above findings are in line with the findings of Kamble *et al.* (2014) ^[17], Hipparkar (2015) ^[18], Alam *et al.* (2016) ^[19], Islam *et al.* (2019) ^[20], Patil (2021) ^[21] and Kalamkar (2022) ^[2].

9. Mass media exposure

According to data furnished that the it revealed that the majority of respondents i.e. 58.61 percent of the respondents had medium level of mass media exposure, followed by 25.56 percent of the respondents had high level and 15.83 percent had low level of mass media exposure.

Above findings are in line with the findings of Borole (2010) ^[22], Patel *et al.* (2011) ^[24], Badhe (2012) ^[23], Laxman (2016) ^[8] and Prasad (2016) ^[4].

Table 1: Distribution of respondents according to their personal, socio-economic and psychological characteristics of farmers.

Sr. no.	Profile	Frequency	Percent
1.	Age		
1	Young (Upto 35 years)	122	18.62
2	Middle (36 to 55 years)	171	47.50
3	Old (56 and above years)	67	33.88
2.	Education		
1	Illiterate	02	0.55
2	Primary education (Std. I to IV)	28	7.77
3	Middle education (Std. V to VII)	30	8.34
4	Secondary education (Std. VIII to X)	144	40.00
5	Higher secondary (Std. XI to XII)	96	26.67
6	Graduation/ Post graduation (Degree and more)	60	16.67
3.	Farming experience		
1	Low (Upto 11 years)	78	21.67
2	Medium (12 to 27 years)	217	60.27
3	High (28 year and above)	65	18.06
4.	Land holding		
1	Marginal (Upto 1.00)	69	19.16
2	Small (1.01 to 2.00)	174	48.34
3	Medium (2.01 to 4.00)	95	26.38
4	Big (Above 4.01)	22	6.12
5.	Irrigation		
1	River	100	27.78
2	Pond	07	6.66
3	Well	172	47.78
4	Canal	26	7.23
5	Tube well	38	10.55
6.	Total annual income		
1	Low (Upto ₹ 403355)	48	13.33
2	Medium (₹ 403356 to 747828 ₹)	264	73.34
3	High (₹ 747829 & above)	48	13.33
7.	Crop insurance		
1	Low (Upto 4)	102	28.34
2	Medium (5 to 8)	194	53.88
3	High (9 and above)	64	17.78
8.	Extension contacts		
1	Low (Upto 9)	68	18.89
2	Medium (10 to 16)	200	55.55
3	High (16 and above)	92	25.56
9.	Mass media exposure		
1	Low (Upto 4)	57	15.83
2	Medium (5 to 8)	211	58.61
3	High (9 score and above)	92	25.56
10.	Access to weather forecast		
1	Low (Upto 12)	266	73.89
2	Medium (13 to 24)	85	23.61
3	High (25 and above)	09	2.50
11.	Awareness		
1	Low (Upto 12)	60	16.67
2	Medium (13 to 15)	177	49.16
3	High (16 and above)	123	34.17
12.	Innovativeness		
1	Low (Upto 9)	75	20.84
2	Medium (10 to 12)	172	47.78
3	High (13 and above)	113	31.38
13.	Scientific orientation		
1	Low (Upto 8)	60	16.67
2	Medium (9 to 21)	177	49.16
3	High (22 and above)	123	34.17

10. Access to weather forecast

The data in the Table 1 shows that the majority of the respondents i.e. 73.89 percent had low level of source of information, while, 23.61 percent of the respondents had

medium level and 2.50 percent of the respondents had high level of access to weather forecast.

Above findings are in line with the findings of Chadachal (2017)^[9].

11. Awareness

The level of awareness of the farmers about climate change is discussed in Table 1. It revealed that about 49.16 percent of the respondents were 'medium' awareness category, followed by 34.17 percent respondents in 'high' and 16.67 percent respondents belonged to 'low' level of awareness category.

This finding is in confirmatory with the studies of Sarkar and Padaria (2010) ^[25] and Sorhang and Kristiansen (2011) ^[26].

12. Innovativeness

It is observed from Table 1 that 47.78 percent of the respondents were in 'medium' innovativeness category, while, 31.38 percent of the respondents in 'high' and more than one fifth i.e. 20.84 percent of the respondents were in 'low' innovativeness category.

This finding is in confirmatory with the finding of Sangeetha (2013) ^[3], Parganiha (2016) ^[1], Kalamkar (2022) ^[2] were also reported similar findings in their study.

13. Scientific orientation

The results shown that nearly half i.e. 49.16 percent of the respondents belonged to the 'medium' scientific orientation category, followed by 34.17 and 16.67 percent of the respondents were found to have 'high' and 'low' scientific orientation category, respectively.

This finding is in confirmatory with the finding of Karpagam (2000) ^[27] and Parganiha (2016) ^[1].

Conclusion

The demographic profile as an independent variables of the respondents belongs to low and medium possession or categorization. To drive meaningful reforms and address the challenges facing the agricultural sector during this critical phase of transformation, it is essential to equip marginalized segment of agriculture communities with the latest digital knowledge and skills in agriculture and allied sectors. Empowering these groups with up-to-date information and training will be key to fostering sustainable development and ensuring their active participation in the sector's evolution.

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