Determinants of Farmers' Perception about Climate Change in Marathwada Region

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Abstract

The present study was conducted randomly in Aurangabad, Hingoli and Jalna district of the Marathwada region of Maharashtra state during the year 2018-2019. From this three district six tahsils were selected randomly. From each selected taluka two villages were selected randomly for the study. Ten (10) respondents were selected randomly from each selected villages. Thus comprising total 120 farmers were selected from Marathwada region for research study. To study the farmers perception about climate change in Marathwada region. People's perceptions are very much useful to establish the fact that the particular region is facing direct or indirect problems in agriculture and other activities due to climate change. Consequently, understanding the perception of climate change by farmers is important as perception can shape the preparedness of these actors to adapt and change their practices. The adoption and successful implementation of new technology by farmers in their ecosystems depend on their tendency to perceive and react favourably towards changes in climate and environment. This study also tries to quantify the people's perception on various seasonal climatic variability.

Keywords: Profile of respondents, perception.

Introduction

The most obvious manifestation of climate change is the rising of average worldwide temperature, popularly termed as global warming. The average annual temperature of the Earth's surface has risen over the last several years. Not only is the temperature rising, but the rate of warming itself is also increasing at a significant rate. The mean global annual temperature increased between 0.4 to 0.7 0c and this is a very rapid rate of change in ecological term. Trends towards more powerful storms and hotter, longer dry periods have been observed and are assessed in the IPCC's Fourth Assessment Report (IPCC, 2007). Agricultural activities are very sensitive to climate and weather; these are some of the biggest risk factors in growing conditions. The differences of a measure of time have important implications for how we predict changes in weather and climate. Weather is the conditions of the atmosphere over a short period of time. It describes the atmospheric conditions at a specific place, at a specific point of time.

Climate is the atmospheric behaviour over large periods of time, and it refers to the statistics of weather. In other words, the average pattern over a period of months, years, decades, or longer in a specific place is weather. Climate and weather factors include rainfall and water, light, temperature, air, and wind. Thus perception about climate change and plays an important role to support farm-level decisions during the cropping cycle. The people and their livelihoods are inextricably entwined with their climate and a very small change can affect them directly as well as indirectly. The impact of climate change is not directly visible in the plains as compared to hilly regions, but there is no doubt that there are some potential impacts that are still unknown, that can adversely affect the regions as well.

Material and Methods

The present study was conducted randomly in Aurangabad, Hingoli and Jalna district of the Marathwada region of Maharashtra state during the year 2018-2019. Selected district six tahsils were selected randomly. From each selected taluka two villages were selected randomly for the study. Ten (10) respondents were selected randomly from each selected villages. Thus comprising total 120 respondents were selected from Marathwada region for research study. Ex-post facto research design was adopted in this study. The

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data were collected with the help of pretested interview schedule. The statistical methods and tests such as frequency, percentage, mean, standard deviation were used for the analysis of data.

The study was conducted with the objectives to understand the profile of the farmers and to determine their perception about climate change among.

Results

Socio-economic profile of the respondents

A number of profile characteristics were selected as independent variables to find out profile of farmers of the study area. The results obtained are given in Table 1. It is evident from the above table that majority of respondents (35.84%) in the study sample were in 'middle school' category followed by 18.00 per cent respondents in the 'College level' category; and 15.84 per cent respondents were illiterate. Farming experience wise composition of the study sample reveals that large majority of them (67.50%) had medium farming experience; 18.33 per cent belongs to medium social participation; 70.84 per cent having 'farming' as their major occupation. As

Table 1. Distribution of respondents according to their socio-economic profile (N=120)

Sr. No.	Variable	Frequency (F)	Percentage (%)
1.	Education		
	Illiterate	19	15.84
	Can read only	00	00.00
	Can read and write	11	09.16
	Primary school	15	12.50
	Middle school	43	35.84
	High school	14	11.66
	College level	18	15.00
2.	Farming Experience		
	Low	17	14.16
	Medium	81	67.50
	High	22	18.33
3.	Social Participation		
	Low	40	33.33
	Medium	50	41.67
	High	30	25.00
4.	Occupation		
	Labour	15	12.50
	Caste occupation	07	05.84
	Business	05	04.16
	Farming	85	70.84
	Service+farming	08	06.66
5.	Land Holding		
	Marginal	49	40.84
	Small	44	36.66
	Medium	12	10.00
	Big	15	12.50
6.	Irrigation facilities		
	River	00	00.00
	Pond	02	01.66
	Well	80	66.67
	Farm pond	01	00.83
	Dam	00	00.00
	Canal	03	02.50
	Tube well	34	28.33
7.	Annual Income		
	Low	50	41.67
	Medium	56	46.66
	High	14	11.66
8.	Socioeconomic Status		
	Low	18	15.00
	Medium	80	66.67
	High	22	18.33
9.	Crop Insurance		
	Low	17	14.16
	Medium	97	80.84
	High	06	05.00
10.	Extension Contact		
	Low	22	18.33
	Medium	67	55.84
	High	31	25.83
11.	Innovativeness		
	Low	30	25.00
	Medium	66	55.00
	High	24	20.00
12.	Risk orientation		
	Low	20	16.67
	Medium	73	60.83
	High	27	22.50

regards land holding, 36.66 per cent respondents were small farmers, 40.84 per cent marginal and only 12.50 per cent having 'big' farmer's category of land holding. Majority of farmers (66.67%) reported that they had well as a main source of irrigation followed by 28.33 per cent farmers had tubewell as main source of irrigation, only 00.83 per cent farmers had farm pond as source of irrigation.

As regards annual income majority of farmers (46.66%) belongs 'medium' annual income followed by high (11.66%) and low (41.67%). Further, majority of the respondents (66.67%) reported 'medium' socioeconomic status, followed by 18.33 per cent displaying 'high' and only 15.00 per cent reporting 'low' socioeconomic status. As regards their awareness about crop insurance, 80.84 per cent had 'medium awareness' followed by 14.16 per cent having 'low' awareness whereas, 5.00 per cent farmers had low awareness about crop insurance. Additionally, majority of the respondents (55.84%) displayed medium followed by 25.83 per cent farmers had high extension contact. Innovativeness was quite interesting as 60.83 per cent of the farmers reported medium innovativeness category. Further, a large majority of respondents (22.50%) displayed 'medium' risk orientation.

Perception about climate change among the farmers

Table 2 indicates that in Weather and climate section, statements are divided into two categories i.e. above mean level and below mean level. Among the percentage of above statements the mean value is about 87.00 per cent. From table 2.1 it is concluded that change in the date of onset of monsoon, Heavy rain affect the unfilled grains in cereal crops, Very high temperature during summer, Summer season is prolonged, There is uneven rainfall this statement had the perception level above 87.00 per cent therefore these statements were more perceived by farmers. whereas; remaining statements Change in date of withdrawal of monsoon, Number of heavy showers decreased, Occurrence of more dry spell, Fluctuation in temperature during winter, Number of rainy days has decreased these statements had perception level below 87.00 percent therefore these statements were less perceived by the farmers as compare to above

Table 2. Statement wise distribution of perception level of farmers about weather and climate under climate change scenario.

Sr. No.	Statements	No	%	Rank
1	Change in onset date of monsoon	115	95.83	I
2	Heavy rain affect the unfilled grains in cereal crops	108	90.00	II
3	Very high temperature during summer	107	89.16	III
4	Summer season is prolonged	106	88.33	IV
5	There is uneven rainfall	105	87.50	V
6	Change in date of withdrawal of mansoon	104	86.66	VI
7	Number of heavy showers decreased	103	85.83	VII
8	Occurrence of more dry spell	103	85.83	VII
9	Fluctuation in temperature during winter	102	85.00	VIII
10	Number of rainy days has decreased	96	80.00	IX

Table 3. Statement wise distribution of perception level of farmers about agriculture under climate change scenario.

Sr. No.	Statements	No	%	Rank
1	Quality of crops decreases	113	94.16	I
2	Ripening time of crops/ fruits are changed	107	89.16	II
3	Traditional varieties of crops are getting extinct	106	88.33	III
4	Pest attack is increased	106	88.33	III
5	Attack of diseases is increased	105	87.50	IV
6	Production of various crops is reducing	104	86.66	V
7	Number of irrigations is increased	99	82.50	VI
8	Wind speed affects the pollination in fruit crops	98	81.66	VII
9	Cropping pattern changed	94	78.33	VIII
10	Increased sunlight causing dropping of flowers in fruit crops	91	75.83	IX

statements.

Table 3 indicates that in Agriculture sector, statements are divided into two categories i.e. above mean level and below mean level. Among the percentage of above statements the mean value is about 87.00 per cent. From table 2.2 it is elucidated that the statement Quality of crops decreases, Ripening time of crops/ fruits are changed, Traditional varieties of crops are getting extinct, Pest attack is increased, Attack of diseases is increased, Production of various crops is reducing which had the perception level above 87.00 per cent. While remaining statements Number of irrigations is increased, Wind speed affects the pollination in fruit crops, Cropping pattern changed, Increased sunlight causing dropping of flowers in fruit crops had perception level below 87.00 per cent. Therefore these statements were less perceived by the farmers as compare to above statements.

Table 4 indicates that in Livestock sector, statements are divided into two categories i.e. above mean level and below mean level. Among the percentage of above statements the mean value is about 85.00 per cent. From table 2.3 it is observed that the statements Death rate of livestock is increasing, Poultry and livestock rearing become difficult, Habits of animal/ birds are changing had perception level above 85.00 per cent. Whereas remaining Scarcity of fodder crops, Health of farm animals/ cattle are affected, Most of the animal species getting distinct these statements have perception level below 85.00 per cent. Therefore these statements were less perceived by the farmers as compare to above statements.

Table 5 indicates that in Health sector, statements are divided into two categories i.e. above mean level and below mean level. Among the percentage of above statements the mean value is about 90.00 per cent. From table 4.4 it is observed that the statements Increasing deaths, Increased malnutrition, Diarrhoea and Malaria Diseases, Nasal Diseases due to Air Pollution, were had the perception level above 90.00 per cent. While increased deaths due to floods, storms and droughts, Heat Mortality, Disease and injuries due to heat waves these statements have perception level below 90.00 per cent therefore these statements were less perceived by the farmers as compare to above statements.

Table 6 indicated that in Industrial sector, statements are divided into two categories i.e. above mean level and below mean level. Among the percentage of above statements the mean value is about 90.00 per cent. From table 2.5 it is observed that the statements increased water shortage in processing, Increasing cost of key raw materials had perception level above 90.00 per cent.

Table 4. Statement wise distribution of perception level of farmers about livestock under climate change scenario.

Sr. No.	Statements	No	%	Rank
1	Death rate of livestock is increasing	108	90.00	I
2	Poultry and livestock rearing become difficult	106	88.33	II
3	Habits of animal/ birds are changing	106	88.33	II
4	Scarcity of fodder crops	102	85.00	III
5	Health of farm animals/ cattle are affected	98	81.66	IV
6	Most of the animal species getting distinct	87	72.50	V

Table 5. Statement wise distribution of perception level of farmers about health under climate change scenario.

Sr. No.	Statements	No	%	Rank
1	Increasing deaths	115	95.83	I
2	Increased malnutrition	115	95.83	I
3	Diarrhoea and Malaria Diseases	114	95.00	II
4	Nasal Diseases due to Air Pollution	108	90.00	III
5	Increased deaths due to floods, storms and droughts	106	88.33	IV
6	Heat Mortality	99	82.50	V
7	Disease and injuries due to heat waves	96	80.00	VI

Table 6. Statement wise distribution of perception level of farmers about industry under climate change scenario.

Sr. No.	Statements	No	%	Rank
1	Increased water shortage in processing	113	94.16	I
2	Increasing cost of key raw materials	112	93.33	II
3	Fishing industry affected due to rise in sea level	107	89.16	III
4	Increasing electricity demands	85	70.83	IV

Table 7. Overall distribution of the respondents according to the perception about climate change

Sr. No.	Category	Frequency	Perception (%)
1	Low (Up to 29)	23	19.16
2	Medium (30 to 34)	69	57.50
3	High (35& above)	28	23.34
	Total	120	100.00
Mean : 32.10			SD:2.86

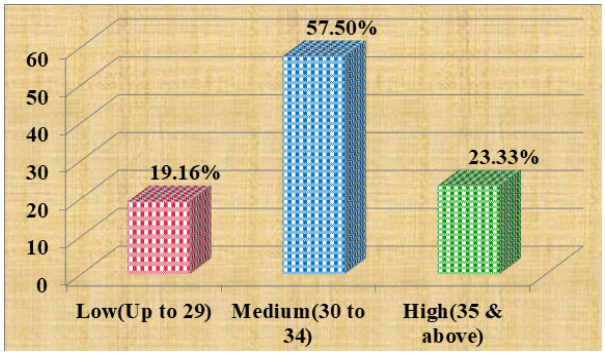

Fig. 1. Overall distribution of the respondents according to their perception about climate change

Whereas Fishing industry affected due to rise in sea level, Increasing electricity demands these statements had perception level below 90.00 per cent therefore these statements were less perceived by the farmers as compare to above statements.

Table 7 and Fig. 1 show that that, 57.50 per cent of farmers had medium perception, 23.33 per cent farmers had high perception about climate change followed by 19.16 per cent of farmers had low perception level about climate change.

Similar findings were also reported by Johnsen and Aune (2011), Krishna et al. (2011), Sorhang and Kristiansen (2011), Mandleni (2011), Onyekuru and Marchant (2017),Chand and Kumar (2018) and Grimberg et al. (2018).

Conclusions

The finding from this study revealed that the above majority 90 per cent of the farmers in the study area perceived change in on date of mansoon season, Quality of crops decreases, Death rate of livestock is increasing and Increased water shortage in processing. Almost all factor reported increase in temperature, drought, floods and decreasing the rainfall over the last 10 years. Increasing temperature along with decreasing precipitation may enhance water scarcity from resulting drought which will affect crop production. However, many farmers still display low perceptions and are not adequately equipped with knowledge of adaptation, mitigation and resilience strategies in order to foster the adverse impacts of climate change on agriculture. Therefore, it is of significant importance to create awareness by way of sustained and high-voltage communication campaigns to educate the farmer about climate change and adaptation strategies

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