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Farmer's perception about climate change in North Gujarat

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Abstract

Climate change is the global phenomenon of climate transformation characterized by the changes in the usual climate of the planet (regarding temperature, rainfall and wind) that are especially caused by human activities. The districts, talukas, villages, and farmers were chosen using a multiple random sampling techniques. Three districts in North Gujarat were chosen at random. Two talukas were chosen at random from each district. Four villages were chosen at random from each taluka. Ten farmers were chosen at random from each village. As a result, 240 farmers were chosen as the sample size. The data was gathered through personal interviews and then compiled, tabulated, and analyzed to obtain the correct response using various appropriate methods of statistics. The majority 82.08 percent of them had medium to high level of perception. The relationship with farmers' perception was observed positive and significant with age, farming experience, occupation, source of weather forecast, extension participation, mass media exposure, decision making ability. It also observed a significant and positive relationship between education, social participation, crop insurance and risk orientation.

Keywords: Perception, farmers and climate change

Introduction

"Climate is the long-term pattern of weather in a particular area." It also define climate as the average weather for a particular region and time period, usually taken over 30 years. It's really an average weather pattern for a particular region. According to the National Geographic Survey, "Climate change is the global phenomenon of climate transformation characterized by the changes in the usual climate of the planet (regarding temperature, rainfall and wind) that are especially caused by human activities". The unexpected temperature and rainfall levels can no longer be relied on, this unexpected weather pattern may make it difficult to maintain growing crops in regions that rely on farming. Climate change has also been linked to other damaging weather events such as increased frequency and intensity of hurricanes, floods, drought, and winter storms. Maddox (1995) [6] defines perception as the process of gathering and interpreting information from one's surroundings. Climate change perception is a complex process that encompasses a range of psychological constructs such as knowledge, beliefs, attitudes and concerns about if and how the climate is changing (Whitmarsh and Capstick, 2018) [8].

Perception is influenced and shaped, among other things, by the individuals' characteristics, their experience, the information that they receive, and the cultural and geographic context in which they live (Vander Linden, 2015; Whitmarsh and Capstick, 2018) [7, 8]. Agricultural sector is most affect by climate change as it is dependent on environmental stability in terms of water supply, atmospheric temperature, soil fertility and incidents of pest and disease. Temperature and rainfall fluctuations have a considerable impact on the quality of fruits, vegetables, tea, coffee, aromatic and medicinal plants. The temperature and humidity have a profound influence on pathogen and insect populations and changes in these parameters can alter their population dynamics. The other impact on agricultural and related sectors includes lower yields from dairy cattle and decline in fish breeding, migration and harvest. Accordingly, the present study entitled as "Farmers' Perception about Climate Change in North Gujarat" has been taken up with a following specific objectives.

1. To study the perception of farmers about climate change
2. To ascertain the between the profile of the farmers and their perception about climate change

Materials and Methods

The main aim of the study was to measure the farmers' perception about climate change in North Gujarat. It is large section of the population is dependent on climate-sensitive sector such as agriculture. In North Gujarat, last many decades; there have been varying in climatic condition such as rainfall, temperature, drought and flood. Hence, the study is planned to examine socioeconomic condition to understand farmers' perception about the climate change in North Gujarat. In that context Kutch, Patan and Mehsana districts are randomly selected and also come under the jurisdiction of Sardarkrushinagar Dantiwada Agricultural University. The present study was confined to "Ex-post facto" research design. The literal meaning of ex-post facto is "from what is done afterwards". It means some time done or occurring after an event with a retrospective effect on the event. The Kerlinger (1976)^[4] have described several elaborate sampling techniques. The study's sample was drawn using a multistage random sampling technique. For the selection of districts, talukas, villages and farmers, the random sampling technique was used.

In the research study, two talukas were randomly selected from each district. Thus, a total of six talukas were selected randomly for this study. A total of four villages were chosen from each taluka using a random sampling technique. As a result, 24 villages were chosen at random for the study. Ten farmers were chosen at random from each village. As a result, 240 farmers were chosen for the study. The primary data were gathered using pre-tested interview regularity. According to the nature and demand of the data, the data were recorded, categorised, tabulated, and relevant statistical tools such as frequency, percentage, mean and correlation co-efficient.

Results and Discussion

Perceptions of farmers about climate change

People's perceptions are extremely useful in determining whether a particular region is experiencing direct or indirect problems in agriculture and other activities as a result of climate change. As a result, understanding farmers' perceptions of climate change is critical, as perception can shape these actors' readiness to adopt and change their practices.

Table 1: Distribution of farmers according to their perception about climate change in Kutch district

(n=80)			
Sr. No.	Categories	Frequency	Percentage
1	Low (below 67.85 score)	15	18.75
2	Medium (67.85 to 108.85 score)	48	60.00
3	High (above 108.85 score)	17	21.25
Total		80	100.00
Mean = 88.35			
S.D. = 20.50			

It is evident from the data presented in Table 1 shows that exactly three-fifths (60.00%) of the farmers had medium level of perception about climate change followed by 21.25 percent

of them had high level of perception and 18.75 percent of the farmers had low level perception about climate change, respectively.

Table 2: Distribution of farmers according to their perception about climate change in Patan district

(n=80)			
Sr. No.	Categories	Frequency	Percentage
1	Low (below 55.61 score)	15	18.75
2	Medium (55.61 to 98.91 score)	47	58.75
3	High (above 98.91 score)	18	22.50
Total		80	100.00
Mean = 77.26			
S.D. = 21.65			

The result presented in Table 2 shows that less than three-fifths (58.75%) of farmers had medium level of perception followed by 22.50 percent of them had high level of perception and 18.75 percent of the farmers had low level perception about climate change, respectively.

It is apparent from the data presented in Table 3 shows that slightly more than three-fifths 61.25 percent of the farmers had medium level of perception about climate change followed by 20.00 percent of them were high level of perception and 18.75 percent of the farmers were low level perception about climate change, respectively.

Table 3: Distribution of farmers according to their perception about climate change in Mehsana district

(n=80)			
Sr. No.	Categories	Frequency	Percentage
1	Low (below 68.75 score)	15	18.75
2	Medium (68.75 to 93.25 score)	49	61.25
3	High (above 93.25 score)	16	20.00
Total		80	100.00
Mean = 81.00 S.D. = 12.25			

Table 4: Distribution of farmers according to their overall perception about climate change in three districts

(n=240)			
Sr. No.	Categories	Frequency	Percentage
1	Low (below 63.10 score)	43	17.92
2	Medium (63.10 to 101.30 score)	158	65.83
3	High (above 101.30 score)	39	16.25
Total		240	100.00
Mean = 82.20			
S.D. = 19.10			

Looking to the overall data, the data presented in Table 4 shows that less than two-thirds (65.83%) of the farmers had medium level of perception about climate change followed by 17.92 percent of the farmers had low level perception and 16.25 percent of them had high level of perception about climate change, respectively. This might be due to the reason that the farmers had medium level of education, farming experience, social participation, extension participation, more innovativeness, more risk bearing ability, medium to high exposure to mass media, access to weather forecast and decision making ability which are help them to get better understanding regarding underlying issues and causes of climate change.

Relationship between profile of the farmers and their perception about climate change

The farmer shows different degree of perception towards various criteria of the climate change because of the difference in their profile. Thus, it may be stated that the perception of the farmers about climate change were differs with their profile. Hence, considering the importance of these profile and review of past research studies, an attempt has been made in this investigation to ascertain the relationship if any between the profile of the farmers and their perception about climate change.

Table 5: Relationship between profile of the farmers and their perception about Climate change

(n= 240)

Sr. No.	Independent variables	'r' value
1	Age	0.164*
2	Education	0.511**
3	Farming experience	0.160*
4	Occupation	0.163*
5	Land holding	0.100 ^{NS}
6	Annual income	0.103 ^{NS}
7	Social participation	0.504**
8	Source of irrigation	0.102 ^{NS}
9	Knowledge of crop insurance	0.492**
10	Source of weather forecast	0.165*
11	Extension participation	0.157*
12	Mass media exposure	0.164*
13	Risk orientation	0.497**
14	Decision making ability	0.166*
15	Innovativeness	0.161*

* = Significant at 0.05 level

** = Significant at 0.01 level

NS = Non-significant

Age and farmers' perception about climate change

It is apparent from the data presented in Table 5 that there was positive and significant ($r = 0.164$) relationship between age of the farmers and their level of perception at 0.05 level of significance. It reflects that level of perception about climate change was influenced significantly by age of the farmers. The age of the farmers directly affects to understanding about things, object or any kind of idea. They should be able to understand the threat of climate change condition for better things in future. The present findings are in line with the findings of Joshi (2016) [13], Laxman (2016) [5], Chouhan (2017) [12], Uddin *et al.* (2017) [14] and Ansari *et al.* (2018) [10].

Education and farmers' perception about climate change

The data presented in Table 5 indicate that there was positive

and highly significant ($r = 0.511$) relationship between education of the farmers and their level of perception. The result indicates that level of perception of farmers increased with an increase in level of education. There was positive and highly significant relationship between the perception about climate change and education of the farmers. The educated farmer knows the adverse effect of climate change on agriculture farming. This leads to increase their perception about climate change.

The present findings are in line with the findings of Joshi (2016) [13], Laxman (2016) [5], Uddin *et al.* (2017) [14], Ansari *et al.* (2018) [10], Chandrashekar (2019) [2] and Dward *et al.* (2019) [15].

Farming experience and farmers' perception about climate change

The data presented in Table 5 mention that farming experience of the farmers had positive and significant correlation ($r = 0.160$) with their level of perception. The result indicates that experience in farming of the farmers had important role in determining their level of perception. It can be inferred that there was positive and significant relationship between the farmers' perception about climate change and their farming experience the majority of medium to old aged farmers were engaged with farming based on farming experience. The more years spend by the farmers in farming those faces many problems related to climate change. Thus, it leads to increase their perception with farming experience. The present findings are in line with the findings of Joshi (2016) [13], Uddin *et al.* (2017) [14] and Ansari *et al.* (2018) [10].

Occupation and farmers' perception about climate change

The data presented in Table 5 shows that there was positive and significant ($r = 0.163$) relationship between occupation of the farmers and their level of perception. It can be inferred that there was positive and significant relationship between the perception about climate change and their occupation. This might be that most of the farmers were engaged with agriculture and animal husbandry as their primary occupation. So, farmers are better perceptive about variation in climatic condition. The present findings are in line with the findings of Joshi (2016) [13], Chouhan (2017) [12], Uddin *et al.* (2017) [14] and Ansari *et al.* (2018) [10].

Land holding and farmers' perception about climate change

It is apparent from the data presented in Table 5 shows that there was positive and non-significant ($r = 0.100$) relationship between land holding of the farmers and their level of perception. It reflects that level of perception about climate change was not influenced significantly by land holding of the farmers. This might be that irrespective of land holding farmers had been perception increase or decrease depends on their level of education, farming experience and extension participation *etc.* The present findings are in line with the findings of Laxman (2016) [5], Joshi (2016) [13] and Uddin *et al.* (2017) [14].

Annual income and farmers' perception about climate change

It is apparent from the data presented in Table 5 that there was positive and non-significant ($r = 0.103$) relationship between annual income of the farmers and their level of perception. It

reflects that level of perception about climate change was not influenced significantly by annual income of the farmers. This might be that annual income of the farmers had not any impact on their level of perception about climate change. The present findings are in line with the findings of Joshi (2016)^[13], Laxman (2016)^[5] and Chandrashekhar (2019)^[2].

Social participation and farmers' perception about climate change

The data presented in Table 5 shows that social participation of the farmers had positive and highly significant correlation ($r = 0.504$) with their level of perception. The result indicates that social participation of the farmers had important role in determining their level of perception. It can be inferred that there was positive and highly significant relationship between the farmers' perception about climate change and their social participation. This might be that social participation of farmers was able to contact through different sources of information for adapting strategies against climate change and also more participation in different social activity made by the farmers to know about worst effects of climate change on farming. The present findings are in line with the findings of Chouhan (2017)^[12] and Uddin *et al.* (2017)^[14].

Source of irrigation and farmers' perception about climate change

It is apparent from the data presented in Table 5 mention that there was positive and non-significant ($r = 0.102$) relationship between source of irrigation and their farmers' level of perception. It reflects that level of perception about climate change was not influenced significantly by source of irrigation of the farmers. It can be inferred that there was non-significant relationship between the farmers' perception about climate change and their source of irrigation. It means that farmers exhibit their level of perception about climate change irrespective of their source of irrigation. The present findings are in line with the findings of Chandrashekhar (2019)^[2].

Knowledge of crop insurance and farmers' perception about climate change

It is evident from in Table 5 observes that knowledge of crop insurance of the farmers had positive and highly significant correlation ($r = 0.492$) with their level of perception. The result indicates that knowledge of crop insurance of the farmers did play important role in determining their level of perception. This might be that crop insurance provides an insurance of accidental loss in case of failure crop though unpredictable climatic condition. It promotes farmers to adopt new adaptation strategies against climate change condition. The present findings are in line with the findings of Allahyari *et al.* (2016)^[9] and Chandrashekhar (2019)^[2].

Source of weather forecast and farmers' perception about climate change

It is clear from in Table 5 shows that source of weather forecast of the farmers had positive and significant correlation ($r = 0.165$) with their level of perception. The result indicates that source of weather forecast of the farmers played important role in determining their level of perception. It can be inferred that there was positive and significant relationship between the farmer's perception about climate change and their source of weather forecast. This might be that farmers were different sources for awareness about weather forecast

information it provided short-term weather information on climate change in farming. Farmers have better chances to aware about climate change and also aware about different management practices that used as adaptation strategies against climate change. The present findings are in line with the findings of Chandachal (2017)^[1].

Extension participation and farmers' perception about climate change

It clear from the data presented in Table 5 shows that extension participation of the farmers had positive and significant correlation ($r = 0.157$) with their level of perception. The result indicates that extension participation of the farmers did play important role in determining their level of perception. It can be inferred that there was positive and significant relationship between farmers' perception about climate change and their extension participation. It concluded that farmers were more participation in extension activities like as demonstration, agriculture exhibition, field day and krushimela *etc.* Farmers were aware about climate change and its effects on agriculture and allied activities through extension participation. The present findings are in line with the findings of Chouhan (2017)^[12], Uddin *et al.* (2017)^[14] and Chandrashekhar (2019)^[2].

Mass media exposure and farmers' perception about climate change

It is clear from the data presented in Table 5 shows that mass media exposure of the farmers had positive and significant correlation ($r = 0.164$) with their level of perception. The result indicates that mass media exposure of the farmers did play important role in determining their level of perception. It can be inferred that there was positive and significant relationship between the perception about climate change and their mass media exposure. It might be that farmers had more mass media exposure to know about climate change and it responsible for erratic climatic situation in farming like as insects-pests attack, reduces production, reduce yield *etc.* Thus, mass media exposure was significant with perception about climate change. The present findings are in line with the findings of Chouhan (2017)^[12] and Uddin *et al.* (2017)^[14].

Risk orientation and farmers' perception about climate change

It is evident from in Table 5 shows that risk orientation of the farmers had positive and highly significant correlation ($r = 0.497$) with their level of perception. The result indicates that risk orientation of the farmers did play important role in determining their level of perception. It can be inferred that there was positive and highly significant relationship between the perception of farmers about climate change and their risk orientation. The present findings are in line with the findings of Paragniha (2016)^[17].

Decision making ability and perception about climate change

It is apparent from the data presented in Table 5 shows that decision making ability of the farmers had positive and significant correlation ($r = 0.166$) with their level of perception. The result indicates that decision making ability of the farmers play important role in determining their level of perception. It can be inferred that there was positive and significant relationship between the farmers' perception about

climate change and their decision making ability. This might be that the farmers had medium to high level decision making ability. Thus, farmers had perfectly able to taken rapid decision against worst situation in farming. The present findings are in line with the findings of Joshi (2016)^[13].

Innovativeness and farmers' perception about climate change

The data presented in Table 5 mention that innovativeness of the farmers had positive and significant correlation ($r = 0.161$) with their level of perception. The result indicates that innovativeness of the farmers did play important role in determining their level of perception. It can be inferred that there was positive and significant relationship between the farmers' perception about climate change and their innovativeness. This might be that farmers had willing to try something new to cope-up with different causes of climate change. They had obviously need information about climate change for implementation of their innovative idea in agriculture farming. The present findings are in line with the findings of Mishra and Sahu (2019)^[16, 18], Asayehegn *et al.* (2017)^[11], Uddin *et al.* (2017)^[14] and Chandrashekhar (2019)^[2].

Conclusion

From the foregoing discussion, it can be concluded in this study indicated that majority of the farmers had medium level of perception might be due to the reason that the farmers had medium level of education, farming experience, social participation, extension participation, more innovativeness, more risk bearing ability, medium to high exposure to mass media, access to weather forecast and decision making ability which are help them to get better understanding regarding underlying issues and causes of climate change. The relationship of perception was observed that positive and significant with eight variables *viz.*, age, farming experience, occupation, source of weather forecast, extension participation, mass media exposure, decision making ability, Innovativeness. It also observed positive and highly significant relationship with four variables *viz.*, education, social participation, knowledge of crop insurance and risk orientation.

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