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The study on adaptation strategies initiated by farmers to 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. Multiple random sampling techniques were followed for selection of the districts, talukas, villages and farmers. In the North Gujarat, three districts were selected randomly. From each district two talukas were selected randomly. Four villages from each talukas were selected randomly. From each village 10 farmers were selected randomly. Thus, total 240 farmers were selected as sample size. The data were collected through personal interview and then after it is compiled, tabulated and analyzed to get proper answer with the help of various appropriate statistical tools. In the research study major findings was more than three-fifths (62.08%) of the farmers had medium level of adaptation strategies followed by 20.42 per cent of them had high level of adaptation strategies and 17.50 per cent of the farmers had low level adaptation strategies. The majority 85.42 per cent of the farmers were adopt crop diversification and alternate cropping system used in their area it secured I rank followed by the farmers were adopt short duration varieties for dry land area and contingency crop planting it secured II and III rank, respectively.

Keywords: Adaptation strategies, farmers, 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". This unexpected weather pattern can make it difficult to maintain growing crops in region that rely on farming because of expected temperature and rainfall level can no longer be relied on. Climate change has also been connected with other damaging weather event such as more frequent and more intense hurricane, flood, drought and winter storms. Perception refers to the process concerned with the acquisition and interpretation of information from one's environment (Maddox, 1995) [6].

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) [9]. 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 (Van der Linden, 2015; Whitmarsh and Capstick, 2018) [8, 9]. 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.

Objective

To study the adaptation strategies initiated by farmers in North Gujarat

Research Methodology

The main aim of the study was to measure the adaptation strategies initiated by farmers 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 was planned to examine adaptation strategies initiated by farmers 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 Guildford (1956) [2] and Kerlinger (1976) [10] have described several elaborate sampling techniques.

Multistage random sampling technique was employed for drawing sample of the study. While, random sampling technique was used for the selection of districts, talukas, villages and farmers. In the research study, two talukas were randomly selected from each district. Thus, a total of six talukas were selected randomly for this study. The lists of total villages in each of the selected talukas were obtained from respective talukas panchayat office. Out of total villages, four villages were selected from each talukas by using a random sampling technique. Thus, total 24 villages were selected randomly for the study. From each selected villages, ten farmers were selected randomly. Thus, total 240 farmers were selected for the study.

Result Discussion

Adaptation strategies initiated by farmers

Practically, adaptation strategies about climate change means doing different things against variation in climatic condition like as irregular rainfall, drought and unpredictable heat stress and cool temperature, extreme weather conditions. The farmers were uses different adaptations practices due to climate change.

In order to measure the adaptation strategies initiated by the farmers, the complete response was received from each farmer and that was calculated. The classification of farmers based on their adopted different adaptation strategies are presented in Table 1, Table 2, Table 3, Table 4 and Table 5.

Table 1: Distribution of farmers according to their adaptation strategies in Kutch district (N=80)

Sr. No.	Categories	Frequency	Percentage
1	Low (below 10.68 score)	14	17.50
2	Medium (10.68 to 18.80 score)	46	57.50
3	High (above 18.80 score)	20	25.00
Total		80	100.00
Mean = 14.74 S.D. = 4.06			

The data presented in Table 1 shows that less than three-

fifths (57.50%) of the farmers had medium level of adaptation strategies followed by 25.00 per cent of them were high level of adaptation strategies and 17.50 per cent of the farmers had low level of adaptation strategies.

Table 2: Distribution of farmers according to their adaptation strategies in Patan district (N=80)

Sr. No.	Categories	Frequency	Percentage
1	Low (below 9.22 score)	17	21.25
2	Medium (9.22 to 17.54 score)	44	55.00
3	High (above 17.54 score)	19	23.75
Total		80	100.00
Mean =13.38 S.D. = 4.16			

It is apparent from the data presented in Table 2 shows that more than half (55.00%) of the farmers had medium level of adaptation strategies followed by 23.75 per cent of them had high level of adaptation strategies and 21.25 per cent of them had low level adaptation strategies.

Table 3: Distribution of farmers according to their adaptation strategies in Mehsana district (N=80)

Sr. No.	Categories	Frequency	Percentage
1	Low (below 11.83 score)	14	17.50
2	Medium (11.83 to 16.89 score)	47	58.75
3	High (above 16.89 score)	19	23.75
Total		80	100.00
Mean = 14.36 S.D. = 2.53			

It is clear from in Table 3 shows that the majority (58.75%) of the farmers had medium level of adaptation strategies followed by 23.75 per cent of them had high level of adaptation strategies and 17.50 per cent of the farmers had low level adaptation strategies.

Table 4: Distribution of farmers according to their overall adaptation strategies in three districts (n=240)

Sr. No.	Categories	Frequency	Percentage
1	Low (below 10.47 score)	42	17.50
2	Medium (10.47 to 17.85 score)	149	62.08
3	High (above 17.85 score)	49	20.42
Total		240	100.00
Mean = 14.16 S.D. = 3.69			

Looking to the overall data, the data presented in the Table 4 shows that more than three-fifths (62.08%) of the farmers had medium level of adaptation strategies followed by 20.42 per cent of them had high level of adaptation strategies and 17.50 per cent of the farmers had low level adaptation strategies.

Table 5: Distribution of the farmers according to their statement-wise adaptation strategies (N=240)

Sr. No	Statements	Frequency	Percentage	Rank
1	Deep ploughing in summer season	192	80.00	VII
2	Rain water harvesting and watershed management	183	76.25	IX
3	Adopting soil conservation measure that conserve soil moisture	165	68.75	XIV
4	Improved crop varieties (early/late maturity)	195	81.25	V
5	Change in cropping pattern and calendar of planting	198	82.50	IV
6	Contingency crop planting	200	83.33	III
7	Heat and drought tolerance varieties	193	80.42	VI
8	Waterlogging resistant varieties	157	65.41	XVII
9	Intercropping and relay intercropping	188	78.33	VIII

10	Short duration varieties for dry land area	201	83.75	II
11	Crop diversification and alternate cropping system use in area	205	85.42	I
12	Adjustment of planting dates	134	55.83	XXII
13	Sowing of cover crops	123	51.25	XXIV
14	Planting the trees (afforestation) and agro forestry	168	70.00	XIII
15	Judious use of fertilizers	93	38.75	XXIX
16	Select variety for higher efficiency utilization of fertilizer and solar radiation	87	36.25	XXX
17	Levelling the high and low land soil for giving a proper slope	169	70.42	XII
18	Efficient use of natural resources	101	42.08	XXVIII
19	Integrated nutrient management (INM)	146	60.83	XX
20	Optimum use of available farm resources	107	44.58	XXVII
21	Use of organic fertilizer	159	66.25	XV
22	Adoption of micro irrigation system	156	65.00	XVIII
23	Timely and proper method of weeding	129	53.75	XXIII
24	Integrated pest management (IPM)	119	49.58	XXV
25	Integrated disease management (IDM)	181	75.42	X
26	Adding of organic matters into farm	139	57.92	XXI
27	Mulching	177	73.75	XI
28	Use green manure crop	113	47.08	XXVI
29	Sub soiling in summer season	158	65.83	XVI
30	Repairing the bunds, wells and drainage system	151	62.92	XIX

It is evident data from in Table 5 shows that majority 85.42 per cent of the farmers were adopt crop diversification and alternate cropping system used in their area it secured I rank followed by 83.75 per cent and 83.33 per cent of the farmers were adopt short duration varieties for dry land area and contingency crop planting it secured II and III rank, respectively. The 82.50 per cent, 81.25 per cent, 80.42 per cent, 80.00 per cent and 78.33 per cent of the farmers were adopt change in cropping pattern and calendar of planting, improved crop varieties (early/late maturity), heat and drought tolerance varieties, deep ploughing in summer season and intercropping and relay intercropping it secured IV, V, VI, VII, VIII rank, respectively.

From the Table 5 it shows that 76.25 per cent of the farmers were adopt rain water harvesting and watershed management it secured IX rank followed by 75.42 per cent, 73.75 per cent, 70.42 per cent, 70.00 per cent, 68.75 per cent, 66.25 per cent, 65.83 per cent, 65.41 per cent and 65.00 per cent of the farmers were adopted integrated disease management (IDM), mulching, levelling the high and low land soil for giving a proper slope, planting the trees (afforestation) and agro forestry, adopting soil conservation measure that conserve soil moisture, use of organic fertilizers, sub soiling in summer season, water logging resistant varieties and adoption of micro irrigation system it secured X, XI, XII, XIII, XIV, XV, XVI, XVII and XVIII rank, respectively.

From the table 5 it shows that 62.92 per cent of the farmers were adopt repairing the bunds, wells and drainage system it secured XIX rank followed by 60.83 per cent, 57.92 per cent, 55.83 per cent, 53.75 per cent, 51.25 per cent, 49.58 per cent, 47.08 per cent, 44.58 per cent, 42.08 per cent, 38.75 per cent and 36.25 per cent of the farmers were adopt integrated nutrient management (INM), adding of organic matters into farm, adjustment of planting dates, timely and proper method of weeding, sowing of cover crops, integrated pest management (IPM), use green manure crop, optimum use of available farm resources, efficient use of natural resources, judious use of fertilizer and select variety for higher efficiency utilization of fertilizer it secured XX, XXI, XXII, XXIII, XXIV, XXV, XXVI, XXVII, XXVIII,

XXIX and XXX rank, respectively.

Conclusion

From the foregoing discussion, it can be concluded that the majority 82.50 per cent of the farmers had medium to low level of adaptation strategies against climate change because of farmers were middle to old age group, educated up to primary to higher secondary school, medium to high level of farming experience, mobile phone and television for access to information about weather forecast, medium to high level of extension participation, medium to high level of mass media exposure and medium to high level of decision making ability. Farmers were adopted different adaptation strategies like as crop diversification and alternate cropping system used in their area, Short duration varieties for dry land area and Contingency crop planting.

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