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Perception of the Cotton Growers of Telangana State towards Climate Variability and Correlation with Their Profile

Mahesh, L. [a*], Ahire, R.D. [a], Deshmuck P,R. [a] and Venkateshwar Rao, N. [a]

[a] Department of Extension Education, College of Agriculture, Parbhani, VNMKV, Parbhani-431402, India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The present research conducted in Adilabad and Mahabubnagar districts of Telangana state was purposively selected for the study. *An ex-post facto* research design was adopted in the present investigation. The study was conducted in twelve villages selected from two manuals of each district, which included 20 farmers from each of the selected villages, a sample of 240 farmers was selected for the study by simple random sampling method. This study examines the responses and coping strategies of affected communities in these districts to climate variability. The analysis of the perception of the cotton growers indicates that the majority of the respondents had a medium

**Corresponding author: E-mail: maheshagri07@gmail.com;*

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(58.33%) level of perception followed by low (24.17% and high (17.50%) levels of perception. Age, farming experience, land-holding family size, achievement, credit and subsidy orientation and risk orientation were positively and significantly related to the perception of the cotton growers in combating climate variability. Annual income, extension contact, social participation, and Cosmo politeness preparedness to adaptation showed a non-significant relationship with the perception of cotton growers towards climate variability.

Keywords: Perception; profile; cotton growers; ex-post facto.

1. INTRODUCTION

"Climate variability refers to the variations in the mean state of the climate and variations in other parameters (such as the occurrence of extremes) on all temporal and spatial scales beyond that of individual weather events. The average range of temperature for a location, as indicated by minimum, maximum and average temperature values, is an example of a measure of climate variability" [1].

The projected increases in drought frequency due to climate change are expected to significantly impact districts such as Adilabad and Mahabubnagar, affecting water resources and various dependent sectors. Such intensified drought conditions pose severe threats to agricultural and pastoral livelihoods, heightening vulnerability and risks for farmers and those reliant on these livelihoods. For farmers dependent on rainfall for their crops, drought-induced crop failure could lead to household food insecurity. Similarly, for pastoralists and agro-pastoralists, whose livelihoods and food security hinge on livestock, drought can lead to animal malnutrition or disease due to inadequate fodder. This study examines the responses and coping strategies of affected communities in these districts to climate variability. Through personal interviews, it investigates the impacts of climate variability, explores coping mechanisms, and identifies key factors that enhance community resilience. According to Maddison [2], a critical prerequisite for adaptation to climate change is farmers' ability to recognize that climate change has occurred. He asserts that adaptation involves first perceiving climate change, and then identifying and implementing appropriate adaptation measures. Maddison highlights that farmers often learn about effective adaptation techniques through three methods: (1) experiential learning, (2) imitation of others, and (3) formal instruction. Bryant et al. [3], emphasized that Adaptation in agriculture translates perceptions of climate change into actionable decision-making processes. Hence, only those who acknowledge climate change were engaged in adaptive practices. Research on climate change perceptions in both developing [4,5] and developed countries [6,7] indicates widespread awareness of climate change. However, no previous studies have specifically addressed farmers' perceptions and adaptability of climate variability in the Adilabad and Mahabubnagar districts of Telangana state, to address this gap, the research problem titled "Perception and Adaptability of Cotton Growers towards Climate Variability in Telangana State" was conducted.

2. METHODOLOGY

This study employed *an ex post facto* research design, as defined by Kerlinger [8], which entails a systematic empirical investigation where the scientists lack direct control over influencing (independent) variables because these variables have already manifested. Telangana was selected for this study due to the researcher's affiliation with the state. Specifically, Adilabad and Mahabubnagar districts were chosen due to projections indicating an increased likelihood of drought in these areas, which is expected to impact water resources and other interconnected sectors. Such intensified drought conditions are anticipated to severely affect agricultural and pastoral livelihoods, heightening vulnerability and risks for farmers and others reliant on these activities. For farmers who depend on rainfall for crop cultivation, drought-induced crop failure could exacerbate household food insecurity. The study was conducted across twelve villages, selected from two talukas within each district, with twenty farmers surveyed from each village, resulting in a total sample size of 240 farmers [9].

3. RESULTS AND DISCUSSION

3.1 Perception of the Farmers on Climate Variability

The data from (Table 1) reveals that the majority of respondents exhibited a medium level of

perception regarding climate variability (58.33%), with 24.17% showing a low level and 17.50% demonstrating a high level of perception. This distribution may be attributed to the fact that most farmers had moderate levels of farming experience and other related attributes. According to Bryant et al. [3], adaptation in agriculture is fundamentally linked to how perceptions of climate change are integrated into agricultural decision-making processes. Therefore, the ability of farmers to perceive climate change is a crucial prerequisite for their adaptation choices [10].

Relationship between the profile of cotton growers and perception of the farmers towards climate variability: To investigate the nature of the relationship between selected independent variables and farmers' perceptions of climate variability, correlation coefficients (r) were calculated and are presented in Table 2. The relationships were assessed by testing both null and empirical hypotheses.

Null hypothesis: The null hypothesis posits that there is no relationship between the selected independent variables and farmers' perceptions of climate variability.

Empirical hypothesis: The empirical hypothesis asserts that there is a significant relationship between the selected independent variables and farmers' perceptions of climate variability.

3.2 Age vs. Perception of the Farmers towards Climate Variability

Table 2 shows that the computed correlation coefficient for age (r = 0.128) is positively significant for farmers' perceptions of climate variability. Consequently, the null hypothesis was rejected, and the empirical hypothesis was supported. This indicates a significant relationship between age and farmers' perceptions of climate variability. Most farmers in the study had medium levels of farming experience and were of middle age. Their accumulated experience and ongoing engagement with climate patterns likely contribute to their ability to perceive climate variability. Therefore, it can be concluded that age significantly influences farmers' perceptions of climate variability.

Table 1. Distribution of the respondents according to their level of perception of climate variability

Sr. No.	Category	Respondents (N=240)		
			Frequency	**Percentage**
1	Low	Up to 44	58	24.17
2	Medium	45 to 51	140	**58.33**
3	High	52 & above	42	17.50
		Total	**240**	**100.00**
		Mean	**48.00**	
		SD	**4.00**	

Table 2. Relationship between the selected independent variables and the perception of the farmers towards climate variability [1]

Sr. No	Independent variables	correlation
1	Age	0.128*
2	Education	0.011 NS
3	Farming experience	.118**
4	landholding	0.136*
5	Family size	0.129*
6	Annual Income	0.06 NS
7	Achievement	.198**
8	Extension contact	0.046 NS
9	Social participation	0.01 NS
10	Cosmo politeness	0.014 NS
11	Credit and subsidy orientation	0.160*
12	Preparedness to adaptation	0.041 NS
13	Risk Orientation	0.173**

**Significant at 0.05 level of probability*
*** Significant at 0.01 level of probability*

3.3 Education Vs Perception of the Farmers towards Climate Variability

Table 2 reveals that the computed correlation coefficient for education (r = 0.011) was not significantly related to farmers' perceptions of climate variability. As a result, the null hypothesis was accepted, and the empirical hypothesis was rejected. This finding suggests that no significant relationship between education and farmers' perceptions of climate variability. The lack of a significant relationship may be attributed to the fact that a substantial proportion of cotton-growing farmers in the study were illiterate. Consequently, their limited educational background may not influence their perception of climate variability, leading to the observed non-significant correlation.

3.4 Farming Experience vs. Perception of the Farmers towards Climate Variability

The computed correlation coefficient for farming experience (r = 0.118) was positively and significantly associated with farmers' perceptions of climate variability (Table 2). Thus, the null hypothesis was rejected, and the empirical hypothesis was affirmed. This suggests a positive and significant relationship between farming experience and farmers' perceptions of climate variability. Farmers with more extensive experience are better equipped to observe and compare climatic changes over some time with current conditions. This enhanced observation capability likely improves their perception and adoption of various adaptation strategies. Experienced farmers tend to have a deeper understanding of climate change and possess greater knowledge about climate-related information, and effective crop and livestock management practices. Consequently, this trend of increased perception with greater farming experience was evident in the study.

3.5 Land Holding vs. Perception of the Farmers towards Climate Variability

The computed correlation coefficient for farm size (r = 0.136) was positively and significantly related to farmers' perceptions of climate variability (Table 2). Consequently, the null hypothesis was rejected, and the empirical hypothesis was supported. This indicates a positive significant relationship between landholding size and farmers' perceptions of climate variability. Larger landholdings generally enhance farm income, hence farmers can have greater access to information on scientific agricultural practices and weather-related data. Thus, increased farm size is associated with improved perception and understanding of climate variability among farmers.

3.6 Family Size vs. Perception of the Farmers towards Climate Variability

Table 2 indicates that the computed correlation coefficient for family size (r = 0.129) was significantly related to farmers' perceptions of climate variability. Thus, the null hypothesis was rejected. This suggests a significant relationship between family size and farmers' perceptions of climate variability. An increase in family size may facilitate the acquisition and dissemination of information related to cotton cultivation among more family members. Consequently, this broader information exchange contributes to a positive correlation between family size and farmers' perceptions of climate variability.

3.7 Annual Income vs. Perception of the Cotton Growers towards Climate Variability

Table 2 demonstrates that the computed correlation coefficient for annual income (r = 0.06) was not significantly related to cotton growers' perceptions of climate variability. Therefore, the null hypothesis was accepted. This finding suggests that there is no significant relationship between annual income and cotton growers' perceptions of climate variability. This lack of significance may be attributed to the fact that the annual income of many cotton growers is moderate, which may limit their access to comprehensive information about climate change and its impacts.

3.8 Achievement Motivation vs. Perception of the Cotton Growers towards Climate Variability

The estimated coefficient of correlation value (r=0.198) of achievement motivation was shown to be positively and significantly correlated with farmers' perceptions of climate variability in Table 2 The empirical hypothesis was thus accepted and the null hypothesis was rejected. Thus, it could be concluded that the farmers' sense of climate variability and achievement motivation were positively and significantly

correlated. This could be because someone driven by accomplishment motivation feels compelled to work tirelessly to accomplish a goal that he sets for himself and learns about climate change in the process.

3.9 Extension Contact vs. Perception of the Cotton Growers towards Climate Variability

It was evident from Table 2 that there was no statistical significance discovered between the extension contact's computed coefficient of correlation value (r = 0.046) and farmers' perceptions of climate variability. Thus, the null hypothesis was approved. Consequently, it was possible to deduce that there was no meaningful connection between farmers' perceptions of climate variability and extension interactions. The majority of cotton growers may have had only moderate extension interaction, which prevented them from attending seminars and training provided by extension agents and left them with limited knowledge of climate change.

3.10 Social Participation Vs Perception of the Cotton Growers towards Climate Variability

Table 2 shows that the computed correlation coefficient for social participation (r = 0.05) was not significantly related to cotton growers' perceptions of climate variability. As a result, the null hypothesis was accepted, and the empirical hypothesis was rejected. This indicates that there is no significant relationship between social participation and cotton growers' perceptions of climate variability. This lack of significance may be due to the moderate levels of social participation and extension contact among cotton growers. Their limited engagement in workshops and training sessions organized by extension agents likely contributes to their reduced knowledge about climate change.

3.11 Cosmo Politeness vs. Perception of the Cotton Growers towards Climate Variability

Table 2 indicates that the computed correlation coefficient for cosmopolitanism (r = 0.014) was not significantly related to cotton growers' perceptions of climate variability. Consequently, the null hypothesis was accepted. This finding suggests that there is no significant relationship between cosmopolitanism and cotton growers' perceptions of climate variability. This lack of significance may be attributed to the moderate levels of cosmopolitanism, social participation, and extension contact among the cotton growers. Their limited engagement in training sessions and meetings held in urban areas likely restricts their exposure to broader information about climate variability.

3.12 Credit and Subsidy Orientation vs. Perception of the Cotton Grower's Climate Variability

The computed correlation coefficient for credit and subsidy orientation (r = 0.160) was positively and significantly related to cotton growers' perceptions of climate variability Table 2 As a result, the null hypothesis was rejected, indicating a significant relationship between credit and subsidy orientation and farmers' perceptions of climate variability. This significant relationship may be attributed to the fact that credit and subsidy orientation can influence farmers' access to resources and information related to climate variability. Limited availability of credit facilities, typically concentrated in main cities and towns, may impact farmers' ability to adapt to climate changes, thereby affecting their perceptions of climate variability.

3.13 Preparedness for Adaptation vs. Perception of the Cotton Growers towards Climate Variability

Table 2 indicates that the computed correlation coefficient for preparedness for adaptation (r = 0.041) was not significantly related to cotton growers' perceptions of climate variability. Consequently, the null hypothesis was accepted, and the empirical hypothesis was rejected. This suggests that there is no significant relationship between preparedness for adaptation and farmers' perceptions of climate variability. This lack of significance may be attributed to the fact that many cotton growers have moderate annual income and limited extension contact. Their infrequent participation in training sessions and meetings likely results in insufficient knowledge about climate change, thereby diminishing the impact of preparedness for adaptation on their perceptions.

3.14 Risk Orientation vs. Perception of the Cotton Growers towards Climate Variability

The estimated coefficient of correlation value (r = 0.173) of risk orientation was shown to be

positively and significantly correlated with farmers' perceptions of climate variability in Table 2. The empirical hypothesis was thus accepted and the null hypothesis was rejected. Thus, it could be concluded that risk orientation and farmers' perceptions of climate variability were positively and significantly correlated. This could be because the majority of farmers rely solely on rainfall, and despite growing cotton, they only have a moderate awareness of climate change.

Combined effect of all independent variables on the perception of the farmers towards climate variability: To ascertain the collective impact of all the chosen independent variables in explaining variance in the farmers' impression of climate variability, multiple linear regression analysis was performed. Table 2 displays the partial regression coefficient (b) values and the computed coefficient of determination (R2) value along with their matching values. A statistical test was performed to determine the significance of the R2 and b values.

4. CONCLUSION

The analysis concluded that the majority of respondents had a medium level of perception regarding climate variability (58.33%), followed by low (24.17%) and high (17.50%) levels of perception. Correlation analysis indicated that farming experience, achievement motivation, and risk orientation were positively and significantly associated with the cotton growers' perceptions of climate variability at the 1% level of significance. The research points out a gap in previous literature regarding farmers' perceptions of climate change specifically in these regions, suggesting that aligned national policies focusing on sustainable agricultural practices are essential. Addressing the unique challenges faced by the farming community in Telangana, particularly the marginalized sectors, will require a concerted effort involving government intervention and the implementation of targeted agricultural technologies.

This study contributes significantly to understanding how cotton farmers in Telangana perceive climate change and adapt their farming practices. They underscore the importance of developing comprehensive strategies that not only aim to mitigate climate-related risks but also ensure long-term sustainability and food security for agricultural communities in the vulnerable.

CONFERENCE DISCLAIMER

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DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during the writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Mahesh L, Ahire RD, Deshmuck PR. Adaptability of the cotton growers towards climate variability and relationship with profile. 2021;SP-9(3):14-17.
2. Maddison D. The perception and adaptation to climate change in Africa. CEEPA Discussion Paper No. 10. Centre for Environmental Economics and Policy in Africa, University of Pretoria, South Africa; 2006.
3. Bryant RC, Smit B, Brklacich M, Johnston RT, Smithers J, Chiotti Q, Singh B. Adaptation in Canadian agriculture to climate variability and change. Climate Change. 2000;45:181-201.
4. Gbetibouo GA. Understanding farmer's perceptions and adaptations to climate change and variability: The case of the Limpopo Basin, IFPRI Discussion Paper 00849. South Africa; 2009.
5. Ishaya S, Abaje IB. Indigenous people‟ 's perception of climate change and adaptation strategies in Jema‟ 's local government area of Kaduna State, Nigeria. Journal of Geography and Regional Planning. 2008;1(18):138-143.
6. Diggs DM. Drought experience and perception of climatic change among Great Plains farmers. Great Plains research. Journal of Natural and Social Sciences. 1991;1(1):114-132.

7. Semenza JC, Hall DE, Wilson DJ, Bontempo BD, Sailor DJ, George LA. Public perception of climate change voluntary mitigation and barriers to behaviour change. American Journal of Preventive Medicine. 2008;35(5):449-487
8. Kerlinger FN. Foundations of behavioural research. Holt, Rinehart and Winston. New York; 1973.
9. Adams RM, Mc Carl BA, Segerson K, Rosenzweig C, Bryant KJ, Dixon BL, Conner R, Evenson R, Ojima D. The economic effects of climate change on U.S. agriculture; 1998.
10. Gangadhar J. Marketing behaviour of cotton farmers in Warangal district of Andhra Pradesh. M.Sc.(Ag.) Thesis. ANGRAU, Hyderabad, India; 2009.

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