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Attitude of students towards climate change impact

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Abstract

Climate change poses a significant threat to global sustainable development, with agricultural systems playing a dual role as both a contributor to and a victim of its impacts. This study examined the attitudes of undergraduate agriculture students—future professionals in food and farming systems—towards climate change impacts and mitigation. Adopting an ex-post facto research design, the study surveyed 120 final-year B.Sc. (Hons.) Agriculture students at Professor Jayashankar Telangana Agricultural University (PJTAU), India, using a multistage random sampling approach. Data were collected via a pre-structured interview schedule and analysed using descriptive statistics and Pearson's correlation coefficient. The results revealed an overall positive and progressive attitude toward climate change mitigation, with the belief that reducing carbon emissions is crucial for agricultural sustainability ranking highest (Index = 90.50). Correlation analysis indicated that academic performance, mass media exposure, climate orientation, awareness, and academic curriculum ($r = 0.266^{**}$) had significant positive relationships with student attitudes. In contrast, socio-demographic factors such as age, gender, and family income showed no significant influence. These findings underscore that educational and informational factors are more decisive than personal backgrounds in shaping climate-responsive attitudes, highlighting the need for strengthened climate-oriented curricula and experiential learning in agricultural education.

Keywords: Climate change, attitude, agricultural students, Pearson's correlation coefficient, agricultural sustainability

Introduction

Climate change has emerged as a defining challenge to global development, with its impacts falling most heavily on developing countries where adaptive capacity and institutional preparedness remain limited. The consequences of a changing climate extend across interconnected systems, affecting human health, ecological stability, biodiversity, agricultural productivity, economic growth, tourism, and the availability of freshwater resources (Kovats *et al.*, 2005; Ebi *et al.*, 2006; Arnell, 2004) [8, 5, 3]. These multidimensional impacts have elevated climate change from an environmental concern to a critical threat to sustainable development at the global scale (Ahchong & Dodds, 2012) [1]. Observable phenomena such as sea-level rise, increasing frequency of droughts, glacial retreat, and disrupted hydrological cycles highlight the accelerating nature of climate-related risks, with Asian regions projected to experience pronounced water stress in the future (Whaley, 2008) [13].

Contemporary climate change is widely attributed to anthropogenic processes that alter atmospheric composition beyond the limits of natural climatic variability (UNFCCC, 2007). The Intergovernmental Panel on Climate Change (IPCC, 2007) [7] identifies the rapid accumulation of carbon dioxide (CO₂) and other greenhouse gases as the primary driver of global warming. Agricultural activities contribute

significantly to this process through multiple emission pathways, including methane (CH₄) released during enteric fermentation in ruminants and anaerobic conditions in flooded rice systems, as well as nitrous oxide (N₂O) emissions associated with the intensive application of chemical fertilisers (Obadijah, 2010) [10]. These emissions intensify the greenhouse effect, thereby accelerating increases in global mean temperatures.

While technological innovation and policy reforms are essential for addressing climate change, effective responses also depend on human attitudes and willingness to engage with mitigation and adaptation efforts. Higher education institutions play a pivotal role in shaping these orientations, particularly among agriculture students who are expected to assume key roles in managing climate risks within food and farming systems. Research in educational psychology indicates that students' engagement with complex socio-scientific issues is strongly influenced by pedagogical approaches that encourage reflection, dialogue, and persuasion (Alexander *et al.*, 2002; Murphy, 2001; Sinatra & Kardash, 2004) [2, 9, 11].

In social psychology, attitudes are conceptualised as evaluative tendencies that shape how individuals interpret, respond to, and act upon specific issues or phenomena (Crano & Prislin, 2006) [4]. Within the agricultural domain, students' attitudes towards climate change impacts are

therefore of particular importance, as they may influence future professional decisions related to adaptation strategies, mitigation practices, and sustainable resource management. Despite this relevance, empirical research examining agriculture students' attitudes towards climate change especially in developing-country contexts remains limited. Addressing this gap is critical for informing curriculum design and pedagogical strategies aimed at developing climate-responsive agricultural professionals. Accordingly, the present study focused on examining the attitudes of undergraduate agriculture students towards the impacts of climate change on agricultural systems. In addition, the study analysed the influence of selected personal, educational, and informational variables on agriculture students' attitudes towards climate change impacts.

Materials and Methods

The study was carried out in Telangana State, India, using a multistage random sampling technique. The investigation was conducted at Professor Jayashankar Telangana Agricultural University (PJTAU). An ex-post facto research design was adopted, with the sample comprised of 120 undergraduate agriculture students enrolled in the final year of the B.Sc. (Hons.) Agriculture programme, who were

selected randomly from the target population. Final-year students were purposively considered suitable for the study owing to their extensive academic exposure to agricultural sciences, environmental studies, and climate-related coursework. Primary data were collected using a structured and pre-tested interview schedule administered online through Google Forms to ensure accuracy, convenience, and minimal response bias. The collected data were systematically coded, classified, tabulated, and analysed to facilitate meaningful interpretation. Attitude statements were ranked based on index scores, and Pearson's correlation coefficient was employed to examine the relationships between selected independent variables and the dependent variable.

Results and Discussion

Table 1 depicted the attitude of students towards climate change impact in agriculture, measured through an index score and corresponding ranking for thirteen statements. The results revealed an overall positive and progressive attitude among students regarding climate change mitigation and the reduction of carbon emissions in the agricultural sector.

Table 1: Attitude of students towards climate change impact

S. No	Statement	Index Score	Ranking
1.	I believe that reducing carbon emissions is crucial for the sustainability of the agriculture sector.	90.50	1
2.	I think awareness about carbon emissions should be a key part of agricultural education.	88.83	2
3.	I believe that every agricultural stakeholder has a role in reducing carbon emissions.	88.67	3
4.	I think that climate change education should be a priority in agricultural curricula.	88.00	4
5.	Sustainable farming practices can be as productive and profitable as conventional methods.	84.17	5
6.	I am not likely to consider greenhouse gas emissions when making farm management decisions.	60.33	13
7.	I am willing to adopt new technologies that can help reduce my farm's carbon footprint.	82.33	7
8.	I do not intend to change my farming practices to address climate change concerns.	54.67	12
9.	I am not interested in participating in carbon offset programs for agriculture.	53.33	10
10.	I plan to incorporate agroforestry practices into my farming system.	78.17	9
11.	I think that agricultural education should place more emphasis on carbon emission reduction.	84.00	6
12.	I think that focusing on carbon emissions will harm agricultural productivity.	66.50	11
13.	I believe that consumers should consider the carbon footprint of their food choices.	80.17	8

The highest-ranked statement (Index = 90.50) reflects a strong belief that reducing carbon emissions is crucial for the sustainability of agriculture, indicating high awareness of the long-term environmental challenges facing the sector. Similarly, students strongly agreed that awareness of carbon emissions should be a key component of agricultural education (Index = 88.83) and that every agricultural stakeholder has a role in reducing carbon emissions (Index = 88.67). These high index values demonstrate a shared sense of responsibility and recognition of education as a critical driver of climate action.

Statements emphasizing the prioritization of climate change education in agricultural curricula and the viability of sustainable farming practices also received high rankings, suggesting that students view sustainability and productivity as compatible rather than conflicting goals. Furthermore, a substantial proportion of students expressed willingness to adopt new technologies to reduce farm-level carbon footprints and supported placing greater emphasis on carbon emission reduction within agricultural education.

In contrast, statements reflecting resistance or negative

attitudes towards climate action received comparatively lower index scores. Notably, statements such as unwillingness to change farming practices, lack of interest in carbon offset programs, and the perception that focusing on carbon emissions may harm agricultural productivity were ranked lower. This indicates that while some skepticism or hesitation exists, it is less dominant among the respondents.

Overall, the table highlights that students possess a favourable attitude toward climate change mitigation in agriculture, with strong support for educational reform, sustainable practices, and shared responsibility. However, the lower-ranked statements suggest the need for targeted awareness and practical demonstrations to address concerns related to productivity, economic implications, and adoption of climate-friendly practices. This underscores the importance of strengthening experiential learning and policy-oriented education to translate positive attitudes into concrete action.

The relationship between selected independent variables and the attitude of students towards climate change impact was

analysed using correlation analysis. The results shown in Table 2, indicated that a few academic, informational, and psychological variables had a significant influence on students' attitude, whereas most socio-demographic variables did not show any significant association.

Table 2: Relationship between independent variables and Attitude of students towards climate change impact

Independent Variable	'r' value
Age	-0.024
Gender	0.054
Academic Performance	0.192*
Place of Residency	-0.099
Family Size	0.025
Farm Size	-0.076
Family Occupation	0.023
Family Income	-0.078
Mass Media Exposure	0.192*
Achievement Motivation	0.112
Climate Orientation	0.214*
Academic Curriculum	0.266**
Awareness	0.194*

**= Significant at 0.01 level (2 tailed) * = Significant at 0.05 level (2 tailed)

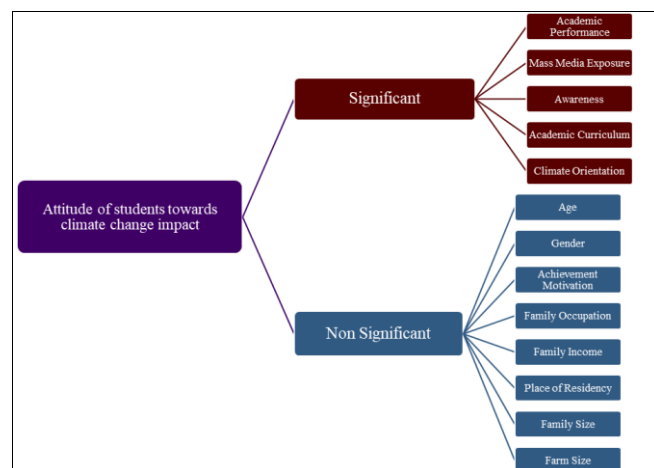


Fig 1: Relationship between independent variables and Attitude of students towards climate change impact

Among the independent variables, academic performance exhibited a positive and significant relationship with students' attitude towards climate change impact ($r = 0.192^*$). This indicates that students with better academic achievement tend to possess a more favourable and informed attitude towards the impacts of climate change. Higher academic engagement may enhance students' understanding of environmental issues and their consequences.

Mass media exposure also showed a positive and significant relationship with attitude ($r = 0.192^*$). This suggests that students who were more exposed to mass media sources such as television, social media, and digital platforms demonstrated a better attitude towards climate change impacts. Media exposure likely enhances awareness by disseminating information on climate change, extreme events, and environmental degradation.

Climate orientation was found to have a positive and significant relationship with students' attitude ($r = 0.214^*$).

This implies that students who were more sensitive and oriented towards climate-related concerns exhibited a stronger and more favourable attitude towards understanding the impacts of climate change.

The variable academic curriculum showed a positive and highly significant relationship with students' attitude towards climate change impact ($r = 0.266^{**}$). This indicates that curriculum content related to climate change, environment, and sustainability plays a crucial role in shaping students' attitudes. Structured academic exposure strengthens scientific understanding and promotes responsible environmental attitudes among students.

Similarly, awareness exhibited a positive and significant relationship with attitude ($r = 0.194^*$). Students with higher awareness levels regarding climate change causes, impacts, and mitigation strategies were found to have a more positive attitude towards climate change impacts.

In contrast, variables such as age (-0.024), gender (0.054), place of residency (-0.099), family size (0.025), farm size (-0.076), family occupation (0.023), and family income (-0.078) did not show any significant relationship with students' attitude towards climate change impact. This suggests that socio-demographic and economic characteristics alone do not substantially influence students' attitudes unless supported by academic exposure, awareness, and psychological orientation.

Overall, the findings highlight that educational, informational, and psychological factors play a more decisive role in shaping students' attitude towards climate change impact than socio-demographic variables. Strengthening climate change-related curriculum, enhancing awareness programmes, and promoting climate-oriented learning environments may therefore help foster more positive and informed attitudes among students.

Conclusion

This study confirms that agriculture students maintain a favourable attitude toward climate change mitigation, viewing sustainability and productivity as complementary goals. Results demonstrate that educational and informational variables specifically academic curriculum, awareness, and media exposure outweigh socio-demographic factors in shaping these views. Because curriculum content has the strongest correlation ($r = 0.266^{**}$) with positive attitudes, institutions should prioritize climate-integrated learning and practical demonstrations. Fostering these orientations is crucial for developing a workforce capable of implementing carbon-friendly practices and ensuring the long-term sustainability of global agricultural systems.

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