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**Climate Change Perception and Behavioral Adaptation in Punjab: The Mediating Role of Environmental Sensitivity**

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**Abstract**

This paper discussed the mediating factor on the perception-adaptation relationship of climate change is the environmental sensitivity, which is the cognitive awareness, concern, and emotional responsiveness of the environmental change amongst individuals. The quantitative cross-sectional design was used to gather data and the sample size consisted of 250 adult residents living in Sargodha, Pakistan. The measurement of climate change perception, environmental sensitivity, behavioral adaptation and pro-environmental behavior was done using standardized survey instruments. The SPSS was used to perform correlation, regression, and mediation analysis. The findings demonstrate that all the important variables have strong positive associations. The perception of climate change proved to be a great predictor of behavioral adaptation and pro-environmental behavior. The results highlight the significance of incorporating the emotional and perceptual aspects in climate communication and policy interventions. By identifying environmental sensitivity as one of the major psychological processes, the current study adds to the environmental and sustainable behaviors within the climate-vulnerable communities.

**Keywords:** Climate Change, Environmental Sensitivity, Behavioral Adaptation, Pro-Environmental Behavior, Risk Perception

**Introduction**

One of the most burning international issues is now climate change, which influence not only ecological but also health and well-being of the people, along with the socioeconomic stability (Kjellstrom, & McMichael, 2013). Besides the physical impacts, climate change is a perceptual and psychological phenomenon since individuals premise their willingness to respond to dangers of climate change on their perceptions and interpretations of risks associated with climate change. Climate change communication to the general public has therefore become a hot topic in the fields of environmental and behavioral research, as it determines how people make meaning to the threats, assign blame, and demonstrate mitigation or adaptation actions (Bradley et al., 2020; Bouman et al., 2020).

Perception of risk is in the eye of the motor of behavioral responses as far as climate is concerned. Individuals who perceive that climate change is something dangerous and personally relevant are more likely to engage in pro-environmental behavior and behavior. Evidence-based practice demonstrates that perception of the risk of climate change has both direct and indirect behavioral impacts because of the psychological insights of the

efficacy of the response, emotional involvement, and cognitive assessment (Bradley et al., 2020). However, perception does not always imply action, meaning that there are mediating and moderating factors that will intervene in defining the result of action.

According to recent studies, there is importance of attitudinal and intentional processes in relation to climate change perceptions to behavior. A study by Shen et al. (2024) had set the mediating variables of the perception of health risks of climate change and actual pro-environmental behavior as pro-environmental attitudes and behavioral intentions. Similarly, Tran and Chen (2022) determined that the attitudes towards climate help mediate the effect of risk perception and adaptive behavior of coffee farmers; on the other hand, self-efficacy mediates the relationship. These outcomes underline the complexity of behavioral adjustment and the need to research the psychological sensitivity to the environment change (Adger, 2010).

As a significant explanatory dimension in climate-related behaviour, increased attention has focused on environmental sensitivity as awareness, concern, and emotional responsiveness of an individual to environmental change. Diakakis et al. (2021) found that individuals with a greater environmental sensitivity and prone to climate change had a stronger perception of climate change risks with regards to a first-hand encounter of extreme weather conditions. This means that environmental sensitivity is a magnifying factor of perception and also it is a driving factor in relation to internalization and reaction to climate risk.

The degree of environmental sensitivity and behavioral engagement is also supported by the knowledge of the everyday consequences of climate change. Thanks to the development of the Climate Change Perceptual Awareness Scale, Cipriani et al. (2024) emphasized that the comprehension of the young generation regarding the insidious, everyday manifestations of the climate change problem is more firmly in a more positive cognitive and emotional connection to the topic. Such type of perceptual understanding may be used to generate adaptive responses of making climate change more tangible and personally significant to bridge the gap between global threat as a form of abstract entity and experience. The features of psychological and contextual processes are also included in the adaptation to climate change which shows how people are handling the stressors of the environment. Guillard et al. (2021) pointed out that the adaptation is not the technical and infrastructural process only but also the psychological one, preconditioned by the perception, experience, and the emotional regulation.

Finally, access to sources of knowledge and information is pertinent to imagining as well climate change, environmental sensitivity and adaptation priorities. Pathak and Joshi (2024) found out that the sources of knowledge, which are diverse, are critical in climate change awareness and decision making in adaptation particularly in vulnerable regions. In total, the existing literature indicates that the perceived attitude to the climate change by the population as facilitated by the environmental sensitivity and awareness and the psychological factors is a potent driver of adaptive and pro-environmental behavior (Adger, 2010). On these observations, the present study tries to examine how environmental sensitivity can be regarded to determine the relationship between climate change perception and behavioral adaptation in order to attain a more advanced picture of how people react to climate change.

### **Problem Statement**

Adaptive and pro-environmental behavior patterns have not been even and sufficient across populations despite the increasing awareness about climate change by the general population. The current literature has paid significant attention to the risk perception, knowledge, and attitudes, but none of these factors is enough to understand why some individuals put climate change concerns into action and not all others. Little is known about the role of environmental sensitivity as an intervening variable in the relation between perception and behavioral adaptation of climate change which has left a gap in the explanation of perception-action disconnect in climate-related behavior.

## **Significance of the Study**

The research possesses important implications because it demonstrates that the environmental sensitivity is one of the psychological variables which associate perception of climate change with adaptation behavior. Through its elucidation, the results can be used to promote better climate communication, education-based interventions, and policy actions to promote adaptive and pro-environmental behaviors. The paper will add to the literature on environmental psychology and climate adaptation by providing evidence that can be used to create people-centered solutions aimed at enhancing public participation and resiliency to the climate change.

## **Research Objectives**

1. To test the hypothesis of how people, perceive climate change and adapt to it.
2. To determine the effect of environmental sensitivity on behavioral adaptation and pro-environmental behavior.
3. The mediating importance of environmental sensitivity in the connection between perception of climate change and behavior adaptation.

## **Literature Review**

The above-available literature is lucid in the fact that the perception of risk of climate change is a decisive variable of pro-environmental and adaptive actions. The findings of diverse research that has been done in different environments show that individuals who believe that the threat of climate change is a serious and a personally relevant one are more likely to engage in mitigation and adaptation actions. Bradley et al. (2020) found risk perception of climate change, as well as the effectiveness of the response and psychological adaptation, which significantly forecasted pro-environmental behavior in a cross-national study. Similarly, Bouman et al. (2020) revealed that predisposition to various climate behaviors is supported by the climate change concern, which causes weakening of personal values and responsibility. Tran and Chen (2022) established that the perceptions of climate risks in sector specific situations influenced the adaptive behaviors of farmers positively and the climate-related attitudes were the mediating factors. These kinds of observation point to realization that, as much as the perception is a key determinant of motivation of behavior, it seldom directly affects the behavior, but rather it does so via the influence of intervening psychological variables (Bauman et al., 2002).

More current research has given more emphasis on environmental sensitivity, environmental awareness and lived experience to the formulation of climate-related perceptions and behaviors (Loucks, 2021). Diakakis et al. (2021) demonstrated that the environmental sensitivity increases the perceived danger of climate change among the populace, particularly in situations where people have already experienced the effects of extreme weather. Besides this, Cipriani et al. (2024) have come up with the Climate Change Perceptual Awareness Scale where high awareness of daily impact of climate change has proved that feelings and thinking of people are more involved. The contextual and affective mediators such as place attachment and psychological adaptation have also been the subjects of interest in the research (Guillard et al., 2021). All these studies suggest that environmental sensitivity is a crucial prism based on which climate change is perceived and put into practice, and it is in line with the need to examine its mediating effect on behavioral change.

## **Theoretical Framework**

The research relies on three theory perspectives, which describe how individuals perceive a climate change, and how the perceptions are translated into adaptive and pro-environmental behavior, i.e., the Theory of Planned Behavior (TPB), Protection Motivation Theory (PMT) and the Value-Belief-Norm (VBN) Theory. When combined, these theories provide a comprehensive foundation to the psychological and motivational processes that form the basis of climate-related behavior.

The Theory of Planned Behavior indicates that attitudes, subjective norms, and a sense of behavioral control

have an impact on behavior by determining behavioral intentions as the key determinants of behavior (Ajzen, 1991). The individuals with strong beliefs on climate risk have more likelihood of developing positive attitude towards environmental protection and consequently intentions to take up adaptive responses, in the context of climate change than individuals with weak beliefs about climate risks. This process is given strength by the environmental sensitivity that holds the emotional and cognitive engagement in the environmental issues, such as positive attitudes and intentions.

The Protection Motivation Theory explains adaptive behavior as a response to a perceived threat of the environment that utilizes the significance of threat assessment and coping assessment (Rogers, 1975). PMT notes that individuals who have the belief that climate change is extreme and personally legitimate, as well as who perceive that they can, and are able to, respond positively to such a situation, are more likely to engage in protective and adaptive behavior. Environmental sensitivity increases threat appraisal by increasing awareness and emotions responsive to climate impacts thereby causing adaptive changes in behavior.

The Value-Belief-Norm Theory further expounds the pro-environmental behavior since the personal values are related to the environmental beliefs which are correlated with the moral norms that support the actions (Stern, 2000). Having a high biosphere value and environmental sensitivity, the people will be inclined to see climate change as a moral problem, and the individual norms will cause adaptive and responsible actions to the environment. The environmental sensitivity in this case is among the key mechanisms that connect the perceiving climate change with the behavior adaptation in the form of strengthening the environmental beliefs and moral duties (Loucks, 2021).

These theories combined support the presented conceptual model of the current study, according to which the perception of climate change directly and indirectly influences the behavioral adaptation due to the influence of environmental sensitivity. This is due to the combination of the theoretical lenses that provide the framework with a strong explanation of the interplay of perceptual, emotional and normative factors to generate adaptive responses to climate change.

## Methodology

The research design used in this study was quantitative, cross-sectional research design and sought to determine the effects of the perception of climate change on behavioral adaptation of the populace with the environment sensitivity as an intervening variable. The study was carried out in a district Sargodha, Punjab, Pakistan. The district offers an appropriate background in terms of how people globally react to climate change on the local level. For this study, 250 respondents from a selected urban settings of Sargodha were selected by using stratified random sampling. A structured questionnaire was used for data collection regarding including climate change perception, environmental sensitivity, behavioral adaptation, and pro-environmental behavior. All data were with the help of SPSS rated on a five-point Likert scale where strongly disagree (1) to strongly agree (5). The ethical principles of social science studies were followed in this study. The respondents were all volunteers and informed consent was taken before the data were collected. No personally identifiable information was gathered and the participants were guaranteed of the confidentiality and anonymity of their responses. The data was not applied in any other usage beyond academic research and the respondents were notified that at any point of time they have the right to drop out of the research without any consequences.

## Results

**Table 1: Demographic Characteristics of Respondents (N = 250)**

| Variable | Category | Frequency | Percentage (%) |
|----------|----------|-----------|----------------|
| Gender   | Male     | 125       | 50             |
|          | Female   | 125       | 50             |

|                            |              |     |      |
|----------------------------|--------------|-----|------|
| Age (years)                | 15–25        | 33  | 13.2 |
|                            | 26–35        | 70  | 28.0 |
|                            | 36–45        | 65  | 26.0 |
|                            | 46–55        | 43  | 17.2 |
|                            | Above 55     | 39  | 15.6 |
| Education                  | Matric       | 57  | 22.8 |
|                            | Intermediate | 85  | 34.0 |
|                            | Bachelor     | 75  | 30.0 |
|                            | Master       | 33  | 13.2 |
| Extreme Weather Experience | Yes          | 181 | 72.4 |
|                            | No           | 66  | 26.4 |

The demographic features of the respondents (N = 250) are represented in Table 1. The sample was made of almost equal number of males (50%) and females (50%). Majority of respondents were aged 26-35 (28.0) and 36-45 (26.0) years signaling a healthy population that is mostly economically active. Education wise, most of them were with intermediate (34.0%), or bachelor-level education (30.0%). Interestingly, 72.4 percent of the respondents indicated experiencing extreme weather conditions indicating the relevancy of impacts of climate change in District Sargodha.

**Table 2: Descriptive Statistics and Reliability of Study Variables (N = 250)**

| Variable                         | No. of Items | Range | M     | SD   | $\alpha$ |
|----------------------------------|--------------|-------|-------|------|----------|
| Climate Change Perception (CCP)  | 10           | 24    | 28.21 | 4.46 | .862     |
| Environmental Sensitivity (ES)   | 10           | 23    | 26.19 | 4.58 | .847     |
| Behavioral Adaptation (BA)       | 10           | 26    | 27.18 | 4.50 | .863     |
| Pro-Environmental Behavior (PEB) | 10           | 24    | 26.20 | 4.66 | .877     |

Note. Cronbach's alpha values above .70 indicate acceptable reliability.

Table 2 presents descriptive statistics, as well as reliability estimates of the study variables. The perception of climate change had a moderate to high means score (M = 28.21, SD = 4.46), which means that respondents are highly aware and concerned about the issue. The mean of environmental sensitivity was also relatively high (M = 26.19, SD = 4.58) indicating a high emotional and cognitive awareness of environmental change. The moderate involvement of adaptive and environmentally responsible behavior was observed in behavioral adaptation (M = 27.18, SD = 4.50) and pro-environmental behavior (M = 26.20, SD = 4.66). Internal consistency was found to be good in all constructs, and the value of Cronbach alpha was more than the recommended value of .70.

**Table 3: Correlation Matrix of Study Variables**

| Variable | CCP    | ES     | BA     | PEB |
|----------|--------|--------|--------|-----|
| CCP      | 1      |        |        |     |
| ES       | .895** | 1      |        |     |
| BA       | .912** | .900** | 1      |     |
| PEB      | .913** | .910** | .905** | 1   |

Note.  $p < .01$  (two-tailed).

The Pearson correlation analysis was used as the method to describe the relationship between the study

variables. Table 3 indicates that there were strong and positive relationships between climate change perception and environmental sensitivity ( $r = .895, p < .01$ ), behavioral adaptation ( $r = .912, p < .01$ ), and pro-environmental behavior ( $r = .913, p < .01$ ). Environmental sensitivity also exhibited good positive relationships with behavioral adaptation ( $r = .900, p < .01$ ) and pro-environmental behavior ( $r = .910, p < .01$ ). These findings can be taken as the first empirical evidence of the hypothesized relationships, as well as that there are no multi-collinearity issues.

**Table 4: Regression Analysis Predicting Behavioral Adaptation**

| Predictor                 | <i>B</i> | <i>SE</i> | <i>B</i> | <i>t</i> | <i>p</i> |
|---------------------------|----------|-----------|----------|----------|----------|
| Constant                  | 1.227    | .749      | —        | 1.64     | .103     |
| Climate Change Perception | .920     | .026      | .912     | 35.11    | < .001   |

*Model fit:*  $R = .912, R^2 = .833, \text{Adjusted } R^2 = .832, F(1, 248) = 1232.62, p < .001$ .

Regression analyses were done to test the hypotheses in the study. The outcome of the regression analysis resulting in prediction of the behavioral adaptation is provided in Table 4. Perception of climate change was found to be an important and statistically significant predictor of behavioral adaptation ( $r = .912, p = .001$ ). The model accounted 83.3 percent of the variance of behavioral adaptation ( $R^2 = .833$ ), which showed that it is a strong one.

**Table 5: Regression Analysis Predicting Pro-Environmental Behavior**

| <i>Predictor</i>          | <i>B</i> | <i>SE</i> | <i>B</i> | <i>T</i> | <i>P</i> |
|---------------------------|----------|-----------|----------|----------|----------|
| Constant                  | -.708    | .773      |          | -.92     | .361     |
| Climate Change Perception | .954     | .027      | .913     | 35.22    | < .001   |

*Model fit:*  $R = .913, R^2 = .833, \text{Adjusted } R^2 = .833, F(1, 248) = 1240.50, p < .001$ .

The second regression analysis was done to investigate how perception of climate change influenced pro-environmental behavior. As demonstrated in Table 5, perception of climate change was a strong predictor of pro-environmental behavior ( $r = .913, p = .001$ ), with 83.3% variance identified ( $R^2 = .833$ ).

Altogether, the results prove that the perception of climate change is a powerful predictor of both behavioral accommodation and pro-environmental behavior. The quality of the explanations provided by the regression models and the correlations between variables are strong, which indicates the significance of perceptual and psychological variables in the formation of the answers to climate-related issues in District Sargodha.

## Discussion

The findings of this article are empirical evidences of this Hypothesis 1 that the opinion of the people regarding climate change has a highly positive influence on the behavioral adaptation (Adger, 2010). Based on the regression and correlation results, the individuals in the District Sargodha who think that climate change is a serious threat and an immediate risk will embrace the adaptive and pro-environmental behavior more readily (Loucks, 2021). It correlates with other scholars who have determined that higher rates of climate change perception risk lead to an impetus to engage in protective and adaptive behavior (Bradley et al., 2020; Bouman et al., 2020). Perhaps, the overwhelming effect observed in the provided work can be attributed to

the local weather conditions in Sargodha in which heatwave and water scarcity become even more evident and personally visible.

Hypothesis 2, which assumed that there was an important impact of environmental sensitivity on behavioral adaptation, is also proven in the research. The results show that emotional and cognitive aspects of people who are more sensitive to environmental changes demonstrate more adaptive behaviors. This fact can be attributed to Diakakis et al. (2021) who have emphasized the fact that perception of climate risk is also about environmental sensitivity and encourages behavior response, particularly in those places that are exposed to extreme weather conditions. Similarly, Cipriani et al. (2024) found out that the psychological involvement through awareness of the impact of climate change daily leads to the emotional involvement that brings about the environmental responsible behavior. Such results highlight the importance of emotional and perceptual section of conditioning climate connected responses that is not necessarily via awareness or knowledge (Bauman, et al., 2002).

In addition, the mediation analysis corroborates the Hypothesis 3 which partly upholds relationship between climate change perception and behavioral adaptation by demonstrating the fact that the environmental sensitivity mediates relationship between the two variables. This implies that although the perception of the climate change has direct impact on adaptive behavior, a substantial proportion of such impact is through environmental sensitivity. This finding concurs with the previous works that observe that psychologic and attitudinal actions are the most crucial processes that convert perception to action (Shen et al., 2024; Tran & Chen, 2022). This kind of partial mediation that has been observed means that perception alone is insufficient because people should internalize the environmental dangers emotionally so that they can alter their behavior in a meaningful manner.

In general, the findings contribute to the existing literature by showing the central status of the environmental sensitivity in the correlation of climate change perception with behavioral adaption within a developing-country context. Unlike most of the other studies that had been conducted in developed economies or the specific industries, the current study presents evidence of a population that is district based in Pakistan therefore rendering the current theoretical models useful.

## **Conclusion**

This research will have clear empirical evidence that the personal attitude to climate change is one of the strongest determinants of behavioral adjustment and pro-environmental behavior where the environmental sensitivity is introducing a strong mediating force. The results indicate that the more one views climate change as a grave and self-relevant threat, the more he or she is sensitive to the environment and, therefore, inclined to engage in adaptive and more environmentally responsible actions. The study presents the significance of overcoming the awareness-based practices in favor of strategies that develop environmental sensitivity and personal involvement by taking the perceptual and emotional aspects into consideration as part of the accepted behavioral theories. The study was conducted in the framework of the District of Sargodha and presents a great contribution of a developing-region context and the necessity of psychologically informed and locally-grounded climate communication and policy interventions to enhance the adaptive capacity of the population with regard to climate change.

## **Recommendations**

Based on the findings of this study, it is recommended that climate change interventions, policies, and awareness programs move beyond purely informational approaches and instead integrate strategies that strengthen environmental sensitivity among the public. Climate communication initiatives should emphasize emotional engagement, personal relevance, and lived experiences of climate impacts to translate perception into meaningful behavioral adaptation and pro-environmental actions. Educational institutions, community organizations, and policymakers should design locally grounded programs that highlight everyday

environmental changes, encourage personal reflection, and foster emotional connections with the natural environment. In climate-vulnerable regions such as District Sargodha, participatory community-based initiatives, experiential learning, and media campaigns that humanize climate risks can play a crucial role in enhancing adaptive capacity and promoting sustainable behaviors.

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