

Community Perceptions of Climatic Hazards in District Nushki, Balochistan

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Abstract

Climate change has become one of the major environmental and socio-economic challenges in developing countries, particularly in arid and semi-arid regions. District Nushki in Balochistan is highly vulnerable to climatic hazards because of water scarcity, frequent droughts, increasing temperatures, and dependence on climate-sensitive livelihoods such as agriculture and livestock. The present study examines community perceptions regarding climatic hazards and explores the socio-economic impacts of climate change on local communities in Nushki. The study also investigates adaptation and resilience strategies adopted by households to cope with climatic changes. The quantitative research design was used in this study, and data were collected through household surveys. The findings reveal that local communities have experienced significant changes in rainfall patterns, increasing temperatures, drought conditions, declining agricultural productivity, livestock losses, and water shortages during recent years. The study concludes that climate change has intensified community-level vulnerabilities in District Nushki and there is a strong need for community-based adaptation strategies, awareness programs, improved water management systems, and sustainable policy interventions to strengthen resilience among local populations.

Keywords: Climate Change, Climatic Hazards, Community Perceptions, Vulnerability, Adaptation, Nushki, Balochistan

Introduction

Climate change has emerged as one of the significant environmental problems facing all human communities in the world. It has become a global concern that is affecting the environment, economy, and human livelihoods (Dessler, 2020). The increasing temperatures, changing rainfall patterns, prolonged droughts, floods, heatwaves, and extreme weather events have caused several environmental imbalances. Therefore, climate change has had negative impacts on communities in diverse ways, such as low agricultural productivity, water scarcity, poor health conditions, and weak economies in various parts of the world

(Houghton, 2002). International climate reports that the recent risks and severity of climatic hazards have increased over the last two decades as a result of global warming. However, climate change imbalances have developed a significant issue of concern for the governments, policy makers, researchers, and environmental organizations throughout the world (IPCC, 2022).

Due to limited adaptive capacity, the developing countries are more vulnerable to climate change, with poverty, inadequate infrastructure, and reliance on natural resources. These countries are often endangered by climatic hazards, whose responses are inadequate. Poor financial resources, technological development, and institutional structures are the main issues for them (Tylor, 2014). Rural areas of developing countries are particularly at risk since they are deeply dependent on water, forests, livestock, and agriculture for livelihoods (Papoulis et al., 2015). Climatic hazards are directly connected to agricultural production, food security, and socio-economic stability. Moreover, limited access to education, health care, disaster, and climate information services increases the vulnerability of the local population to environmental changes (Shakoor et al., 2011).

Community perceptions on climate change are more important to understanding local climate change knowledge, vulnerabilities, and responses. Perception is the means by which individuals and communities perceive and understand environmental changes from their own practices (Whitmarsh & Capstick, 2018). Local knowledge of vulnerable areas is valuable in terms of the environmental changes they have experienced, their perceptions of climate, and how they deal with them over a long period of time (Bollettino et al. 2020). Community perceptions allow researchers and policymakers to better distinguish local significances, climate-related issues, and the local-level adaptation practices (Sloggy, 2021).

The local knowledge and community participation in the process of planning for adaptation to climate change have been highlighted in several studies carried out in various parts of Pakistan. But few studies have been conducted in District Nushki specifically on the perception of climatic hazards by the community. Most of the earlier studies have focused on the physical and environmental effects of climate change, while less emphasis has been laid on the socio-economic impacts and perceptions of climate variability in the drought-affected areas of Balochistan. Hence, it is important to examine the perception of climatic hazards, the impact of climatic hazards, and adaptation strategies of the communities in District Nushki to mitigate climatic changes.

Problem statement

Climate change is most alarming for developing countries like Pakistan and has direct consequences for the livelihood sources of people. Unpredictable changes in weather conditions can raise frequent and high-intensity events, thus pushing the communities to adjust to these fluctuations or forcing them to migrate from their areas. Balochistan that has been experiencing more climate-related challenges in the last 20 years. The arid and semi-arid lands of Balochistan, including Nushki District, are especially susceptible due to the reliance on agriculture

and natural resources. Local communities in Nushki are primarily agricultural, which is why the impact of climate change on livelihoods is very high.

The proposed study aims to determine how local communities perceive climate change and how they cope with the problems in the area.

Significance of the Study:

Climate change has appeared as an abnormal challenge nationally as well as internationally. This research study shed light on community perceptions of climate change in the district of Nushki, Balochistan. The following arguments modestly suggest the significance of this study. Pakistan, including Balochistan, witnessed devastating climatic conditions. The last two decades are the most significant regarding climate-related problems produced in the region because, in previous years, climate change caused several imbalances such as heatwaves, earthquakes, floods, health issues, and agricultural and livestock production across Balochistan and Nushki. The given research study will seek the effects of climate change and the capacity of the public to cope with environmental degradation.

Furthermore, the study explores possible channels through which the communities can mitigate climate hazards to their domestic and non-domestic activities, for example, awareness of climate disasters and how they can reduce climatic imbalance with the help of theoretical and research-based explorations.

Literature Review

Climate change is defined as long-term changes in the normal weather conditions of Earth. It has led to significant environmental imbalances, including greenhouse gas emissions, increasing temperatures, changes in rainfall patterns, extreme weather events, increasing sea levels, and environmental distractions (Pielke, 2004). Anthropogenic activities, especially in developed and industrialized countries, such as burning fossil fuels and deforestation, are the main drivers of increases in environmental carbon dioxide levels (Janjua et al., 2014).

Human societies are facing more and more imbalances in human activities due to natural disasters (Venn & Archibald, 2007). Several tragic disasters are the earthquake and tsunami in Japan, the tsunami in Indonesia, and the flood that has engulfed huge parts of Pakistan and Australia, claiming tens of human lives. Particularly, the problem has not only affected human life activities, but also shows a full range of global environmental changes that interact with dependent and fast globalizing human societies (Folke et al, 2011).

Semenza et al. (2008) found that human activities have become one of the most significant causes of global climate change. The consequences of the changes are expected to be severe, far-reaching, and disproportionately impacting the physically and economically vulnerable groups of people. Social approaches to climate change can largely be divided into two broad approaches, which include adaptation and mitigation.

Ratter et al. (2012) believed that Individual experiences are important factors that shape perceptions of climate change. Firsthand experiences of environmental risks are more likely to create lasting impressions that

affect behavior and the way risks are conveyed in communities. Nevertheless, unlike short-term and obvious threats, climate change is usually hard to notice by individuals directly because of natural variability in day-to-day weather conditions. The consequences render it difficult to distinguish between the long-term climatic changes and the short-term environmental changes.

Perceptions are not constructed only by the physical experiences, but social and cultural contexts are equally important. Such cultural values, beliefs, and socially transmitted interpretations play a significant role in the way people perceive and react to climate change (Wang et al., 2016). Weather and climate conditions are basic in influencing community perceptions of the environment. Factors like temperature, rain, humidity, and wind patterns determine what people believe in, the culture of a community, and the way people practice daily. Such environmental factors tend to be understood in different cultural contexts, and as such, various communities have a varied understanding of the risks presented by climate (Shi et al., 2015).

Social judgment is a key factor defining the reaction of societies to climate change. The perceptions that the community has concerning the causes, consequences, and severity of climate change significantly affect individual and collective actions. Public support is essential in policy development and implementation in most political systems, most of which are founded on the participation of the people. Climate policies, including emission cuts, the use of renewable energy technologies, and the use of adaptation measures, need institutional commitment as well as active involvement of citizens (Cvetkovic & Grbic, 2021)

Therefore, during recent years, world communities have become increasingly aware of the significant risks that climate change poses to human activities. The effects of climate change may include increased temperatures, rising sea levels, more intense rainfall, droughts, and heat waves. It also poses particular threats to the socio-economic factors of human life. To name just a few, these include increased economic stress, feeble agricultural productivity, livestock production, and migration (IPCC, 2007).

Methodology

The present study employed a quantitative research design to examine community perceptions regarding climatic hazards in District Nushki. District Nushki is located in the northwestern part of Balochistan, Pakistan. The district is characterized by an arid and semi-arid climate with low rainfall, high temperatures, and frequent drought conditions. Agriculture and livestock are the primary livelihood activities of local communities.

The study used both quantitative and qualitative data collected through structured questionnaires. A study consisting of 383 participants was used.

Data collection comprised structured household questionnaires, which were used to collect contextual data (Islam et al., 2022). Household questionnaires were used to collect data that were entered and analyzed in SPSS version 27. The current research used a multistage stratified sampling method to cover all administrative units in District Nushki in a representative manner. The district has a single tehsil, one municipal committee, and sixteen union councils.

Research Findings

The findings of the given study comprised descriptive statistics of key variables and demographic characteristics of the respondents of 383 samples. It has given the association of key variables in crosstabulation and chi-square results.

Demographic Characteristics of Respondents

Variables	Categories	Frequency	Percentage
Age Group (Years)	20–29	53	13.8%
	30–39	100	26.1%
	40–49	140	36.6%
	50–55	90	23.5%
	Total	383	100.0%
Gender	Male	186	48.6%
	Female	197	51.4%
	Total	383	100.0%
Education Level	No Formal Education	71	18.5%
	Primary	47	12.3%
	Middle	65	17.0%
	Matric	67	17.5%
	Intermediate	69	18.0%
	Bachelor's or Higher	64	16.7%
	Total	383	100.0%
Occupation	Farmer	51	13.3%
	Labor	51	13.3%

Variables	Categories	Frequency	Percentage
Total		383	100.0%

The table presents demographic characteristics of respondents. The age groups showed that 36.6 % of respondents belonged to the age group of 40 to 49. The share of age group from 30-39 of respondents are (26.1%), (23.5%) of respondents were in the age group of 50-55 years. Similarly, the 20-29 years age group comprise a 13.8%. The gender distribution of respondents showed that the female gender was 197 (51.4%) of the population, while males were 186 (48.6%).

The education levels of respondents revealed that only 71 participants have no formal education (18.5%). Similarly, primary-level respondents were only 47 in number, which comprises (12.3%). In the same way, the middle level was 65, which makes (17.0%) of the data. Besides this (17.5%) of the respondents communicated that their education qualification is metric. Moreover, another category of respondents (18.0%) reported having 12 years of education (intermediate). Bachelor's or higher degree comprised (16.7%).

Compare the current weather with the last 10-15

Weather	Frequency	Percentage
Normal	90	23.5%
Warm	109	28.5%
Very Warm	184	48.0%
Total	383	100.0

The table shows perception of respondents to the current weather compared to that of 5 to 10 years ago. Highest proportion of respondents (48 %) experienced the weather as “very warm,” while (28.5%) measured it “warm.” The results revealed that almost 90% of respondents have observed a perceptible rise in temperature over the past era. Moreover, (23.5%) specified that the weather is normal.

Community Level Adoption Measures in the Study Area

Adoption	Frequency	Percentage
Yes	260	67.9%
No	106	27.7%
Don't know	17	4.4%
Total	383	100.0

The above table results indicate the condition of the adoption measures among respondents who use them to tackle the problem at the individual and community level. A majority of respondents (67.9%) indicated that

adaptation measures against climate change exist in their area, while (27.7%) reported that no such measures have been implemented, and (4.4%) were unaware of any. This suggests a moderate level of community and individual engagement in addressing the impacts of climate change.

Relationship between Education Level and Climate Change Adaptation

Education Level	Yes n (%)	No n (%)	Total n (%)
No formal education	19 (26.8%)	52 (73.2%)	71 (100%)
Primary	42 (89.4%)	5 (10.6%)	47 (100%)
Middle	62 (95.4%)	3 (4.6%)	65 (100%)
Matric	65 (97.0%)	2 (3.0%)	67 (100%)
Intermediate	67 (97.1%)	2 (2.9%)	69 (100%)
Bachelor's or Higher	61 (95.3%)	3 (4.7%)	64 (100%)
Total	316 (82.5%)	67 (17.5%)	383 (100%)

A chi-square test of independence was conducted to examine the association between education level and adaptation. The results showed a statistically significant association between variables, $\chi^2 (5, N = 383) = 189.095$, $p < .001$. Therefore, the null hypothesis was rejected, and the alternative hypothesis was accepted.

Discussion

The study revealed that over the past few years, there have been significant changes in the climate in communities of District Nushki, such as rising temperatures, droughts, irregular rains, and water shortages. The study also found that various adaptation strategies are being implemented in households, including water conservation, livelihood diversification, and changes in agricultural activities. But some communities have limited resources, poverty, and a lack of education, which limits their adaptive capacity.

The results of statistical analysis showed that there was a significant relationship between education and climate change adaptation. The respondents with higher levels of education were more aware and were also more adapted in their practices than those with lower levels of education.

Recommendations

- It has been recommended that to improve community education about climate change, community-based programs.
- It has been suggested that media campaigns, and incorporating climate education into school and college programs, can enhance knowledge and the ability to adapt.
- It is suggested that encouraging livelihood diversification through government development programs.
- It has also recommended that support for small-scale businesses should be introduced to reduce training dependency on agriculture and livestock.

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