



## Climate Change and Climate Justice in Rural Sindh: Evidences and Experiences from the Rural-Based Population of Khairpur District

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### ABSTRACT

The present research study was carried out to collect the evidences of the climate change impact on the local communities of district Khairpur and to understand the views of people how they experience the climate change impact on their lives. The current study was undertaken employing the qualitative research methodology with a small sample size of villages aging from 25 to 65 age from a single union council. Qualitative research cannot be generalized as qualitative findings are generalized where large sample size is selected to collect the data. The study was carried out on four major areas of the climate change stressors which are Changes in weather patterns, floods, heat waves and heavy rains. All four stressor have direct severed effect on the lives of rural-based population. The findings of the study reveal that climate change has severe impact on the lives of common people which bear lots of pain in terms of agriculture loss where their standing crops are vanished away, their homes are destroyed completely, livestock is dying off due to the diseases spread and lack of pastures in the vicinity where flooded water stand. Other than this, findings tell us that the role of government seems very pathetic towards the affected people of district Khairpur where score of people have no food items to eat, no shelter to live in and other temporary things at the time of heavy rains and floods. This study can be a torch bearer for the policy makers, governments to formulate the policies according to the ground realities. The vulnerabilities of people due to these climate change stressors are visible to governments. Hence, Climate disasters are affecting every corner of the Sindh, and its marginalized communities are left to face a disproportionate share of the impacts of climate change which is violation of UN Framework for climate change.

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## 1. Introduction

The climate change impact on human societies and eco-system is already observed, however; evidently the IPCC reports during 2018, 2019 and 2020 have discussed much more about this phenomenon (IPCC, 2018, 2019). Climate change is causing rising temperatures, shifting patterns of precipitation, and an increase in the frequency of extreme weather events, all of which have a negative impact on food and livelihood security, land degradation, and an increase in the number of people displaced (Zommers et al., 2016). In the report of Global Peace Index 2019, the major portion of the population of the world in present times is located in the regions which are declared high risk areas, however; mainly the under developed and developing countries where climate changes hazards are inevitable wherein women, young old aged are at risk of the climatic hits. Pakistan has been declared high risk zone in the reports of IPCC, 2018, 2019 (Climate Change, 2023; IPCC, 2018; Synthesis Report, 2018). Studies reveal that climate change impacts are perceived and experienced differently by the different people in various regions of the world. According to Ayebe-Karlson et al., while there are a lot of studies on the

effects of climate change, there are few that look at people's different perspectives and experiences. This paper studies the climate change impact on the lives of rural population of Sindh province of Pakistan on account of the peoples perspective who are directly affected from the climate change. Sindh province has diversified population which is settled in deserts plains, mountains and coastal belt.

From the methodological perspective, this research is innovative because in the geographical context qualitative research has not yet gained the ground in this part of Pakistan, however; there are many studies available in quantitative research methodology. Qualitative research studies are conducted all around the world which supports in exploring the peoples perspectives towards their sufferings. Reviewing the literature on the topic, the researcher found very rare work on this topic which requires huge and in-depth study on this area of study. Small numbers of studies are available in this context on the topic which gives a clear picture from the peoples' perspectives.

The current study has wide scope in the context of present situation where climate change has become global problem for major parts of the world and Pakistan come sunder those countries where climate changes effects are visible. Climate change stressors such floods, heavy rains, heat waves, drought are frequent in Pakistan many parts. Heavy rains and flash floods have brought Pakistan at the brink of severe consequences of economic losses mainly, however; the losses are unbearable. The present study reveals the facts from the perspective of peoples lived experiences that how they experienced these climatic hits. The study opens up new dimensions for the policy makers and governments to revisit their policy fireworks according to the current situation.

## **1.1. Theoretical Perspective of the Current Study**

### **1.1.1 Social-Ecological Theory**

This theory is interdisciplinary framework in for understanding the complex relationship and interaction process of human societies and the natural environment. This theory tells the co relationships of social and ecological systems which according to this theory evolve together and bear the effects for societies. The theory has been used by multiple disciplinary researchers. This theory makes a sense of understating the relationship between human activities and environmental outcomes. The theory describes that the socio-ecological systems are complex and uncertain to predict the environmental outcomes. The theory suggests the adaptive management measures and strategies as a response. In nutshell, this theory is an important component to understand the complexity and dynamic conditions of human societies and natural environment which pave the ways for policy makers to formulate the policies accordingly.

## **1.2. Research Objectives**

The present research study has been carried out in those areas of district Khairpur Mirs which are severely affected by the changes in weather pattern whereby huge population has surfed a lot due to the heavy rains falls and floods mainly. The major focus of the study was to understand the climate change patterns from the people perspectives what they are thinking about this concept and how did they face the severity of weather havocs, their way of dealing with these disasters. This study will make a sense to comprehend the situation in which people are facing and cop with the real hardships of the climate changes impacts in their lives. The researchers chose three major climate stressors which are frequently happening in these areas which are given below.

1. Weather patterns shifting
2. Floods
3. Heavy Rains

## **2. Review of Literature**

### **2.1. Future threats of Global Warming to these Areas**

According to the studies, the future threats are inevitable in the future to these areas which are vulnerable to the risk of future climate changes. Mainly the northern regions will be severely affected due to the rise in temperature as compared to the global rise. The frequency of day and night rise in temperature is projected to be rise in future. Major crops such as wheat and rice are expected to be decreased significantly. Rainfall may increase in Upper Indus Basin and may decrease in Lower Indus Basin (Chaudhry, Ahmad, Rashid, & Uddin, 2017).

## **2.2. Understating the Concepts of Climate Change in Pakistan**

Pakistan is a country declared disaster-prone high risk country ranked in the fifth number due to the extreme weather in the interval of 1999 and 2018 (Eckstein, Künzel, Schäfer, & Winges, 2020). In the views of Rahman A, 2015, Pakistan is a country which heavily relies upon the agriculture economy (Rehman et al., 2015). So far, rising temperature and water scarcity along with the monsoon changing patterns bring heavy losses to the millions of the people in the region. Pakistan is suffering from poverty and other socio-economic problems, however; on the other hand climate changes have greatly affected the population. In the views of Abu Bakar 2020, Pakistan has witnessed 152 extreme weather events wherein 9989 lives received death and also suffered net worth of 3.8 billion during the years of 1998 to 2018 (Abubakar, 2020).

There is a score of research studies available on the climate change impacts on the human societies but mainly on food security (Gorst, Dehlavi, & Groom, 2018). Previous studies show that Pakistan is disaster-prone region in the world due to the rising temperature, heavy rains, melting of glaciers, and agriculture fields. Although, there is little literature available on the attitudes of people of Pakistan in the context of climate change impacts on their lives, livestock and their concepts and their attitudes of adaptation the climate changes. There is very little work done on the coupling strategies and adaptation measures taken by the people during the disasters and what are their problems and hardships to face these gradual climate changes. The present research study aims to fill the knowledge gap employing the people-centered and narrative-based approach to understand the impact of climate change through their lived experiences of those people who are frontline in climate change in Sindh province of Pakistan.

There are major sector which contribute significantly in the livelihood system of human societies globally such as agriculture, plantation and fisheries. Climate change severely affects the local communities' mainly rural based communities in developing countries. When the climate change affects the agriculture then it means overall economic system goes downward. Due to the rainfalls, the major crops bring low yielding which directly affects the life of communities (Rusmayandi, Hertini, Harahap, & Nugroho, 2023). Climate change affects agricultural production through changes in temperature, rainfall patterns, and extreme weather events. Temperature changes can affect crop yields, nutrient content, and planting and harvesting time. Changes in rainfall patterns can affect water availability for irrigation, causing low results and the quality of agricultural products. Extreme weather events such as floods and landslides can damage crops and infrastructure, causing significant losses in agricultural production.

## **3. Research Methodology**

The current study was undertaken employing the qualitative research methodology which gives an in-depth insightful data from the people perception that how do they experience the impact of climate change on their lives. In the views of Creswell and Creswell (2017), qualitative research design is employed wherein a researchers does want to explore phenomena from the peoples perspectives that how do they see the events and incidents in their lives. This can be carried out only in natural settings to collect the insightful data from targeted research participants (Creswell & Creswell, 2017).

### **3.1. Population**

The population for the present study was only those people who are severely affected in the climate changes stressors.

### **3.2. Sampling Types**

The researcher used purposive sampling for the current research study which is used when researcher does want to collect the data from targeted participants who have lived experiences of any happening or even in their lives.

### **3.3. Sample Size**

The researcher collected the data from 15 research participants who experienced directly the impact of climate change on their lives. The present study was carried out on self-funded with the support of local communities of the district Khairpur Mirs which is more affected in the recent flash floods and heavy rains. In the study, 15 research participants contributed through sharing their views. The total responded in the research were 20 of which 15 were male and 5 included the female belong to the rural communities across the district.

The researcher collected the data using note taking technique with the assistance of research assistant to accomplish the task in minimum time period. The research participants were local community members including teachers, university students, and old aged male and female, farmers' daily wage earners. The researcher used the open ended questions which allow respondents to share their lived experiences in natural settings. Before conducting the interviews of the research participants, each respondent was given general overview regarding the research study that they can make their mind to share conveniently their views on the topic. Each interview lasted for 30 to 45 minutes from each respondent which was then translated into English for data analysis process which was then done through thematic analysis to write the research findings. The interviews were conducted in Sindhi Siraiki, however; each interview lasted between 30 and 45 min. All research data were transcribed and translated into English after each field visit and later a thematic analysis of the interviews was carried out.

### **3.4. Why Narrative-Focused Approach**

Qualitative research approach basically is focused on the collection of words spoken by the people about any phenomenon. It is mandatory for the policy makers to first understand the shared views of affected population and attitudes, beliefs, experiences towards climate change impacts. It is pre-requisite to involve the local affected communities and all stakeholders who are directly disaster-prone and comes in the line of climate change impact. This would be convenient for the policy makers and other governing bodies to formulate policies and plans accordingly (IPCC, 2019). It is crucial to know what people actually think and what are their views towards the targeted research problems such as climate change impacts on their lives? This approach could give the other side to know much more about the phenomenon of interests. This approach provides insightful data on the phenomenon of interest through different perspectives, beliefs, and experiences on understanding the climate change impact on human societies which may be not acknowledged yet. The shared views, stories and lived experiences of the research participants towards climate change impacts on human societies accelerate the collective decision making for different stakeholders in joint collaboration (Moezzi, Janda, & Rotmann, 2017).

Given the trans-disciplinary nature of climate change, offering diverse perspectives using a people-centered and narratives-focused approach can help foster understanding and collaboration between actors for context-specific climate action and policy changes. This is important, because climate impacts vary based on context, sector, geography, and resource capacity. In addition, highlighting climate change narratives of under-represented people from developing countries is crucial to provide a more holistic picture of the global climate impacts and the different adaptation needs in different contexts and at different scales.

1. Changes Weather patterns in district Khairpur Mirs
2. Heavy Rains
3. Floods

### **3.5. Research Sites**

Researcher selected the areas of the district Khairpur mirs which are severely affected by the climate stressors where people suffered a lot due to the changes in weather and its impacts on the lives of people. The researcher went through the extensive review of literature in understanding the most severity of climate change stressors for obtaining the data from the affected people who experienced directly. The researcher focused on major stressors which have high scale impact on the lives of people such as changes in weather patterns, floods and heavy rains. The researcher conducted research at 10 locations in the district of Khairpur mirs.

**Table 1**

<b>District</b>	<b>Taluka/Tahseel</b>	<b>Province</b>	<b>Number of respondents</b>	<b>Climate stressors</b>
Khairpur Mirs	Kot Diji	Sindh	7	Weather change patterns, Heavy rains
	Kingri		4	Heavy rains, Weather change patterns,
	Gambat		6	Flash flood, Heavy rains, Weather change patterns,
	Khairpur		3	Heavy rains Weather change patterns,
			20	

## **4. Research Findings**

This section will describe the impacts of climate change on the lives of people through their lived experiences in the district of Khairpur Sindh province of Pakistan. We will see how research participants have responded about the changes of stressors and its severity and frequency in different parts of the province. Then well will go on describing the effects of the climate on their lives. This is basically an analysis that how people who are directly facing the situation feel the pain and severity of its impact on their life and what are their coping strategies during the happenings of stressors. The findings of the study will reveal through the discussions on the impact of stressors and its impacts on the lives of people. End of these sections will be based on the recommendations for the key policy makers in respective affected areas. This section will be based on the four major climate stressors which have been experienced by the people through their lived experiences.

### **4.1. Changes in Weather Patterns in Khairpur District**

Climatic changes have a direct impact on weather patterns, particularly precipitation. Surface evaporation increases as temperatures rise, resulting in a higher atmospheric concentration of water vapor and heavier downpours. When it is raining in the mountainous areas, this can result in devastating floods (Trenberth, 2011). Alternately, increased evaporation caused by global warming may aggravate drought conditions in arid regions. The research participants in all of the research study observed shifting changes in weather patterns and discussed the deficient in precipitation, temperature changes, and onset of the seasons in their regions. Respondents from other parts of Sindh province shared observations about the unpredictable nature of rain, addressing its effects on agriculture fields: "There were times when our old-aged people who were famous in their predictions of weather forecast but these days even their predictions do not work due to the climate change.

" I am well remembered the days when the summer seasonal winds were blowing in lovely normal pace but all of sudden these winds are no more tolerable even, however; same conditions we felt in the rainy seasons wherein unusual rains and storms happened in the area unexpectedly."

This exemplifies how shifting weather patterns are making it easier for new pests to emerge and causing crop damage. Because date palm fruits are sold worldwide and throughout Pakistan, crop losses can have a significant impact on farmer incomes and export revenues. According to one of the respondents, the effects of the shifting weather patterns can also be seen in crop yields and quality, as well as in delayed harvesting:

"We used to harvest all of our wheat in November; currently, the weather delays the process. Also, the harvest doesn't ripen right. We cut and gather it, but the quality of the wheat has decreased from before."(Zulfiqar Ali, 2022).

#### **4.1.1. Heavy Rains**

Usually rains are considered blessings of nature itself, however; in Sindh province of Pakistan rains have been experienced one of the bad experiences of the life by the people. Recent heavy rains brought the unbearable losses of their loved ones, livelihood, standing crops in the fields, homes destruction as well.

"It is beyond sharing my feelings towards the losses we received during these monsoonal rains which turned as havoc we people. No one can feel the pain of our heart and mind but we ourselves can feel only how we are living the lives in these hard days. People in big cities are enjoying their lives as usual but we the rain-affected people are at stake. Nothing remain here everything is washed away, our homes, livestock, crops." (Allah Bachai 65 age from Kot Diji).

Kot Diji is most affected area of district Khairpur where people received great losses. Given below are the shared experiences of those affected population in the natural disaster of heavy rains in 2022 of monsoonal rains.

"Throughout my life, I have never experienced such unusual happenings of the rains. The winds are no more human friendly, the rains are turned as human enemies. I had goats and all these dead due to heavy rains of the whole week. My hut is no more and I am sitting in an open

sky without any shelter. Rains are no more blessings for humans now on the other hand these are now wrath of God." Abdul Gaffar age 75 from Kot Diji ).

"We the rural-based people mainly depend on the seasonal crops and live stock to run the business of life. This season become the greatest material loss during the heavy rains of monsoons 2022. Standing crops, livestock and homes are destroyed and nothing remains in hand. We are shelter less to live in the tents which we had never experiment throughout our whole life. There was a flood during the Ayoob era and Bhutto era but it was not destructive as this was actually." Ali Hassan age 56 from Kotdiji tahseel.

#### **4.1.2. Floods**

World has experienced irrecoverable losses in the natural disasters in major regions of the world. Climate change phenomenon has impacted brutally in many parts of the world. Climate change has been perceived differently by people in different areas. This study is carried out by the researcher on the perception of rural-based population to explore how they see this phenomenon and what are their personal experiences in their routine life due to the weather havocs. Recent flood have sever hit the rural based population in Sindh and Baluchistan.

"We have been living in reverine since our forefathers but have never been experienced such a horrific and devastating flood this time occurred in our area. The flooded water washed all the standing crops and livestock which we could not bring out from the villages. The water was unstoppable for days and great losses we received during this flood." Lutifillah Age 72 Tahseel Gambat.

Muhammad Khan is a farmer who cultivates some 10 acres of agriculture land of local landlord. He expressed his lived experiences of the current losses he has received in the floods. "Even though we become happy having received the normal flooded water in the reverine but this flood was unbearable for we people which brought havoc itself. We the remote rural-based population entirely depends on the seasonal crops and livestock but in floods our agriculture lands were completely washed away in the flooded water." Muhammad Khan age 65 Tahseel Gambat

"I cannot express my pain of the recent floods and heavy rains which proved a wrath rather than blessings. We had never experienced such flood water in our life. Government is incapable of extending the support to the affected population of these areas."

## **5. Conclusion**

This study was carried out employing the people-centered approach in order to know about the impact climate change impacts from the perspectives of people who are directly affected. Through this data policy makers can conveniently formulate the policies on the behalf of people perception and beliefs. It was revealed and understood that many people yet cannot understand the proper definition of the term "climate change" mainly in remote areas of the Khairpur district. however; the areas which are closely connected with the urban sites and read daily Sindhi newspapers could translate the meaning of term climate change and its impacts. The findings of the present study tells that majority of people have become known to the climate change impacts on their lives, however; yet there is number of people who do not believe in climate change impacts. Government and non-government organizations have played role in public awareness to tell about the climate changes impacts. These organizations conduct the trainings and awareness programs for the local communities regarding the climate change impact and adaptation measurements. In the views of people weather is changed and climate change has direct impact on the human societies. "According to the United Nations Framework Convention on Climate Change (1992), countries should respond to the climate problem "on the basis of justice and in line with their distinct capacities and common but differentiated responsibilities." Therefore the inequality and climate injustice perpetuates much more than the long-lasting crippling effects of climate. Government and international community should advance in climate justice and economic justice, and advocate ending key domestic and international policies that keep people trapped in poverty.

### **5.1. Research Findings and its Justifications**

The present study was undertaken adopting the qualitative research approach by the researcher. Qualitative research is flexible as compared to the quantitative because this approach

has entirely different world view as compared to quantitative approach. Since its application, there have been lots of debates between the positivist and anti-positivists on whether the qualitative research brings the findings can be generalized. Qualitative research studies are undertaken to know the social reality through the people perspectives based on their lived experiences. Hence, this study produces the findings from the peoples perspectives to know about the social world.

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