

Perceptions of Farmers about Socio-economic Impacts of Drought: A Case Study of Mastung District, Balochistan

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ARTICLE INFO

Article History:

Received: December 22, 2024
Revised: January 16, 2025
Accepted: January 17, 2025
Available January 18, 2025
Online:

Keywords:

Drought; Farmers' perceptions;
Coping strategies; Balochistan;
Mastung

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ABSTRACT

Drought is one of the most complicated natural disasters, affecting more people than any other natural disaster. There has been an increasing trend in the number of disasters reported globally over last few decades. Balochistan is among the areas which are arid and drought affected. This study was conducted in Balochistan region with the help of 200 samples of farmers from Mastung District. The farmers were interviewed helping study drought perception in the selected area. The objectives of this study were to find the impact of Mastung district drought how it has impacted the people in the region and what strategies people of Mastung district are taking to overcome this drought. Analysis shows the residents of Mastung District had a fair amount of understanding of climate changes. A vast majority of respondents (95.5%) reported experiencing drought occasionally. The vast majority of respondents 96%, reported that climate change is influencing drought intensity and frequency. The results about effect of drought on household income show that drought has impacted household income and caused significant challenges for the households. Almost all the respondents have reported decrease of livestock numbers due to drought. Results show that drought has a largely negative impact on crop yield, with most of respondents reported moderate declines in crop yield due to drought. A vast majority (98%) of respondents indicated that drought has moderately reduced employment opportunities in the area. All of the respondents confirmed that drought causes malnutrition among children. 57 % of farmers think that there are disputes over water for irrigation use in Mastung District. There are some drought mitigation strategies adopted by local people including storing grains, storing crop residue for livestock and the use of drought resistant crop were other coping strategies. The government and non-governmental organizations should assist the local population in strengthening the communities' resilience by increasing their capacity for adaptation in order to lessen the effects of drought.

Introduction

The number of disasters around the world has been increasing steadily over the last decades. Recent years have seen a rise in the number of disasters and the trends pertaining to global climate change will only worsen this tendency. Drought is one of the major dangers to people's livelihoods and the socioeconomic development of communities and causes considerable damage as it affects tens of millions of people annually and contributes to famine and malnutrition in millions more (UNISDR, 2007). Drought is a creeping phenomenon that develops slowly over time, and its effects are visible even after the climatic conditions turn to normal. Drought is the most tricky but less well understood natural hazard and affects more people than other natural hazards (Hagman, 1984). Drought is a well-recognized issue and almost all climatic regions experience drought, which is a regular and recurring aspect of the climate (Sivakumar & Wilhite, 2002; UNISDR, 2003). It is well-known that drought is a type of disaster which is unavoidable and can affect society, the economy, and the environment in a variety of ways. Food insecurity, decreased agricultural yields, animal losses, forced land sales, forced sales of household belongings, declining health, migration, civil unrest/conflict, famine, and the influence on the country's economy are a few of these. (UNDP, 2012). Understanding the causes and effects of drought is essential for reducing risk before it arises and for planning practical remedies when it does (Sivakumar & Wilhite, 2002). Similarly, perception is a necessary precondition, it is crucial to understand the public perception regarding drought.

Pakistan's lower southern region experiences an arid and hyper-arid climate. One of Pakistan's most vulnerable regions to drought is Balochistan, where severe droughts have been documented in 1967–1969, 1971, 1973–1975, 1994, 1998–2002, and 2009–2015 (UNDP, 2015). Drought is a major threat to livelihood of people in rural Balochistan (Rehman et al., 2019). Drought has affected people's quality of life in areas affected by drought (Anjum et al., 2010). In Balochistan, the drought killed almost 2 million livestock and impacted about 1.5 million people (Anjum et al., 2012). Drought has affected every sector of life in Balochistan province and remains a devastating natural disaster (Rehman & Alamgir, 2018). People's livelihoods in the Mastung district were badly impacted by the drought. A number of people left the area and moved to nearby towns.

A closer look at the literature reveals that little research has been done in Balochistan to examine how farmers view the drought and how farmers are managing it (Ashraf & Routray, 2013). This study is an attempt to explore the perceptions of people about drought in the Mastung area. A deeper understanding of drought perceptions and coping strategies, as well as how these effects propagate through society and the demographics of the impacted population, are crucial to manage long-term drought. The primary goals of the research are to investigate how the farmers view drought and its socioeconomic impacts, and how they cope with drought. Moreover, to make recommendations about how to better manage the negative effects of drought.

The objectives of this study are following:

- To explore farmers' perception of drought in the study area
- To analyze the perceived socio-economic impacts of drought
- To analyze strategies for coping with drought

Material and Methods

A case study design was used and both primary and secondary data and information were gathered using both quantitative and qualitative methodologies in this study. Mastung District in Balochistan, Pakistan, is distinguished by its distinct environmental and socioeconomic characteristics. Prior to 1991 Mastung was part of Kalat district. The Mastung district has an area of total 3,308 square kilometers, and the district consists of three Tehsils of Dasht, Kirdgap and Mastung, and 13 Union Councils (GoB, 2011). The district's main industry is agriculture, and apples, a vital cash crop for the community's economy, are produced in considerable quantities. Mastung district lies in Kalat Division of the Balochistan province, Pakistan. The geographical location of Mastung is between 66°11'34"- 67°25'59" East longitudes and 29°20'13"-30°15'8" North latitudes (Figure 1). The region receives insufficient rainfall, but during the winter, snowfall occurs in the Mastung and Dasht valleys. (GoB, 2011). Mid-April marks the beginning of the summer season, which lasts until mid-September. The hottest month is July (DCR Mastung, 2020). While Mid-September marks the commencement of the winter season, which lasts till mid-April. It is extremely cold in December, January, and February, with January being the coldest. During the winter months of January through March, the majority of precipitation occurs.

As for the Mastung district, as per the 2023 census, there are a total of 43,695 households with a total population of 313,271. Mastung District has a sex ratio of 113.70:100 and literacy ratio of 45.97%: 57.26% (male) and 33.27% (female) (DCR Mastung, 2020). The total population of 313,271 in the district is distributed with an average population density of 80 persons per square kilometer. Nearly 87% of total population resides in rural areas as a result the urban population amount to only 13% is concentrated mainly in the district headquarter town Mastung. Male population constitute around 52% and female population makes 48% of the total population of the district. Average household size in the district is 6.9 persons per house (GoP, 2017). Baloch and other minority groups make up the majority of the population in Mastung District, which has a diverse demographic profile. Brahui and Persian are the two main languages used in Mastung district. Raisani, Shahwani, Bangulzai, Muhammad Shahi, Mengal, Syeds, Sarparah, Kurd, Lehri, Lango, and Dehwar are some of the district's most prominent tribes (GoB, 2011).

Sampling

The sample size for this study was chosen using a multi-stage sampling process, as adopted by earlier studies. In the 1st stage, we had purposively selected Mastung district from Balochistan province because it's severely affected by droughts. In the 2nd stage, we have selected the two most drought affected Tehsils out of the total three Tehsils in Mastung District through purposive sampling. In the 3rd stage, from each of the two selected Tehsils, we had randomly selected two most drought affected Union Councils. In the 4th stage, we had selected the two most drought affected villages from each of the four selected Union Councils. In the final 5th stage, we had randomly select 25 farmers from each drought affected village. Therefore, we covered a total of 200 sample farmers in our survey.

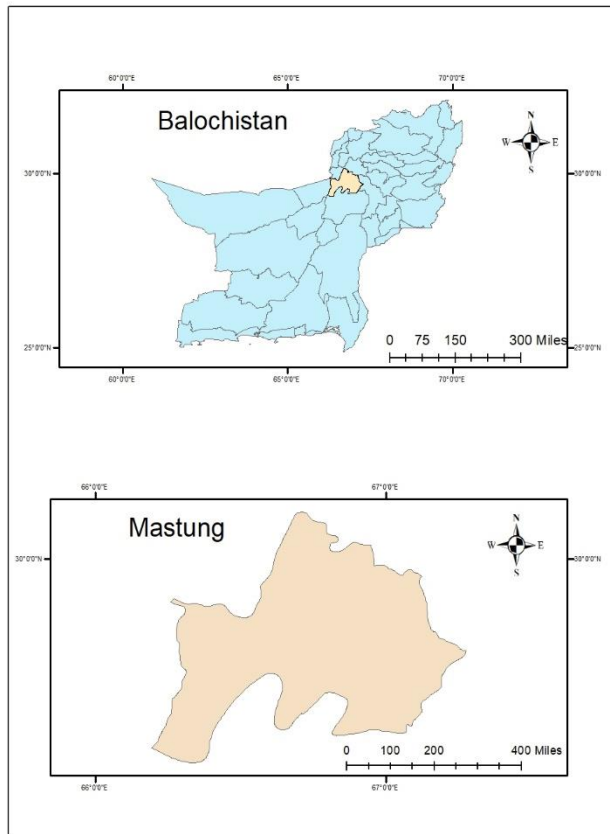


Figure 1: Location Map of Mastung District.

Data Collection and Analysis

Both primary and secondary data will be considered during the research. Key informant interviews, field observations, and household questionnaire surveys will be used to collect the primary data. Research journals, official government records, assessments on the drought conditions assessed by international aid organizations, policy documents, and websites are some of the secondary data sources. Microsoft Excel and SPSS were used to analyze the collected data. Tables, maps, and graphs of the collected data were also created. Numbers and percentages were used to analyze the data.

Result and Discussion

Socio-economic Information

The results about the respondents' age show that the majority of respondents are middle-age to older. The majority of respondents fall within the age group of 51-60 age group which accounts for 47% of the total sample size. The second most represented age group is 41-50 with 37% respondents. All of the respondents were male. The results show that the majority of respondents have lower level of education. Majority of respondents (80.5%) have received only primary level education while 19% respondents have secondary education. Only 1 respondent (0.5%) have higher secondary education. Results regarding the respondents' sources of income show that most respondents rely on labor-based roles within the agricultural sector with 75.5% as agriculture labor. Wheat is the main growing crop in the study area. Most of the respondents grow wheat with some other crops but wheat is the primary crop. Other leading crops are tomato and vegetables.

Also grapes with other main fruits produce in the area. Majority of respondents (86.5%) had land holding from 1-5 acre. Only 1% of the respondents have land holding of 11-15 acre. Most of the respondents (55.5%) had between 16 to 20 livestock and about (35%) had more than 20 livestock before drought.

Causes of Drought in Mastung

The analysis of the causes of drought, as perceived by respondents, reveals that climate change, deforestation, and poor water resource management are the primary perceived drivers of drought in the study area (Figure 2).

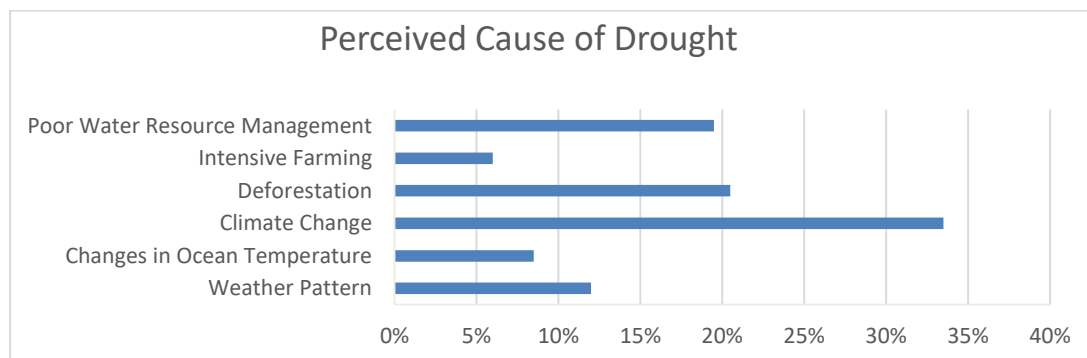


Figure 2: Farmers perceptions on causes of Drought in Mastung

The results demonstrated that Mastung District respondents had relatively high level of awareness about climate change. Farmers experiences about drought when the farmers were asked how often you experience drought, surprisingly, the vast majority of respondents (95.5%) reported experiencing drought occasionally. This is surprising given the fact that drought is a recurring phenomenon in most of Balochistan. While a small portion of 4.5% indicated that they experience drought frequently. The vast majority of respondents 96%, agree that climate change is influencing drought intensity and frequency when they were asked whether climate change is affecting the intensity and frequency of droughts. This shows that climate change is a significant factor affecting drought.

Impacts of Drought in Mastung

The results about effect of drought on household income show that drought has impacted household income and caused significant challenges for the households. 98.5% respondents reported that drought has moderately decreased their household income. While 1.5% of respondents stated that their household income has been severely decreased. In conclusion, the data gathered from Mastung District indicates that a significant percentage of the farmers consider income loss to be a major source of worry. Respondents' reported that drought largely affects livestock through poor health and reduced productivity (Figure 3).

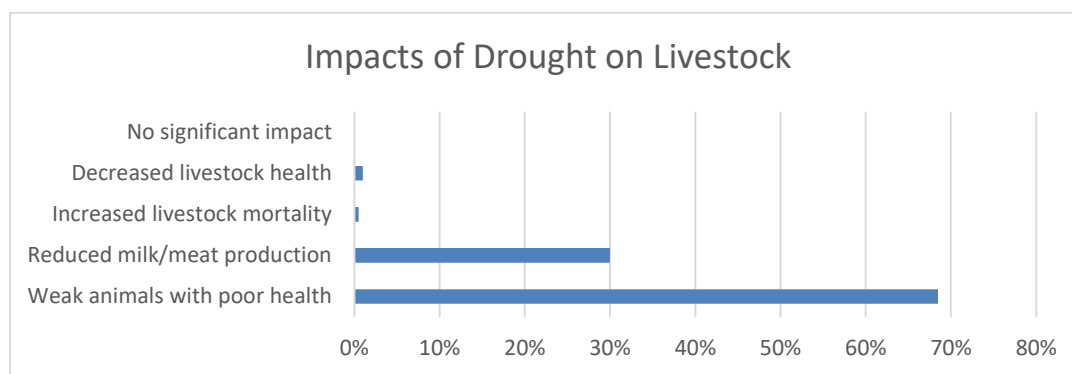


Figure 3: Impacts of drought on livestock

Almost all the respondents have reported decrease of livestock numbers due to drought. This shows how badly drought affects the sector and impacts communities. Results show that drought has a largely negative impact on crop yield, with most of respondents reported moderate declines in crop yield due to drought. This is a significant impact of drought on agriculture. The respondents' perceptions of the effect of drought on employment opportunities reveal that vast majority (98%) of respondents indicated that drought has moderately reduced employment opportunities in the area. This shows significant drought impact on the economic activities of the area. The results on respondents' views on effect of drought on education of children show that no extreme disruption occurred but still it has its effects. Majority (97%) has perception that drought has moderately affected children's education. The other responses are given in the figure about effect of drought on access of children education. From the study results critical social and health challenges were found which are associated with drought. All of the respondents confirmed that drought causes malnutrition among children. This highlights the severe implications of drought on health. The results from this study show that drought has significantly affected food availability for most households, largely in a moderate but impactful way. This emphasizes the need for measures to improve food security and support agricultural resilience during drought conditions. For majority of respondents' (99%), drought has moderately worsened their food availability. A significant portion of farmers (57%) think that there are disputes over water use for irrigation in Mastung District.

Respondents' Coping Strategies against drought

About 50% respondents reported storing grains as their primary coping strategy. Storing crop residue for livestock and use of drought resistant crop were other coping strategies with 26% and 17% respectively. Thus, more or less it is clear that agriculture and water management strategies are important for the farmers of Mastung district to tackle probable impacts of drought on their livelihoods during normal years (Figure 4). Farmers can use these concerns as guidance to implement actions and interventions that will strengthen the district's resistance to drought.

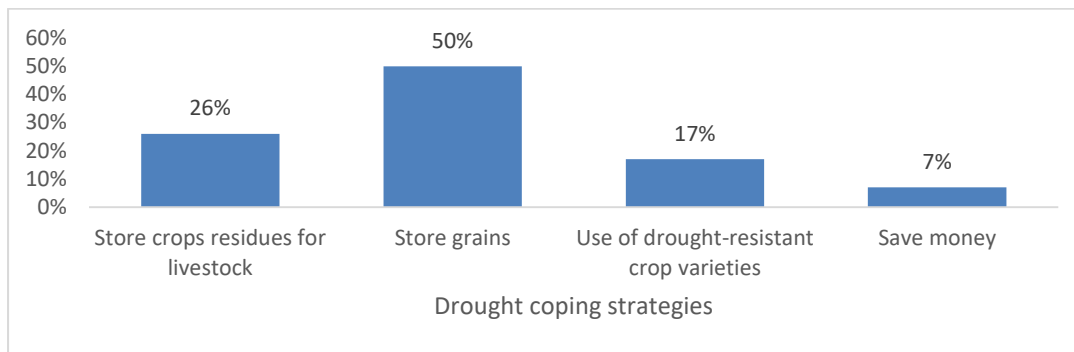


Figure 4: Drought coping strategies

The respondents were further asked about their views on additional measures to support farmers during drought. These findings show that financial aid is viewed as the most critical measure to support farmers with 71.5% of the respondents think that it helps farmers cope with the economic challenges posed by drought. The rest 28.5% endorsed better access to drought-resistant seeds, improved irrigation infrastructure and weather forecasting. This highlights the importance of preparing farmers with adaptive agricultural resources to withstand agricultural production during adverse drought conditions, the use of better infrastructure for irrigation and dissemination of information. The results show that majority of respondents 86% reported receiving support from the government or NGOs. But there is still a need to address the challenges faced by the remaining 14% who have not received any support. This reflects gaps in the coverage or accessibility of aid.

Conclusion

It is evident that drought has affected the people in the area badly. People have sold their livestock which is a major asset for agriculture community. Large number livestock have been sold due to drought. There was also a significant impact of drought on agriculture. Respondents' perceptions of the effect of drought on employment opportunities reveal that vast majority (98%) of respondents indicated that drought has moderately reduced employment opportunities in the area. respondents' views on effect of drought on education of children show that no extreme disruption occurred but still it has its effects. Majority (97%) has perception that drought has moderately affected children's education. From the study results critical social and health challenges were found which are associated with drought. All of the respondents confirmed that drought causes malnutrition among children. This highlights the severe implications of drought on health. The results from this study show that drought has significantly affected food availability for most households, largely in a moderate but impactful way. A significant portion of farmers (57%) think that disputes arise over water use for irrigation. This is due to the fact that lands with irrigation facilities produce more crops than lands without irrigation water sources. About 50% respondents reported storing grains as their primary coping strategy. Storing crop residue for livestock and use of drought resistant crop were other coping strategies with 26% and 17% respectively. A smaller portion of 7% respondents reported money saving as a strategy. These findings show that financial aid is viewed as the most critical measure to support farmers with 71.5% of the respondents think that it helps farmers cope with the economic challenges posed by drought. The results show that majority of respondents 86% reported receiving support from the government or NGOs. But there is still a need to address the challenges faced by the remaining 14% who have not received any support. This reflects gaps in the coverage or accessibility of aid.

Recommendations

A comprehensive strategy involving farmers' community engagement, resilience-building through economics, and targeted assistance is required to address this issue and lessen the detrimental effects of lower revenue on livelihoods and overall well-being. As Drought has significantly affected food availability for most households, largely in a moderate but impactful way. Therefore there is a need for measures to improve food security and support agricultural resilience during drought conditions. To inform policies and interventions aimed at encouraging sustainable water use and resolving disputes in Mastung District, more detailed research on the causes of these conflicts would be useful. These findings show that financial aid is viewed as the most critical measure to support farmers with 71.5% of the respondents think that it helps farmers cope with the economic challenges posed by drought. The rest 28.5% endorsed better access to drought-resistant seeds, improved irrigation infrastructure and weather forecasting. This highlights the importance of preparing farmers with adaptive agricultural resources to withstand agricultural production during adverse drought conditions, the use of better infrastructure for irrigation and dissemination of information. The local population has received some relief measures from the government and non-governmental organizations, but they still believe that these organizations should do more to help them. The government and non-governmental organizations should assist the local population in the district to strengthening the communities' resilience by increasing their capacity for adaptation in order to lessen the effects of the drought. Furthermore, small dams and water reservoirs should be built to deal with drought.

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