



Review Article

Impacts of Climate Change on Rural Livelihoods of Muzaffargarh Farming Community, Punjab, Pakistan

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Abstract | Global climate change is a change in the long-term weather patterns that characterize the regions of the world. So, if we look at the situation in Pakistan it is affecting rapidly that's why Production and growth rate of Agriculture is badly affected because of it. Its destruction on Agriculture sector is massive in Pakistan. Changing in climate is directly affecting the livelihoods of Agricultural communities in Pakistan. It has also become the reason of rising temperature and lot of other problems in agriculture sector like food production, quality, and quantity of food is decreasing. Rising temperature effecting yields a lot in sense of production. The worst and biggest effect of climate change is flood. Around 3.4 million hector area of agriculture damaged by flood during 2010 and 2011 and now in 2022 same as previously 9.1 million acres agricultural land is affected by floods and now the flood situation is worse than the past. Being an agrarian country more than 70% labour force of Pakistan depends on the agriculture. Due to climate changes people living or depending on agricultural sector for their livelihoods are facing much serious problem as their production in agricultural sector is much less than before. People of Pakistan facing so many challenges regarding Livelihood because they are depending on the output of their farms which is affecting severely. This study was conducted in district Muzaffargarh, Punjab, Pakistan.

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Introduction

In all over the world of developing countries Unequal distribution and inadequate usage of water is reduced in these days. Completely water availability is useful to produce agriculture. In agriculture threat of climate change is increased due to raise the level of

soil salinity especially in watered crops. These crops provide forty percent food to the world (Anbumozhi *et al.*, 2012).

Change in climate impact on crops by three ways. Firstly, change of rainfall duration and temperature cause soil moisture. Secondly rise of temperature

condition effect on the production of crops. Suitable environmental condition is necessary for crops. A small change in temperature causes the bad effect on crops yield production. Thirdly, raise in the level of carbon dioxide improve production in some crops (Habib *et al.*, 2022; Abassi *et al.*, 2019; Habib *et al.*, 2017; Houghton *et al.*, 2001).

Mostly 70% of labor force depends on the agriculture. For their livelihood poor farmers are facing the different problem by change in climate condition (Habib *et al.*, 2022). Therefore, the boost up flexibility of the forming sector, guaranteed of food security and decrease rural poverty by their effort to formally alternated method to save from climate change scenario (Siddiqua *et al.*, 2019; Dilshad *et al.*, 2019; FAO, 2011).

Climate change is severe threat for Pakistan in these days. Climate changes and its effect is severe risk on Agri crop and livelihoods. Particularly climate change effect on poorest population, due to its negative impact on human health and food security (Habib *et al.*, 2016; Huq *et al.*, 2004). The agriculture is important sector of Pakistan economy. In rural areas of Pakistan about 70% population is living, where mostly people depend on agriculture production (Zahra *et al.*, 2017; Anwar, 2010).

Research questions

Do agricultural livelihoods impact by climate change hazards?

Theoretical framework

The theoretical framework introduces and describes the theory that explains why the research problem under study exists. The theoretical framework of the present study is based on the Ricardian theory of global warming. He claimed that carbon dioxide emanation and other greenhouse gauss are working behind the high temperature. Moreover, this rapid increase in global temperature causing numerous problems like global warming, unexpected rainfall etc. he also claimed that carbon dioxide is a main cause of high temperature. Traditional estimation technique (which is based on analysis by using production function) was used by Ricardo to examine the impact of climate change on agriculture production. The focus of Ricardian theory was the association between agriculture production and climate changes. This theory revealed that the climate changes push up

to global warming and ultimately reduces agriculture output (Mendelsohn *et al.*, 1994).

Significance of study

Pakistan's economy is an agriculture-based economy and the productivity of agriculture sector badly affected by climate changes. The main of objective of this study is to find out factors responsible for poor agricultural performance linked with climate change hazards with reference to Muzaffargarh. As this district is producing major agricultural crops such as wheat, cotton, sugarcane etc.

Review of literature

Environmental changes are the cause of the failure of the production of agriculture and household insecurity in many parts of the world. Previous years the ratio of temperature intensity and drought is increased. This caused badly especially to the agricultural sector (Anwar *et al.*, 2016; Jalloh *et al.*, 2013). Some factors are important for economic growth, for example human health, ecosystem, fisheries, infrastructure, water resources and agriculture. These are badly affected by environmental change, due to this condition livelihood is completely disturbed in effected areas. Poor communities affected more badly by environmental changes because they are totally dependent on agriculture and better environment is good for agriculture yield production (Huong *et al.*, 2019).

Currently in the climate change situation in Pakistan and other developing countries are affected by land degradation and other environmental issue like soil erosion, loss of soil fertility, flash flood, deforestation (Habib *et al.*, 2022; Huq *et al.*, 2006). The rise in temperature can bring many pests and disease, attack on crops. In Pakistan there are two dissimilar Season for growing crops Rabi and Kharif. Pakistani farmers are old age and poor educated from academic point of view. In villages farmers pursue old techniques of farming which are followed by forefather and these features are common in Pakistan country (Habib and Anwar, 2014; Siddiqui *et al.*, 2012).

Materials and Methods

The present research was designed to dig out climate change and its impacts upon the rural livelihoods of people in Muzaffargarh. The quantitative research design was adopted to see the relationship between

different variables and the data was collected from the scientifically selected sample with the help of self-administrative questionnaire.

The strategy utilized for this exploration was the quantitative system which was measurable in nature. The selection and specification of the population was essential step. The current research was conducted in Muzaffargarh. A questionnaire was a proper and systematic tool used to collect the data in organized arrangement. In the research study a structured questionnaire was developed. A sample of 150 Household was chosen with the assistance of simple random sampling technique.

Results and Discussion

This section aims to discuss the research results considering existing findings, as well as to present concluding remarks by answering the main problem statement. The purpose of this paper was to investigate the relationship between climate change and its effect on rural livelihoods. To explore the issue, a quantitative research approach was employed, collecting data using a survey method, and statistically analyzing the results. On the bases of primary data collection, the chapter of result discussion talks about the results. It focuses to determine the farmer's perception about the influence of the change of climate on production of agricultural crops and socio-economic features of the respondents in Muzaffargarh district.

Table 1 displays the relation of respondents to observe the effect of climate changes on crops. 95.3% respondents observed the effect of climate change on

agriculture crops and 4.7% respondents observed the no effect of climate change on agriculture crops.

Table 1: Respondents distribution to notice the effect of change in climate on crops.

| Effect of climate change | Frequency | Percent |
|--------------------------|-----------|---------|
| Yes | 143 | 95.3 |
| No | 7 | 4.7 |
| Total | 150 | 100.0 |

Table 3 shows the relation among the influence of climate change on rural livelihoods. The Table 3 shows that there is highly significant relationship (p value .001) among the influence of environmental changes on the rural livelihoods. All in all, the findings of this research paper indicate the demerits of climate change and its effect on the livelihoods in the selected area and the results shows that it has very complicated impact on the livelihoods of the respondents.

As per our research we can say that sudden change in climate change is affecting a lot in all sectors of life but most importantly in agricultural field and then the livelihoods. Because of it crops can't be cultivated on time and same is can't be harvest on proper time that's affecting a lot on production of crop. Along this 70% of our population is dependent on agricultural sector and now they are on the mercy and living a very hard life just because of climate change that has changed their lives because they were only dependent on Agri-sector that is now declining day by day.

Hypothesis 1: Association between climate change and its effects on rural livelihoods.

Table 2: Farmers distribution according to type of climate change effect on crops (n=150).

| Type of climate change effects on crops | High extent | | Some extent | | Not change | | Total | |
|--|-------------|------|-------------|------|------------|------|-------|-------|
| | Freq. | % | Freq. | % | Freq. | % | Freq. | %age |
| Changing time of rain | 133 | 88.7 | 10 | 6.7 | 7 | 4.6 | 150 | 100.0 |
| Changing in Growing season | 109 | 72.7 | 29 | 19.3 | 12 | 8.0 | 150 | 100.0 |
| Reduced cropping | 102 | 68.0 | 44 | 29.3 | 4 | 2.7 | 150 | 100.0 |
| Lack of Potable water | 83 | 55.3 | 65 | 43.3 | 2 | 1.3 | 150 | 100.0 |
| Rising crops of farming | 66 | 44.0 | 63 | 42.0 | 21 | 14.0 | 150 | 100.0 |
| Farm destruction due to flood | 86 | 57.3 | 52 | 34.7 | 12 | 8.0 | 150 | 100.0 |
| Increased temperature | 66 | 44.0 | 63 | 42.0 | 21 | 14.0 | 150 | 100.0 |
| Soil erosion | 96 | 64.0 | 46 | 30.7 | 8 | 5.3 | 150 | 100.0 |
| Pest invasion | 92 | 61.3 | 47 | 31.3 | 11 | 7.3 | 150 | 100.0 |
| Increased rate of drought, and crops failure | 72 | 48.0 | 59 | 39.3 | 19 | 12.7 | 150 | 100.0 |

Table 3: *Agricultural Production effected by climate change.*

| Age in years | Climate change effects on rural livelihoods | | Total |
|--------------|---|-------|--------|
| | Yes | No | |
| 20-30 | 29 | 3 | 32 |
| | 90.6% | 9.4% | 100.0% |
| 31-40 | 36 | 28 | 64 |
| | 56.3% | 43.8% | 100.0% |
| above 40 | 28 | 26 | 54 |
| | 51.9% | 48.1% | 100.0% |
| Total | 93 | 57 | 150 |
| | 62.0% | 38.0% | 100.0% |

P-value = .001 Chi-Squire =14.39 Gama -Value= .000

Summary

Extremely change in the situation of temperature and in weather events brings large pressure on the food availability, use, accessibility, and stability. Low production in agriculture occurs by bad effect of climate change on soil fertility and soil water holding things. When some extreme changes occur in temperature and sowing period in crops of agriculture then chances of pest invasion increased in agriculture crops, as this situation can brings many diseases in crops. To identify the influence of environment changes on the production of agriculture was the main aim of this study, so its impact on rural livelihoods is so severe.

Conclusions and Recommendations

Changes in climate conditions are very considerable and important issue in the current era which is increasing over time. There are many factors which are working behind this issue that are mentioned above. After the completion of this study, some points that I would like to suggest capturing the impact of climate change on the agriculture sector and then livelihoods.

- New seeds varieties should be used by the farmers.
- Latest and effective pesticides should be used by the peasants. Effective pesticides also helpful to capture the impacts of climatically changes.
- Farmers should use the greenhouse farming and heat control sheets to secure their crops.

Novelty Statement

Results from this study will provide a better understanding of climate change impacts on rural

livelihoods as this is a global threat so it will provide some better conclusion that how to tackle this phenomenon in future and what consequences can be if neglected.

Author’s Contribution

AZ: Conceive the idea and wrote paper.

ZAM: Wrote Abstract.

GAM: Statistical analysis was done by this author also wrote description of the paper.

IB: Conducted research and helped in writing this paper when needed especially helped in first chapter.

AA: Helped in data collection.

Conflict of interest

The authors have declared no conflict of interest.

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