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The Impact of Climate Change on Socio-Economic and Migration as Adapted Coping Strategies in the Eastern Agro-Climatic Zone of Afghanistan

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ABSTRACT

Climate change migration has become one of the main challenges in 21st century. Afghanistan is one of the most vulnerable countries in the world due to climate induces in the last three decades. The present study objective to find how the climate change impact on the socio-economic and migration as adapted coping strategies in eastern agro-climatic zone of Afghanistan. The study area was non-probability selected and data were collected from three provinces, Nangarhar, Kunar and Laghman out of four provinces according the sample size calculation method 384 sample respondents were face to face interviewed through a structured developed questionnaire. The result of the study showed that socio-economic impact of climate change about 60 percent of respondents say from high to a very high impact on health, agricultural products, opportunity, migrations, and reduction of household income. The results discovered that the sampled respondents among the eight coping strategies internal displacement as the main coping strategy, following the change in cropping pattern, new bore well and migrating children to another country as adapted strategies to mitigate climate variability in the eastern agro-climatic zone of Afghanistan. The study suggests that the government should develop new strategies for natural resources management, construct water dams, create a centralized system for climate data, adoption of technological innovation, and weather-based crop insurance, establish automatic weather stations and increase investment in sustainable agriculture to mitigate the climate change impact in the future.

Keywords: Climate Change, Migrations, Coping Strategies, Afghanistan

INTRODUCTION

In the current century, climate change migration has become one of the main challenges. Climate has always affected the population. Affected population often had move in response to the climate variability (Přívara & Přívarová, 2019). Climate change is any significant variation in the mean state of the climate, repeating for longer period of time as a result of human activities or natural process (IPCC, 2001; Rober *et al.*, 2023). The International Organization for Migration (2007) defined the climate migrants are persons or groups of persons that the compelling reasons of sudden or progressive change in the environment that adversely affects their lives or living conditions, are obliged to leave their habitual homes, or choose to do so, either temporarily or permanently, and who move either within their country or abroad (Laczko *et al.*, 2009; CANSA, 2020). The short-term events and as well as long-term climate change may affect people's decision to migrate because they may have a direct effect on their living standards and present and future income. In developing countries internal migration, has been an important strategy to cope with climate and economic distress and adverse condition, especially in the rural area (Piguet *et al.*, 2011; Wasil et al. 2023; Waldinger, 2015). The movement of the people within the country is called internal migration or the migrants that cross the borders of a country is an international migration (Laczko et al., 2009; Waldinger, 2015; CANSA, 2020).

Afghanistan is ranked eighth out of 170 countries for its vulnerability to climate change over the past 30 years, with 59 percent of the population affected by climate shocks compared to 19 percent suffering from security-related shock. At the end of 2019, Afghanistan had 1,198,000 people displaced internally as a result of disasters (CANSA, 2020). From 1960 to 2008, the mean annual temperature in Afghanistan increased by 0.13^{o}C and rainfall decreased by 2% per decade (Matthew *et al.*, 2009). The country is characterized by large areas with

little to no precipitation, and it has experienced prolonged drought in recent years (Sarwary **et al.,** 2023). The Key climate change impacts on Agriculture, water resources, human health, ecosystems, governance and conflict in Afghanistan (Přívara & Přívarová, 2019). For the following impacts of climate change, the human has been migrating from the vulnerable area to the other area in Afghanistan. Therefore, the present study examined the socio-economic impact of climate change and migration as adapted coping strategy in eastern agro-climatic zone of Afghanistan. The main objective of the study is how the climate change impact on socio-economic in eastern agro-climatic zone of Afghanistan. In addition, the study examined migration and other appropriate strategies as coping strategies for the reducing climate change impacts.

MATERIALS AND METHODS

Study Area

For the present study eastern agro-climatic zone were selected due to the impact of climatic variables. Eastern Agro-Climatic Zone (EACZ), located between 33°56'30" N to 36°02'39" N Latitude and 69°28'47" E to 71°40'43" E Longitude. The eastern zone of Afghanistan consists of the four provinces: Nangarhar, Laghman, Kunar, and Nuristan (Reddy et al., 2017).

Samples Collection

The primary data were collected from the selected vulnerable eastern agro-climatic zone through a structured questionnaire developed by our research team to collect the primary data from the study area. The data were collected during Jul and Aug, 2023. There are four provinces (Nangarhar, Laghman, Kunar, and Nuristan) but for this study three provinces (Nangarhar, Laghman, Kunar) out of four provinces were selected according the non-probability methods. The sample procedure conducted according the sample size calculation method totally 384 respondents selected and from each province 128 respondents face to face interviewed.

Likert-type scaling was widely used in the field of social science studies. In a Likert-type scaling, respondents were asked to indicate degree of each statement in terms of several degrees about some events or attitude. This study was used five degrees of agreement or disagreement and coded the scaling as very high (5), high (4), medium (3), less (2) and very less (1) (Kothari, 2013; Wasil et al., 2022; Taherdoost, 2020; Sarwary et al., 2020).

Statistical Analysis

Garrett Ranking Technique

By using Garrett's score table, the percent positions of each rank were converted into scores and for each factor, the score of each individual respondent was added together and was divided by the total number of respondents for whom scores were added. The mean scores of all the factors were arrived and ranks will be given. The factors having the highest mean value were considered to be the most important response (Vijayasarathy & Ashok, 2015; Dhanavandan, 2016; Zalkuwi et al., 2015)

Percent position = $\frac{100\ (R_{ij}-0.5)}{N_j}$

Where, Rij = Rank given for ith factor by jth respondents and Nj = Number of factors ranked by jth respondents

RESULTS

Socio-economic Impact of Climate Change in Eastern Agro-Climatic Zone of Afghanistan

Various Likert type responses were asked to the respondents associated with socio-economic impacts of climate change and their percentage responses are presented in Figure 1. The results indicated that 60 percent of the respondents perceived high to a very high impact on health, Affect Agricultural Products, lack of work opportunity, caused of internal migrations and reduction of household income. Furthermore, from 50-59 percent effect on increasing food price, conflict for water in society, malnutrition. Less than 50 percent of the respondents reported the impact of climate change on schooling children, migrates to the other countries.

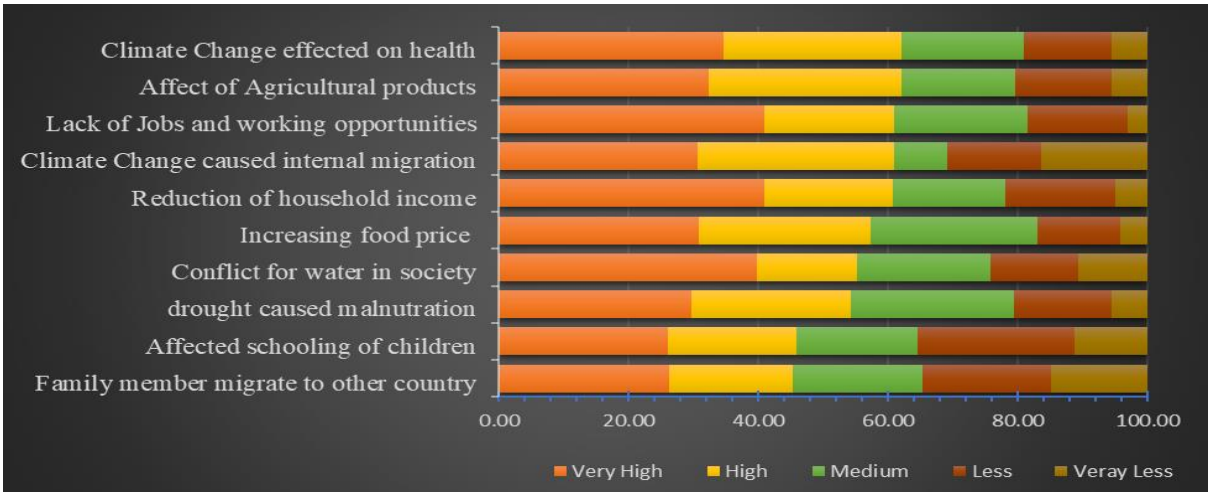

Figure 1. Socio-economic impact of climate change in eastern agro-climatic zone of Afghanistan

Climate Change Adaptation and Adapted Coping Strategies in EACZ of Afghanistan

The sample respondents were asked to specify the coping strategies to mitigate and minimize the impacts of climate change in eastern agro-climatic zone. This was converted into score and ranked through Garret ranking technique and the results are shown in Table 1. Among the eight major coping strategies, Internal migration in the country mean score (56) was considered as the main coping strategies followed by change in cropping pattern (54), reduction in the number of irrigation (53) and drilling new bore wells, migrate child to other country, farm diversification, sale of livestock and sale of some agricultural land. Climate change adaptation activities reduced the impact of natural hazards through sustainable agricultural practices.

Table 1. Climate Change Adapted strategies by sample respondents in EACZ of Afghanistan

Coping Strategies	**Respondents**	
	Mean Score	**Rank**
Internal migration in the country	56	I
Change in cropping pattern	54	II
Reduction in the number of irrigations	53	III
Drilling new bore wells	52	IV
Migrate my child to other country	51	V
Farm diversification	50	VI
Sale of some livestock	44	VII
Sale of some agricultural land	41	VIII

DISCUSSION

The finding of the study showed that the worsening climatic condition in Afghanistan will continue to impact negatively upon socio-economic development, such as agriculture and water resources and the finding is similar with the researchers Matthew et al., (2009), loss of employment and labor scarcity (Sarwary et al., 2021). The finding further explored that migration is one of the coming and adaptation strategies and similar finding was found by Waldinger, (2015) and Adaawen et al., (2019), changing cropping pattern Sarwary et al., (2021), protecting water sources (Matthew et al., 2009), weather prediction and crop based advisories (*Reddy et al.*, 2017).

CONCLUSION

Afghanistan is one of those countries which was in the past 30 years affected by the climate induced and ranked 8 out of 170 countries due to climate variability. The past study showed that 59 percent population affected by climate shocks. Most of the time the affected people migrate from prone area to the productive area. For the following reasons the present study will be examined the socio-economic impact of climate change and migration as adapted coping strategy in eastern agro-climatic zone of Afghanistan. The result of the socio-

economic impact of climate change indicated that more than 60 percent from high to a very high impact on health, effects on agricultural products, lack of work opportunity caused of migrations and reduction of household income of the major climate change impact.

Finaly, the sample respondents among the eight major coping strategies internal migration in the country as the main adapted strategy, followed change in cropping pattern, new bore well and migrate child to other country as adapted by the sample respondents.

POLICY ROMMENDATION

Based on the findings of the study, the following policies were recommending to reduce the risk of climate change impacts in the future. Establish automatic weather stations at the province and sub-province level for better agro-advisory services. Construction of water dams at provinces, districts and village levels. Establish of weather-based crop insurance schemes. Increase investment in sustainable agriculture. The adoption of technological innovations viz., greenhouse and poly-house technologies, drought tolerant verities, and improved irrigation systems may be adopted as a strategy to mitigate climate change in agriculture. Create a centralized system for collecting, managing and analyzing the data and modelling including climate-induced disasters. Consider the creation of a Ministry of Climate Change to address the likely impacts of climatic projections. Subsidies or premiums for the affected farmers. The government of Afghanistan should develop a new strategy for natural resource management especially for (Watershed, miens, forestry).

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