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The Impacts of Climate Change on Rural Areas of Afghanistan: A Comprehensive Review

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ABSTRACT

In Asia, Afghanistan is particularly vulnerable to the impacts of climate change, with frequent droughts and floods. The agricultural sector, drinking water, health, food security, hunger, and soil quality and organic matter are all negatively affected by climate change. Examining how farms are responding to variations in precipitation and temperature and the effects of climate change are the primary goals of present paper. According to recent studies, Afghani farmers use a range of adaptation techniques to cope with the impacts of climate change. These techniques include altering the type of fertilizers used, crop variety, pesticides, quality of seeds, water conservation, diversifying their farms, planting shade trees, using different methods of irrigation, moving permanently or temporarily, and selling resources. Additionally, studies conducted in the literature revealed that farmers in wetland areas felt less variation in the climate than those in dry areas. In this review, we have found severe influences of climate change on agriculture, poverty and health conditions in rural areas of Afghanistan, therefore it is important for the responsible authorities to take immediate action for climate change adaptation to overcome the severe impacts of climate change in rural areas of Afghanistan.

Keywords: Climate change, Agriculture, Floods, Droughts, Vulenrability, Afghanistan

INTRODUCTION

Variations in climatic conditions impact all areas in the globe, causing widespread disturbances that may be extrapolated to ecological system and eventually affect the rural areas (Fahad and Wang, 2019). Temperature and precipitation are two major factors in the climate, that influence the agriculture productivity which is a crucial component of agriculture output (Wheeler and Von Braun, 2013). Due to the dangers and unpredictability involved, agriculture is a composite activity. Farmers are vulnerable to the risks of losing money on their investments in agriculture and the possibility of reduced crop production as a result of changes in the climate (Fahad and Wang, 2019). In addition to having a remarkable and negative impact on food production and security, ineffectively identifying the impacts of climate change on agricultural systems may also stand in the way of efforts to reduce hunger and promote environmentally friendly development (Zabin et al., 2022). Afghanistan is a primarily an agriculture nation, accounting for 22% of the country's GDP overall. Approximately 70% of the country's rural people are employed in agriculture sector, either directly or indirectly, thus, any negative impacts of climate change might have an impact on their level of living (Sarwary et al., 2023). Afghanistan ranks sixth on the list of countries most vulnerable and least prepared to adapt to climate change as shown in Table 1 (Zaki, 2023). Climate-related disasters such as hurricanes, storms, droughts, and floods have severely damaged Afghanistan in recent time. All of these natural disasters became more severe and resulted in greater damage (Qasim et al., 2015). The rural population in Afghanistan had been severely impacted by the natural disasters, such as the floods in 2022 (Figure 1). Several studies reported that Afghan farmers are extremely vulnerable to shifts in climate (Sarwary et al., 2023). The persistent problem that Afghanistan has experienced since its founding is the recurrent occurrence of climate risks; nonetheless the nation yet does not

make adequate usage of the most recent advancements in instructions, regulations, and readily available and feasible tools for its adaptation. Therefore, the response of rural families in Afghanistan to changes in climate, adaptations, and variations are reviewed in the present review paper.

Table 1: Worldwide ranking of countries effected by Climate change for the year 2019

Ranking (2019)	Country	CRI score	Fatalities	Fatalities/100000 people	Reference
1	Mozambique	2.67	700	2.25	(Zaki, 2023)
2	Zimbabwe	6.17	347	2.33	
3	Bahamas	6.50	56	14.70	
4	Japan	14.50	290	0.23	
5	Malawi	15.17	95	0.47	
6	Afghanistan	16.00	191	0.51	
7	India	16.67	2267	0.17	
8	South Sudan	17.33	185	1.38	
9	Niger	18.17	117	0.50	
10	Bolivia	19.67	33	0.29	

CAUSES OF CLIMATE CHANGE IN AFGHANISTAN

As was already mentioned, Afghanistan is extremely susceptible to changes in the climate, so it is critical that the country comprehend and evaluate the issues associated with it. The primary cause of climate change in Afghanistan and other nations is the release of greenhouse gases (GHGs), primarily carbon dioxide (CO_2). Afghanistan's annual CO_2 emissions and the associated sectors are shown in the following Table 2, which covers the period from 2015 to 2019. The CO_2 emissions in million tons that Afghanistan produced between 2015 and 2019, which also observes that the industries responsible for the emissions include forests, energy, waste management, agriculture, and industrial processes. Afghanistan ranked as the 116th biggest GHGs producer in the world in 2019 with emissions of just 28.79 million tons of CO_2 equivalent (0.06% of global emissions) (Zaki, 2023).

IMPACTS OF CLIMATE CHANGE ON AGRICULTURE

Afghanistan is among the under developed nations most susceptible to climate change (Sarwary et al., 2023). The nation is currently experiencing a rise in both the severity and frequency of weather-related events, including droughts, floods, heat waves, and water shortages. In some areas, there have also been more cases of pests and diseases (Khalily, 2022). Afghanistan is the 12th most vulnerable region since 1995, according to the Global Climate Change Vulnerability Index (CCVI) report. In Afghanistan, extreme droughts and floods are two examples of more frequent climatic phenomena. Afghanistan is one of the areas having the lowest potential for adaptation because of a high level of poverty and lack of material and economic assets (Khalily, 2022). The mentioned range of experiences have either an indirect or direct effect on growers' decision-making regarding risk control and adaption to climate change. The extent and severity of natural disasters are determined by variations in the weather; indirect effects of these variations include changes in the distribution of diseases, changes in the frequency of pest infestations, changes in the moisture content of the soil, and the state of both water and soil. Increased temperatures, erratic precipitation patterns, and decreased crop production have an immediate effect on the availability of food in developing and agriculturally based economies. As a result, areas whose primary source of income was farming are negatively impacted by climate change (Bedeke, 2023). Climate change has a significant impact on agriculture by changing or diminishing effective dimension and raising hazards associated with output in direct and indirect ways. Large-scale effects of climate change have been observed in environment, socioeconomic, and associated fields, including human health, biodiversity, water resources, agriculture, and food security. The severity of water scarcity and floods is also likely to be influenced by variations in the pattern of precipitation. The degree of damage for many environments and species are greatly accelerated by rising temperatures. Sarwary et al. (2023) reported that the temperature had a significant negative effect, with yields of wheat and barley decreasing by 271 and 221 kg/ha, respectively, for every 1 °C increase in mean temperature. The average wheat yield is predicted to decline by 21 or 28% between

2021 and 2050, the average rice yield by 4.92 or 6.10%, and the average barley yield by 387 or 535 kg/ha, respectively (Sarwary et al., 2023).

CLIMATE CHANGE IMPACTS ON POVERTY AND HEALTH CONDITIONS

Climate change has important influence on health conditions and poverty, particularly in vulnerable and low-income communities. This review paper aims to explore the various ways in which climate change affects health and exacerbates poverty, as well as potential solutions to mitigate these impacts. Due to climate change, natural disasters like hurricanes, floods, and wildfires are occurring more frequently and with greater intensity. These disasters can result in physical injuries, mental health issues, and the spread of infectious diseases, all of which can have long-term impacts on individuals and communities (Zhao et al., 2022). In addition, natural disasters can destroy homes, infrastructure, and livelihoods, pushing already vulnerable populations further into poverty (Birkmann et al., 2022). This can lead to increased transmission of these diseases in areas that were previously unaffected, putting populations at risk and placing a strain on healthcare systems (Zhao et al., 2022). Climate change can disrupt agricultural production through extreme weather events, changes in precipitation patterns, and the spread of pests and diseases. This can lead to food shortages, price spikes, and reduced access to nutritious foods, resulting in malnutrition and food insecurity, particularly in low-income communities. Climate change can exacerbate air pollution through the increased frequency of heatwaves and wildfires, as well as changes in precipitation patterns that affect air quality (Perera et al., 2022). Climate change can contribute to the displacement of communities due to sea-level rise, desertification, and extreme weather events. This can lead to the loss of homes, livelihoods, and social support networks, increasing the risk of poverty and mental health issues among displaced populations (Hallegatte and Rozenberg, 2017). In conclusion, climate change has far-reaching impacts on health conditions and poverty, particularly for vulnerable and low-income communities like Afghanistan. It is essential to address these challenges through a combination of mitigation and adaptation strategies, such as investing in resilient infrastructure, promoting sustainable agriculture, and strengthening healthcare systems in at-risk areas.

FUTURE CHALLENGES AND POLICIES

Afghanistan faces several challenges related to climate change, and implementing effective policies is crucial to address these issues. Afghanistan is highly dependent on agriculture, and water scarcity due to climate change poses a significant threat to food security and livelihoods. Afghanistan can implement policies to improve water management, invest in irrigation infrastructure, and promote water-efficient agricultural practices to mitigate the impact of water scarcity. Afghanistan is prone to natural disasters such as floods, landslides, and droughts, which are likely to increase in frequency and intensity due to climate change. The government can develop and implement policies for disaster risk reduction, early warning systems, and community resilience building to minimize the impact of natural disasters on vulnerable populations. Climate change contributes to desertification and land degradation in Afghanistan, leading to loss of arable land and pasture. Policies focusing on sustainable land management, afforestation, and rangeland restoration can help combat desertification and preserve natural resources. Afghanistan has limited access to modern and clean energy sources, and the reliance on traditional biomass fuels contributes to indoor air pollution and deforestation. Policies promoting renewable energy development, energy efficiency, and clean cooking technologies can improve energy access, reduce emissions, and improve public health.

CONCLUSION

The impacts of climate change in rural areas of Afghanistan are multifaceted and have led to urgent calls for targeted interventions and policy measures. A comprehensive review highlighted the significant impact of climate change on water scarcity, agricultural productivity, and vulnerability to natural disasters in rural Afghanistan. It emphasized the interconnected nature of these challenges and their compounding effects on poverty, food insecurity, and the overall well-being of rural populations. The review also stressed the need for holistic and cross-sectoral approaches to address the impacts of climate change, emphasizing the importance of promoting sustainable land management, enhancing water conservation and irrigation practices, and fostering the adoption of climate-resilient agricultural techniques. Additionally, the review underscored the critical role of policy interventions, institutional support, and international collaboration in addressing the impacts of climate change in rural areas, emphasizing the need for evidence-based policy formulation, capacity building, and the mobilization of financial and technical resources to support climate adaptation and mitigation measures in rural Afghanistan. The review provided valuable insights into the urgency of concerted action to safeguard the

livelihoods and well-being of rural communities, highlighting the significance of inclusive, participatory, and context-specific approaches to climate resilience.

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