THE ADVERSE IMPACT OF CLIMATE CHANGE ON FOOD SECURITY AND ECONOMIC STABILITY: ADAPTING LEGAL FRAMEWORKS TO ADDRESS CLIMATE-INDUCED FOOD INSECURITY IN PAKISTAN

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Abstract

It has been noticed during the COVID-19 lockdown that the labor community was greatly affected due to the lack of employment opportunities. Presently, if labor is not available due to climatic changes or workers cannot work due to the intensity of heat, it could pose a problem. As we have seen this year, many crops were damaged due to the heat wave, resulting in decrease in production and resultantly in employment opportunities for daily workers. It is evident from the statistics that people aged 21-36 are most affected by unemployment which constitute majority of the Pakistani population. At present, there is a scheme running in Pakistan for workers and poor families, under which Rs. 15,000 per family is provided four times a year. This relief amount was also given during the COVID-19 pandemic but was highly insufficient. Therefore, there is a need to amend labor policies as well as the Compensation Acts of the state by allocating certain hours at the beginning and end of the day when the temperature is lowest and workers can work. Or it could be that indoor work is done during the summers and outdoor work during moderate

weather. Alternatively, during the summers, outdoor work hours could be reduced appropriately. This article attempts to analyze the impact of climatic changes on workers in Pakistan. Its purpose is to understand the current situation of workers and find alternative solutions vis-a-vis climatic changes.

Key Words: Climate Change, Labor Community, Food Insecurity and Legal System.

1. Introduction

1.1. Background

Regardless, environmental pollution is increasing as time passes, leading to more intense weather fluctuations. Even an average person cannot deny the reality of climate change. The question now is what effects it is having on their lives and how they can cope with it. According to recent research, 677 billion hours are wasted worldwide, equivalent to $ 2.1 trillion (Tol 2018). Most affected countries are predominantly from Asia and Africa. Similarly, most affected countries are also in Southeast Asia, including India, Pakistan, Bangladesh, and China (Tol 2013). Affected workers include those who work in open spaces. According to a recent survey, the burden of heat-related losses during the three hottest hours of the day falls most heavily on countries in South and Southeast Asia and Africa. Qatar and Bahrain lose the most hours per worker, and India, with its large population, loses the most total working hours per year. In future, as temperatures raise, India, China, Pakistan, and Indonesia will suffer the most economic losses (Fankhauser and Tol 2005). The article examines the impacts on the labor class and outlines the responsibilities of governments and the general public in this regard, so that we can save the labor class.

1.2. Research Problem

The research problem is focusing on the adverse impact of climate change on our food insecurity and economic instability in Pakistan, principally investigating that how changing climate pattern is affecting agricultural productivity, food availability, and the market stability. Moreover, this study can discover the inadequacy of our current legal framework in covering climate-induced food insecurities and its repercussions on our economic development and social welfare.

1.3. Purpose of the Study

1. To evaluate the prevailing situation of food insecurity and economic instability inside Pakistan in the context of climate change implications;
2. Assessing the effectiveness of current legal framework in combating the climate-induced food insecurity and to maintain economic stability in Pakistan; and
3. Recommendations for improving legal framework in order to address climate-induced food insecurities while to promote economic resilience in Pakistan.

1.4. Research Questions

1. How the climate change has affected food production, supply, and accessing in different areas of Pakistan, and what are the related economic consequences?
2. What legal mechanism is currently in place in Pakistan for addressing climate-induced food insecurities, and how successfully are they integrating climate adaptation and mitigation strategy?
3. What are the perceptions and experiences of key stakeholders; for instance the farmers, policymakers, and other community leaders, concerning the adequacy of prevailing legal framework?

2. Literature Review

In current conditions, by shifting approximately 33% of the losses suffered by global workers due to extreme heat during the three hottest hours of the day to the three coolest hours, considerable savings can be achieved (Carleton and Hsiang 2016). Researcher Parsons says, "As the world warms, the cooler hours of the day also become warmer, so this adjustment becomes less effective with every degree of global warming." With an additional 4 degrees Celsius of warming, 23% of workers worldwide could be at risk, which will require reduction (Auffhammer 2018). Measures can be taken to select the cooler hours of the day to save the workers' labor. However, this practical wisdom may not be effective for all types of work.

Bahadar Ali in his Research Paper "Analyzing Economic Implications of Climate Change in Pakistan; A Legal Frame work Approach" writes that besides economic losses, extreme heat can lead to health issues and even fatalities for workers (Ali 2024). Additionally, changes in working hours will have their negative impacts: for example, alterations in work schedules can affect sleep, increasing the risk of injuries for workers afterwards.it is generally believed that it's essential for us to acknowledge that increased heat and reduced productivity due to workers' reduced capacity and health impacts will still occur, especially when policymakers weigh the costs and benefits of limiting climate change (Molua 2007).

3. Proposed Methodology

Research methodology for the study shall comprise multi-faceted approaches to comprehensively asses the negative impact of the climate change on food insecurity and economic instability in Pakistan; while also investigating the effectiveness of legal framework in combating climate-induced food issues. Primarily, a widespread literature review shall be conducted in order to gather insights from current studies on climate change implications, economic stability, food security, and legal aspects related to adaptations and mitigation strategy. Quantitative data relating to climate pattern, agricultural productivities, food obtainability, market dynamic, and economic indicator shall be collected from governmental sources such as academic publications, reports, and relevant statistical databases. Based on the findings, further suggestions and recommendations shall be developed for adapting a legal framework in order to better address climate-driven food insecurity; ensuring socio-economic considerations and the stakeholders' engagement are integrated to ensure the enhancement of their effectiveness.

4. Results

According to a survey conducted by the World Bank in 2021, there are currently 74.39 million workers (Greenwald, Roberts et al. 2001). This number was 54 million in 2010 (Lal, Alavalapati et al. 2011). Apparently, there has been an increase of 24.39 million over the past 11 years, indicating an average increase of two million annually (Greenwald, Roberts et al. 2001). Most workers are affiliated with the agriculture sector, accounting for 34%. Agriculture holds significant importance for Pakistan as it contributes 19.05% to the national income (Salik, Jahangir et al. 2015). According to recent surveys, there has been a significant decrease in the proportion of workers associated with agriculture. In 1991, 46% of workers were linked to agriculture, which decreased to 39% by 2019 (Israr, Faraz et al. 2016).

4.1. Impact of Temperature

Workers engaged in physical demanding jobs already face significant pressure on their bodies. Due to global warming and climate change, performing such tasks have become extremely unsafe or even impossible in hot and humid countries, leading to interruptions during the hottest hours of the day. This may even result in slower work if workers continue during mid-day or afternoon heat. In India, which still has a large workforce in this sector, an annual loss of 103 billion hours is occurring (Glaser, Lemery et al. 2016). Meanwhile, in Pakistan, 21 million hours of work are lost due to seasonal variations. In Pakistan alone, this loss is approximately 11 million hours (Salik, Jahangir et al. 2015). However, with the increasing annual rise in temperatures, this loss could reach up-to 51 billion hours. On one hand, there will be a decrease in productivity, while on the other hand, unemployment will increase, which is a significant loss for a developing country like Pakistan.

Research indicates that excessive heat during work, typically above 36 degrees Celsius, poses occupational health risks and reduces worker productivity and output (Hussain, Butt et al. 2020). Maintaining body temperature close to 38 degrees Celsius is essential for health and human performance, and excessive heat during work can lead to significant sweating and risk of dehydration. Excessive body temperature and/or dehydration during work can result in heat fatigue, slow work, increased errors during work, health effects of heat (heat fatigue, heatstroke, and even death), and increased risk of accidents (Khan, Khan et al. 2016).

4.2. Impact on Agriculture

Pakistan is a lower-middle-income country, where majority of the people are depended upon agriculture. Many people are also associated with industry, although industrial methods are relatively inefficient. Additionally, over three-quarters of the population reside in rural areas and cities. While the workforce is already sensitive to weather and climate conditions, a significant number relies upon agriculture for livelihood and food security through resources such as land, water, and forests. Agriculture still accounts for 43% of employment for the population and is heavily reliant on irrigation from glacier-fed rivers, constituting about 91% of agriculture (Ahmed

and Schmitz 2011). Various estimates suggest that 34% of Pakistan's total population is affected by poverty. Further economic losses will significantly impact people's health and their ability to afford healthcare (Abid, Scheffran et al. 2019). Health impacts, particularly heat fatigue, reduced nutrition, outbreaks of diseases such as Dengue fever from insects, and waterborne diseases, will further diminish people's ability to work and earn a decent living.

It has been observed that Pakistan has experienced severe weather events regularly over the past two decades, including cold waves, storms, droughts, floods, and landslides. Cold waves occur in high-altitude regions like Baluchistan and Kashmir, where severe snowfall, rainfall, landslides, and below-average temperatures adversely affect people and livestock. For instance, in January 2020, 109 individuals died across the country due to such events, especially avalanches triggered by heavy rainfall and snowfall (Abbas 2022). Flash floods are also common, particularly during the monsoon months, causing widespread devastation. Most areas of Pakistan have experienced periods of drought, which have potential severe impacts on health, sanitation, and the availability of food and water. For example, according to figures presented by the Pakistan Red Crescent, over 5.03 million people were affected by drought in 2018-2019 in Pakistan, including a significant number of poor farmers and agricultural workers (Hashmi, Belgacem et al. 2021).

5. Discussion and Conclusion

A cautious estimate suggests that temperatures will continue to rise in Pakistan, exceeding the global average. The effects of increased heat will be most pronounced in the Northern snow-covered mountainous regions, where the rapid melting of snow poses a risk of floods, landslides, soil erosion, and increased river flow. Heat-waves are expected to be more frequent and severe across Pakistan, with a significant increase in the number of hot days and nights anticipated. Rainfall patterns will also deviate from normal, with summer rains shifting to August and winter rains to March.

In light of all the above discussion and data presented, it is undeniable that climate change can affect agricultural production, land availability, and seasonal patterns in Pakistan, posing risks to farmers, especially related to health and economic aspects of life. Over 83% of farmers in Pakistan are smallholders, and nearly three-quarters of the land is rain-fed (Arshad, Raza et al. 2021). This is particularly significant because changes in rainfall patterns and seasonal variations in the result of climate change have created irregularities in water and weather, posing challenges and unexpected risks to agricultural crops. This sector also faces the challenge of limited adaptability, as its skills are not easily transferable. Livestock are an essential part of poor farmers' livelihoods and they are extremely vulnerable to heat stress, water scarcity, and limited fodder availability, depriving farmers of nutrition and immediate cash income.

5.1. Sources and Concerns

From the given climate change perspective; it is time to reconsider regular working hours. According to the first study of its kind, working during cooler night time or morning hours can

protect outdoor workers from extreme heat - at least for that time. Changing the work schedule is one of several practical measures proposed to cope up with dangerous heat conditions, which will increase with the warming of the planet. However, no one had yet assessed the feasibility of doing so on a global scale (Mahmood and Hassan 2022). One of the serious threats that the labor community is faced with now is the climate change. Employers and policymakers need to take steps to protect workers from the dangers of extreme heat. By adjusting work hours, providing shade and water, and implementing heat safety policies, can help to keep workers safe and healthy The government needs to ensure not only the identification of the environmental issues from the outset but also to demonstrate its excellence in fulfilling its teaching and research responsibilities with great enthusiasm. The challenge of environmental change and its negative impacts have always to be at the forefront of the government's mission. Further the government needs to:

- **Adjust work hours:** Work hours can be adjusted to avoid the hottest part of the day. This can help to reduce the risk of heat stress and other health problems.

- **Provide shade and water:** Laborers should be provided with shade and water to help them stay cool and hydrated. This can help reduce the risk of heat stress and other health problems.

- **Implement heat safety policies:** Employers should implement heat safety policies to protect their workers from extreme heat. These policies should include measures such as providing shade and water, training of workers on heat stress, and monitoring workers for signs of heat stress.

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