

GLOBAL CLIMATIC TRANSFORMATION: IMPLICATIONS FOR PAKISTAN

Muhammad Ahmad*

Lecturer, Govt. Graduate College Township,
Lahore, ahmadsheikhlahore@gmail.com

Rehana Saeed Hashmi

Professor, Department of Political Science,
University of the Punjab, Lahore, rehana.polsc@pu.edu.pk

ABSTRACT

Global climate change has tremendous economic, environmental and social implications for Pakistan. Recently, there has been increased awareness about inevitability of climate change and the realization that though everyone is affected, yet not equally. The central argument of this paper is that Pakistan is the victim of global climate change and facing consequences of the action it has not committed. We will analyze the global perspective of climate change, how Pakistan is being affected by climate change and what is policy response of Pakistan for adapting and responding. We will apply qualitative approach for our analysis. Developing world is facing challenges of poor governance, resource scarcity and violence, thus suffer greater because of natural disasters. Pakistan is among those countries which have experienced increasing frequency of flooding and droughts, erratic weather and agricultural pattern, loss of biodiversity and decline in freshwater availability. Social theory forms the basis of understanding of climate related threats to developing countries. It gives rise to conceptual framework of societal vulnerability, which can be used to explain why Pakistan is the major victim of global climate change. Pakistan has experienced serious impacts of climate change in various sectors like agriculture, water scarcity, inter provincial conflicts over resources, public health, floods and other extreme weather events. This calls for rapid climate action and concrete policy for addressing this rapidly deteriorating situation. The country should enhance its disaster management and coping capacity and work on building the resilience of people and institutions. Availability and distribution of fresh water must be guided by laws formed by coordination of central and provincial government. For efficient administration, interaction, and implementation, it is crucial to combine the relevant ministries under the aegis of provincial and federal disaster response organizations.

Keywords: climate change, Pakistan, social theory, floods, food security, water scarcity.

1. INTRODUCTION

Climate change is a major environmental challenge with vast implications for health, fresh water supply, natural ecosystems, food production etc. Its disastrous impacts are already visible in the form of droughts, floods, cyclones, storm and other extreme weather events. Scientific assessments show that climate system of earth has demonstrated global and regional variations compared to pre-industrial era. It has been predicted that global average temperature will increase by 1.4 -5.8 degree Celsius before the end of 21st century (Z Mustafa, 2014). This temperature increase will severely impact global ecosystem, hydrological systems, crop production, sea level and other phenomenon. This impact would be more obvious in tropical regions comprising of developing countries like Pakistan.

Global climate change has tremendous economic, environmental and social implications for Pakistan. Natural hazards like cyclones, droughts and floods are frequent in Pakistan. Such hazards are further exaggerated by vulnerabilities in form of exclusion, poverty, inappropriate policies and actions that increase susceptibility to climate hazards. Climate change is impacting crops and productivity which affects rural communities of Pakistan. Dry lands, which already face high temperatures and water shortages, are more exposed to these changes. Seasonal changes cause variation in biophysical relationship leading to risk

* Corresponding Author

of diseases and pests and altered irrigation requirement and soil characteristics. Pakistan is particularly affected more as it's an agricultural economy (Zia Mustafa, 2011). In this paper we will shed light on repercussions of global climate change for different sectors in Pakistan, and what steps should be taken address these grave implications.

2. THEORETICAL FRAMEWORK

Though many considers impacts of climate change to be catastrophic and unprecedented (Giddens, 2009), social theoretical framework of the climate change is based upon few slow moving classic problems. This paper will briefly comment on three such problems.

The first revolves around definition and construction of societal problems. Elizabeth Shove argued that climate change is configured as the matter of policy and scientific concern and exposed political, ethical and moral implications of it (Shove, 2010). Social theorists demonstrate that problem definition is selective and loaded with the issues of cultural and political power (Hulme, 2010; Szerszynski, 2010). It then becomes a topic in which climate change, its public representation and policy responses are viewed through conceptual responses.

The relation between culture and nature give rise to second persistent fascination. This serves as the foundation of contemporary analyses that is against culture-nature divide and insists that humans are the part of nature (Beck, 2010). Hird reinstates humans as the soup of microbes and has focused of relationship between animals and humans (Hird, 2010). While Hulme and Szerszynski have focused on cultural farming of interaction between human and nature.

Third, social theory has repeatedly reflected on capitalism. Climate change has created new areas of contraindication and tension within capitalism (Urry, 2010). For Hulme, it is discursive medium which has given rise to various forms of cosmopolitanism (Hulme, 2010). Cooper has concentrated on how climate change impacts international financial markets (Cooper, 2010).

These examples show that established pre occupations in social theory drive questions about climate change. It will also be interesting to understand the impact of climate change on theoretical developments in social sciences.

2.1. Climate Change and Social Theory

Engagement between social science and impacts of climate change has given rise to distinctive concepts. In this section, we will discuss examples that challenge established school of thought. While doing so we will focus on development of theoretical agendas through engagement with practicality of tackling climate change.

Transition and its management

Urry argued that climate change encompasses the 'total reorganization of social life, nothing more and nothing less' (Urry, 2010). This has led to the development of increasingly influential and hybrid theories of transition. This literature is based on innovative studies, evolutionary economics, science and technology studies and history of science, all these explain how settings form and deteriorate. Understanding of socio technical transitions is not simple, but few common features can be identified. One is the notion that societal transitions 'not only involve new technological artefacts, but also new markets, user practices, regulations, infrastructures and cultural meanings' (Elzen, Geels, & Green, 2004). Second, current social arrangement shape future development. Third, network of provision, whether of energy, water or food, is comprised of more rather than just the context consumer choices. Some authors think that societal innovation determines transition towards sustainability, such innovations challenge status quo (Moss, 2000). Some demonstrated that transition towards sustainability involves dissolution and fracture. Resource intensive societal frameworks must give way to less demanding systems. This realization shed light on loopholes in innovation studies, which traditionally focus on formation, not the disappearance, of new technical and societal arrangements. For understanding, reversal of unsustainability it is important to develop counter narrative to innovation studies.

Practice and Consumption

Beck stated that there is 'insatiable appetite for natural resources' (Beck, 2010). It has legitimized ways that reproduce unsustainable demand patterns. Giddens argued that 'social practices ordered across space and time' makes up 'the basic domain of study of the social sciences' (Giddens, 1984). Such focus when

combined with challenge of responding to climate change, has created path for significant efforts to understand relative fixity and fluidity of though ordinary but flawed way of life. Practical manifestations of climate change have given rise to conceptual developments that operate on different dynamics than narrowly defined fashions and trends in social theory. There are two agenda settings, one is driven by relation by between climate change and social change, and other by social theory. These two are not completely disconnected, rather have some point of contact between them.

2.2. Social Vulnerability to Climate Change

Social science asserts that people are vulnerable and susceptible to climate change, while societies, economies and institutions respond and adapt to contemporary threat of climate change. These factors give rise to climate variability and augments the need to understand the concept of vulnerability. Those skeptical about the significance of climate change focus on uncertain climate change events, particularly the projection of specific events. They also focus on capacity of societies to cope with changing climate. Hence, they state that climate change is not significant as societies adopt when and where needed. For instance, Beckerman argues that people migrated in the past to adapt to climate change (Beckerman, 1995). He also argues that even if precautionary action is postponed it will not jeopardise the future coping ability. He has written that 'we would all have plenty of time to change into lighter shirts'. Through this reasoning, future climate change do not pose significant problems. Though, it is for those populations who are ready to migrate or change into lighter shirts. A significant portion of world's population is vulnerable to fragile socio economic scenarios, exacerbated by extreme weather events. Evidence show that frequency of such extreme events will increase in future. The interaction between humans and uncertain natural scenarios is complex, many paradigms compete to explain these phenomena. Alternative concepts about the reasons of vulnerability include marginalization and poverty stricken segments, economic and institutional factors influencing economic activities in hazardous zones and coevolution of natural environment and climate with societal phenomenon.

The disciplines of natural science concerned with vulnerability and risk to environmental changes generally take resources like economic assets and lands, as the grounds of their discussion, and climate or topographical factors as the determinants if whether these assets are at risk. Such approaches are inherent part of IPCC methodologies to examine vulnerability to climate change. This paper emphasizes on social vulnerability. Major climate related calamities including tidal waves, floods, droughts and storms display diverse physical characteristic, which are classified in literature as social aspects of climate hazards. We argue that a major dimension of the concept of vulnerability is social vulnerability to climate change, and because of this parameter emphasis is shifted from proximate to underlying causes of vulnerability. Aspects of collective and individual vulnerability are different. They include role of policy and state intervention at collective, and relative deprivation and poverty and social security at individual level. Vulnerability to climate variability includes changes in collective and individual vulnerability over time as a result of variable incidence of weather events. Policies for reducing social vulnerability support capacity building of vulnerable segments to sustain resources in long run. Moreover, both informal social security and formal government are important for this process.

3. Global Perspective

Recently, there has been increased awareness about inevitability of climate change and the realization that though everyone is affected, yet not equally. Resource scarcity and poverty in developing countries increase their vulnerability compared to developed states that have capacity and resources to adapt. Reports suggest obvious disparity in regional impacts of climate change, with developing countries suffering the most (Shukla et al., 2019). There has been major concerns on the impact of climate change in South Asia, where climate threat has significantly impacted economies and human societies. Countries in South Asian region are ecologically and geographically diverse and large portion of populations reside along river deltas and coastal lines which are at great risk of sea level rise and backwater flooding due to climate change. Moreover, heavy dependence on agriculture increases susceptibility of many communities. Manifestations of climate change are already visible in these regions. There has been a decline in crop yield and increase in diseases in many countries due to rising temperature. Moreover, there is evidence of variability in rainfall and marine ecosystem and melting of Himalayan glaciers. In Asia, most serious implication of climate

change is availability of freshwater, which is sharply declining and will affect about one billion people by 2050 (Raza et al., 2019).

The interrelation between climate change and poverty is obvious and poses challenge for global development and poverty reduction target. Developing world is already facing challenges of poor governance, resource scarcity and violence, thus suffer greater because of natural disasters. Pakistan is among those countries which have experienced increasing frequency of flooding and droughts, erratic weather and agricultural pattern, loss of biodiversity and decline in freshwater availability. Flooding and earthquakes in Pakistan have eroded coping capacity of institution and people, rendering them more vulnerable. Pakistan has diverse geography due to which it has variable climate. Climate in Pakistan ranges from arid and semi-arid regions in the South and West to dry summers and mild winters in North. Country is surrounded by Sulaiman range in East, Himalayas in North and River Indus basins in West, South and coasts. Climate change makes these areas vulnerable to risks of increasing temperature, rise in sea level, glacial retreat and frequent droughts and floods. Vast portion of land in Pakistan is semi-arid and arid due to which variable rainfall and temperature pattern may lead to food insecurity, thus threatening the welfare of local population. Preliminary studies show that Pakistan's 50% population and 23% area is at the risk of climate threat (Iqbal, 2021). Thus, it is important to realize the impact of global warming and climate change and raise voice at international forums.

4. Implications of Climate Change for Pakistan

Geographically speaking, Pakistan is situated in a place where the consequences of global warming are already being felt quite severely. This climatic catastrophe has significant negative effects on the economy, society, environment (Ahsan, 2022), and agriculture (Heureux et al., 2022) of the country. Some of these impacts are discussed below:

4.1. Devastation by Floods

Ninety percent of the agricultural area worldwide is irrigated by the glacier-fed River Indus and its branches. Owing to the worldwide climate crisis, the rate of glacier melt has increased, which may raise the possibility of flash floods and glacial lake outburst floods downstream. This will adversely affect livelihoods, food production, agriculture-related enterprises, and the economy of the country (Riaz et al., 2022). The problem is that industrialized nations have failed to understand that the planet's health is shared by every country and that if one nation destroys the ozone layer, humanity as a whole is forced to bear the brunt. For instance, in 2022, the changing climate caused immense rains in the country which led to significant human casualties, infrastructure damage, and enormous financial damages (30 billion USD) (Ayub, Sadia, & Naveed, 2022; Bhutta et al., 2022). Figure 1 shows satellite images from NASA that shows Pakistan's flood scenario.

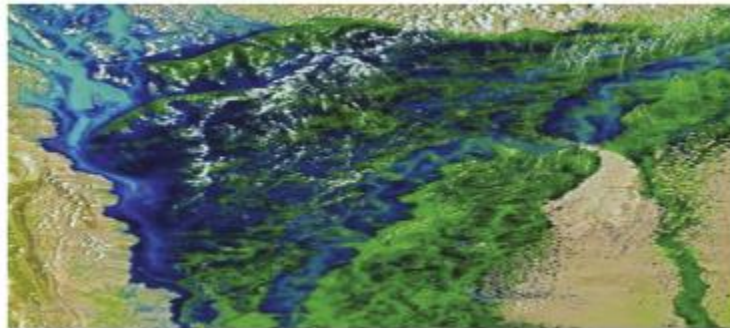


Figure 1: Satellite image of 2022 flood in Pakistan

Source: Ishaque, Tanvir, & Mukhtar, 2022

4.2. Environmental impacts

The climatic problem in Pakistan is mostly linked to rising temperatures and heat waves, which are predicted to lead to a rise in the incidence of pulmonary and heart diseases (Khan, Awan, & Malik, 2012). Another significant problem in Pakistan's industrial eastern Punjab is smog, which causes Lahore, the

province capital, to become heavily polluted during the colder months of the year. Officials claimed that they are attempting to address the issue, which involves a large number of brick kilns (Ahsan, 2022).

4.3. Water Scarcity

Agriculture-driven countries are highly reliant on state-owned natural assets. When there are limited sustainable renewable and nonrenewable assets, it is highly important for the government to manage the demands of the populace along with fiscal problems. In nations like Pakistan, socioeconomic concerns include population increase, urbanization, an absence of good governance, security concerns, a lack of policy measures for population management, and the depletion of resources that are accelerating faster in comparison to GDP growth. Even the country's proximity to the equator geographically can't satisfy its rising demands and aspirations. The growing population besides affecting the number of water reservoirs, has also negatively impacted their quality. While Pakistan has experienced a consistent drop in the amount of water available on an annual basis since its emergence in 1947 due to the wide range of variables, the growth in anthropogenic activity is placing water stress on natural reservoirs. Per capita availability of water was estimated by Pakistan Agriculture Scientists Association (PASA), to be 5600m³ in 1947. This figure dropped by 406 percent from 5260m³ in 1951 to 1038m³ in 2010 and 877m³ in 2020. According to the PASA, the amount of water that is currently accessible will continue to decline until it reaches 660m³ by 2025 and 575m³ by 2050, as illustrated in Figure below (Khalid & Begum, 2020).

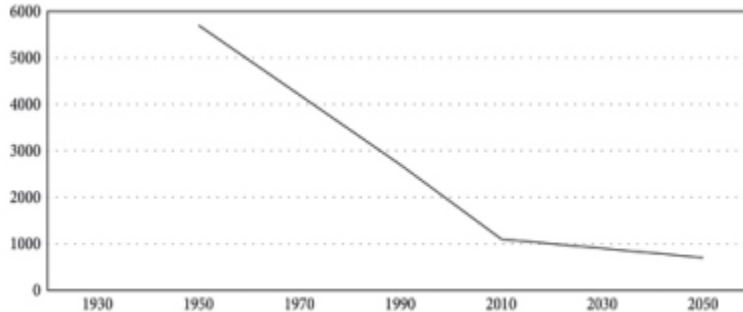


Figure 2: *Pakistan's per-capita water availability*

Source: Panhwar et al., 2022

4.4. Inter-provincial strife over water distribution

For Pakistan, the severe effects of global warming in addition to other socioeconomic problems have exacerbated its political and financial issues and raised serious questions about inter-provincial strife. There are two categories of causes for water scarcity in Pakistan: Aside from operational factors like political disagreements (over the supply of water on a provincial/institutional level) and social disparities regarding water management and distribution, incidental factors like bad local water management policies are also a factor. As irregular population expansion increases the need for clean water resources and disturbs the balance among communities, provinces, and the allocation of water resources, the water issue is not only tied to ecological degradation but also to societal variables. Notwithstanding the country's diversity in terms of its ethnic composition and geographical location competing for access to water supplies has frequently led to disagreements and disputes among the federating units in Pakistan. Growing community vulnerabilities due to inadequate water reservoirs encourage lawlessness, anti-state attitudes, and feelings of inequality among its own citizens. The community is encouraged to distribute illegal water because of a lack of effective monitoring mechanisms over the channelization of accessible water, which would allow for an equitable balance between demand and supply. Since there are numerous unauthorized drillings, concealed pipelines, and undocumented water hookups from the primary supply lines, water theft incidents have primarily occurred in Interior Sindh and Southern Punjab as a result of the implicit acceptance from the water management authorities. In towns and rural areas, these illegal water routes are typically found next to sewage systems, polluting the water resources. Natural reservoirs are also experiencing water stress as a result of the rise in anthropogenic activity (Ishaque, Tanvir, & Mukhtar, 2022).

4.5. Adverse Impact on Agriculture and food security

Although industrial production also makes a significant contribution to the country's economic growth, the agriculture sector still accounts for the majority of economic activity in Pakistan. Pakistan depends significantly on the agricultural industry for both its domestic food needs and exports to other countries, but given the current dilemma of climate change and the use of traditional irrigation systems for agricultural output, the country may face more significant shortages of water in the coming years. In 2021, Pakistan was ranked 80 out of 113 nations in the Global Food and Security Index (Singh, Bhandari, & Priya, 2021), and in 2022 it was further pushed to 84th rank (Ishaque, Tanvir, & Mukhtar, 2022). Pakistan has the highest level of food insecurity among all South Asian nations. Due to poor management of water and land resources, inadequate water governance rules, mushrooming population, and the detrimental effects of global warming, the agricultural industry has not made much progress. Pakistan has also been unsuccessful in implementing innovative tactics such as enhanced water governance in the agricultural industry, the use of adaptation strategies for yield production to increase water consumption in an environmentally acceptable manner, and training farmers regarding water productivity and recycling approaches. The shortage of water is a contentious political problem in Pakistan because of the territorial disputes between the federal and provincial governments. To guarantee that Pakistan's water administration structure was regularized, the government of Punjab took action and established a national water strategy. Climate change has affected earnings and yield output in areas with vulnerable agricultural sector growth. As a result, agricultural production is decreasing year after year, water demand is rising, and unforeseen urbanization is causing valuable agricultural land to be lost. The combined effect of these problems is having a detrimental effect on crop yields and deteriorating Pakistan's food security position (Ishaque, Tanvir, & Mukhtar, 2022).

According to research, salinity, water logging, and floods have all contributed to a thirty percent drop in the yields of important crops. Crop degradation has also been seen to be influenced by the increasing pest prevalence brought on by a warmer environment and more precipitation (due to climate change). It has been noted that fluctuations in both moisture and temperature have an impact on the sensitivity of cereal and tree crops. A temperature rise of just 1°C is predicted to cause a 6 to 9 percent loss in wheat production in Pakistan, and an even smaller increase is predicted to have a significant negative impact on cash crops such as cotton and mango (Mustafa, 2011).

4.6. Impact on public health

The latest studies on Pakistan's health and changing climate is quite concerning. According to an UN research, malnutrition is the main cause of stunted development in forty-four percent of children. This is a significant repercussion of climate change-related food scarcity and impoverishment in Pakistan. Unseasonal rainfall and smog are causing diseases including the Dengue fever, Zika virus, Malaria, and Typhoid that are vector-, water-, and virus-borne illnesses (Iqbal, 2020). The largest threat to the country's national security at the moment is the lack of access to water that is safe to drink. Numerous societal health risks are being brought on by the water proliferation and disappearance of sources of water supplies from official records, in addition to presenting operational concerns. The public is at risk for chronic and infectious illnesses such as hepatitis C, cholera, typhoid, diarrhea, jaundice, gastrointestinal infections, and liver cancer due to water contamination and the existence of sanitary networks.

The lack of water which is a direct effect of global warming has a significant impact on the healthcare sector, and the nation is also plagued with illnesses that are uncommon in affluent nations. As per WHO, around 2.5 million people die in Pakistan each year from severe diarrheal issues brought on by microorganisms found in poor-quality drinking water (Qamar et al., 2022). Since seventy percent of the domestic water consumption in Pakistan depends on bacterial water supplies, roughly eighty percent of the country's population is subjected to contaminated water, putting their safety and health at risk. Therefore, every year fifty-three thousand children die before reaching five years of age as a result of unclean water. The issues with accessibility and availability of safe drinking water have been made worse by the floods of 2022. The field investigations of KPK, urban and rural Sindh, and Baluchistan confirmed reports of drinking water shortage and contamination. These findings have been highlighted by the press and numerous NGOs. Due to wastewater mingling with stagnant water, ideal conditions for germs are set up, posing major health dangers. Flood water is difficult to dispose of, and there are many health problems as

a result. So, the entire population in the impacted areas is susceptible to the negative impacts of polluted water. Since the authorities have shown a lack of competence to control floodwater discharge in the majority of spots, the transmission of water-borne illnesses will continue for an extended period (Ishaque, Tanvir, & Mukhtar, 2022).

With the anticipated climate shifts, Pakistan's already-exorbitant health costs would continue to rise, which will have an even greater impact on the nation's goals for alleviating poverty and improving healthcare. Additionally, rising illness incidence has implications for food security since higher temperatures have been seen to increase the incidence of certain illnesses in the nation's livestock (Mustafa, 2011).

4.7. Social Impacts

Country's livelihood, housing, nutrition, and security are all at risk due to changes in the climate. People's ability to earn and work for a living will be impacted by heat exhaustion, malnutrition, the spread of vector-borne illnesses like dengue fever, a spike in the prevalence of waterborne diseases, and more. Due to their frequent confinement to hazardous areas and treatment barriers, such as financial limitations brought on by unauthorized employment, migrants, IDPs and members of ethnic and religious minorities will be specifically at risk.

Global disparity trends are intrinsically related to climate change. As the climate changes, millions of poor people will face serious issues like extreme weather, health effects, social injustice, financial crises, mobility, access to water, etc. Despite the fact that they are least responsible for the disaster, those most at risk from global warming suffer the greatest harm. As the impacts of warming temperatures intensify in terms of catastrophic events, health repercussions, food availability, socioeconomic issues, and accessibility to water, millions of at-risk individuals are experiencing disproportionate difficulties. Disasters are more likely to affect households headed by women, children, individuals with impairments, minorities, landless renters, immigrant, IDPs, the elderly, and other socially disadvantaged individuals. Their susceptibility is a result of a number of things, such as their place of residence, wealth, economic standing, culture, and race, as well as their ability to obtain justice, and healthcare. Some also asserts that economic downturn brought by global warming might also lead to an increase in child marriages, premature births, and domestic abuse. Children and women will be more vulnerable to malnutrition and starvation as a consequence of decreased agricultural production (Ahsan, 2022).

5. Policy Recommendations

5.1. Implementation of Climate Change Policy

The new National Climate Change Policy's (2021) objective is to direct Pakistan towards carbon neutrality and climate-resilience. So, it offers an extensive structure for tackling the problems Pakistan is currently facing and may face in the future as a consequence of climate change. Now, to implement this, all pertinent entities and ministries must work together to complete an integrated action. Additionally, it is believed that strong international ties are a key component of successful policy implementation; therefore, the Ministries of Climate Change and Foreign Affairs should avoid redundancy and overlap when necessary.

5.2. Population control

The environment is directly impacted by the mushrooming population since more automobiles will be on the road and more industries will be needed to support these people. On emergence, Pakistan had a population of 32.5 million; nevertheless, the 2021 census shows that the country's population has now hiked to 225 million. Pakistan's carbon dioxide emissions are still quite low compared to other countries, but the repercussions of climate change have already had a considerable impact on the country (Anjum et al., 2021). Thus, several population growth frameworks have been investigated by global experts in relation to energy usage and economic expansion. All of the results were in agreement, indicating that slower population increase has the potential to considerably reduce GHG emissions (Umar, 2018).

5.3. Smart and Fair Water Distribution

Lower riparian Sindh often bemoans the lack of water, especially during the yearly pre-monsoon season. IRSA has debunked the claims made by Sindh numerous times that Punjab is taking more water than is legally allotted to them. The distribution of resources among the provinces was ensured to be fair after the passage of the 18th Amendment, although it is up to the respective governments of the provinces to

determine how to accomplish it internally. The management, supervision, and development of SOPs for the delivery of water to the provinces fall within the purview of the IRSA. However, the number of residents and agrarian needs of each province varies widely, making it more difficult to understand and implement the framework. Along with on-site consultation visits by representatives of the federal, provincial, and local governments as well as elected officials, an ‘all levels of government strategy’ is advocated for the quick resolution of conflicting issues in order to address water supply issues on an equal basis. Unnecessary fault lines undermine national cohesion, so they must be avoided at all costs (Saddiqa et al., 2022).

5.4. Units for Water Treatment

Pakistan has to construct treatment facilities immediately since every year, healthcare facilities are overflowing with patients of all ages suffering due to waterborne illnesses. Residents of both rural as well as urban areas can contract infectious diseases and microorganisms from contaminated water, which makes them vulnerable to infection. The authorities must make sure that its citizens have access to safe drinking water since not everyone can afford to purchase water bottles. It is a well-known fact that Pakistan experiences a significant amount of its heavy rainfall during the months of July to September, with the majority of the precipitation ending up in ponds and rivers and the remainder flooding the cities and people who live there. The governing body may set up water treatment facilities that disinfect drinking water in order to guarantee public health. Similarly, to this, it is critical to build additional wastewater recycling plants. Rural areas hardly ever cleanse their sewage, which contaminates both surface and groundwater (Ali, Pervez, & Khan, 2020). Authorities must give immediate attention to the ever-evolving issues related to the cleanup and reuse of wastewater to conserve pure water for drinking and the balanced supply of recycled water for varied uses, including irrigation.

5.5. Climate adaptability measures

It is necessary to make a concerted effort to upgrade the nation's infrastructure, as well as to promote education and a switch to sustainable energy. Effective public transportation networks can help people become more active and so help them escape long-term diseases. In larger cities, walking and cycling may assist with minimizing carbon dioxide emissions and improve air quality. Compact urban housing planning might also help (Riaz et al., 2022).

Additionally, communities provide a variety of perspective, expertise, and knowledge to the issue of enhancing resilience and combating global warming. They should be regarded as contributors to building endurance rather than as beneficiaries. Based on investigations and expertise, community leaders may set objectives, inspire control, and develop and manage investment programs that are appropriate to their area's interests. IPCC emphasizes the importance of numerous types of information, including academic, indigenous, and local wisdom, in building climate adaptability. By advancements in climate finance design, localities and marginalized populations may be linked to institutional level decisions, scientific, and monetary assistance for locally applicable and fruitful development results (Ahsan, 2022).

5.6. Climate justice and equitable measures

Beyond being an environmental catastrophe, global warming has become a social problem that forces us to address problems with inequality on many other levels, including gender, race, income based inequalities. People who are underprivileged and disadvantaged are calling for more serious climate action. The IPCC has emphasized the necessity for climate policies that follow the tenets of climate justice (i.e., recognition, procedural, and distributive justice) in order to provide better results. Initiatives to mitigate global warming often have an unfavorable impact on the most vulnerable people. Without efficient and equitable regulations, global warming adaptation efforts may place more financial strain on families with low incomes; for instance, policies to increase public transportation or charge for carbon emissions might end up resulting in increased public transport costs, which will significantly impact lower-income households. Similar to the previous example, limiting forestry operations to specific times of the year may have an effect on indigenous groups, who depend on woods for their subsistence all year round. Determining the kinds of transitions necessary and spotting ways to combat social disparities during these processes are among the issues that must be understood and addressed in addition to the distributional effects of decarbonizing economies (Ahsan, 2022).

5.7. Disaster Management

Pakistan proved adept at convincing the world during the recently conducted “United Nations General Assembly” (UNGA) meetings of its vulnerability to climate-related threats. The US publicly appealed for aid from Pakistan to minimize hardship and speed up the recovery process for those affected by floods. It is suggested that Pakistan emphasize climate negotiations and diplomacy and start establishing relationships with advanced economies in order to reduce the hazards of global warming. Reactivating the disaster response system also calls for a large amount of cooperation. Using capacity building and specialized training, the current structure for national and provincial disaster mitigation bodies must be upgraded. It is also vital to set up the appropriate equipment for rescue and relief efforts in order to save many more lives (Bhutta et al., 2022). Faster infrastructure construction in flood-hit areas is necessary, and urgent mobilization of vital resources is required. These plans ought to be created and put into practice yearly during the pre-monsoon season in order to ensure a coordinated and suitable action that will minimize reaction time.

6. CONCLUSION

The world is facing an imminent threat from global warming, and Pakistan is especially at risk from its adverse effects. Last year Pakistan saw a severe drought on one side, followed by an unusual flood over a relatively short period of two to three months. Warning sirens are therefore ringing for Pakistan to assess the situation holistically, declare a climatic crisis and embrace "whole of government" and "whole of nation" strategies for an effective response. This will ensure resilient collaboration among agencies and capitalize on the synergetic application of all “Elements of National Power” (EoNP) for the best outcomes. For efficient administration, interaction, and implementation, it is crucial to combine the relevant ministries under the aegis of provincial and federal disaster response organizations. Substantial national awareness must be developed regarding the hazards of climate change. Furthermore, since these practices have been implemented by the majority of advanced nations, innovative approaches for mitigating global warming must be adopted. Conclusively, in light of the unflinching facts, the authorities in Pakistan must act immediately to mitigate the adverse impacts of global warming. The corresponding government departments are expected to use this article as an academic policy contribution to handle Pakistan's climate change challenges in the future.

REFERENCES

- Ali, Y., Pervez, H., & Khan, J. (2020). Selection of the most feasible wastewater treatment technology in Pakistan using multi-criteria decision-making (MCDM). *Water Conservation Science and Engineering*, 5(3-4), 199-213.
- Ahsan, A. (2022, June 17). Climate Change and its impacts in Pakistan. *Pakistan Today*. <https://www.pakistantoday.com.pk/2022/06/17/climate-change-and-its-impacts-in-pakistan/>
- Anjum, M. N., Cheema, M. J. M., Hashmi, M. Z. U. R., Azam, M., Afzal, A., & Ijaz, M. W. (2021). Climate change in the mountains of Pakistan and its water availability implications. *Water resources of Pakistan: issues and impacts*, 79-94.
- Ayub, S., Sadia, H., & Naveed, S. (2022). Impact of Communicable Diseases during Flood Disaster in Pakistan, What’s Next?
- Bhutta, Z. A., Bhutta, S. Z., Raza, S., & Sheikh, A. T. (2022). Addressing the human costs and consequences of the Pakistan flood disaster. *The Lancet*, 400(10360), 1287-1289.
- Beck, U. (2010). Climate for change, or how to create a green modernity? *Theory, Culture & Society*, 27(2-3), 254-266.
- Beckerman, W. (1995). Small is stupid. *Gerald Duckworth, London*.
- Cooper, M. (2010). Turbulent worlds. *Theory, Culture & Society*, 27(2-3), 167-190.
- Elzen, B., Geels, F. W., & Green, K. (2004). *System innovation and the transition to sustainability: theory, evidence and policy*: Edward Elgar Publishing.
- Giddens, A. (1984). The constitution of society (Cambridge. *Polity*, 284.
- Giddens, A. (2009). *Politics of climate change*: Polity.

- Hird, M. J. (2010). Indifferent globality. *Theory, Culture & Society*, 27(2-3), 54-72. eather. *Theory, Culture & Society*, 27(2-3), 9-30.
- Heureux, A. M. C., Alvar-Beltrán, J., Manzanar, R., Ali, M., Wahaj, R., Dowlatchahi, M., ... & Gutiérrez, J. M. (2022). Climate trends and extremes in the Indus River Basin, Pakistan: implications for agricultural production. *Atmosphere*, 13(3), 378.
- Hulme, M. (2010). Cosmopolitan climates. *Theory, Culture & Society*, 27(2-3), 267-276
- Iqbal, M. P. (2022). Climate Change and Water Crises in Pakistan: Implications on Water Quality and Health Risks. *Journal of Environmental and Public Health*, 2022.
- Iqbal, M. P. (2021). Climate Change Effects in Pakistan: Challenges Regarding Food Security and Health. *PAKISTAN JOURNAL OF BIOCHEMISTRY AND MOLECULAR BIOLOGY*, 54(1-2), 1-5.
- Iqbal, M. P. (2020). Effect of Climate Change on Health in Pakistan: Climate Change and Health in Pakistan. *Proceedings of the Pakistan Academy of Sciences: B. Life and Environmental Sciences*, 57(3), 1-12.
- Ishaque, W., Tanvir, R., & Mukhtar, M. (2022). Climate Change and Water Crises in Pakistan: Implications on Water Quality and Health Risks. *Journal of Environmental and Public Health*, 2022. Khalid, I., & Begum, I. (2020). Hydro politics in Pakistan: perceptions and misperceptions. *South Asian Studies*, 28(1).
- Khan, A., & Awan, N. (2020). Inter-provincial water conflicts in Pakistan: a critical analysis. *Journal of South Asian and Middle Eastern Studies*, 43(2), 42-53.
- Khan, N., Awan, H., & Malik, S. M. (2012). Mapping vulnerability to climate change and its repercussions on human health in Pakistan.
- Mustafa, Z. (2011). Climate change and its impact with special focus in Pakistan. In *Pakistan Engineering Congress, Symposium* (Vol. 33, p. 290). Lahore.
- Moss, T. (2000). Unearthing water flows, uncovering social relations: Introducing new waste water technologies in Berlin. *Journal of Urban Technology*, 7(1), 63-84.
- Mustafa, Z. (2011). *Climate change and its impact with special focus in Pakistan*. Paper presented at the Pakistan Engineering Congress, Symposium.
- Mustafa, Z. (2014). Climate change and its impact with special focus in Pakistan. Agricultural Sciences. Paper No. 243. In.
- Panhwar, M. Y., Panhwar, S., Keerio, H. A., Khokhar, N. H., Shah, S. A., & Pathan, N. (2022). Water quality analysis of old and new Phuleli Canal for irrigation purpose in the vicinity of Hyderabad, Pakistan. *Water Practice & Technology*, 17(2), 529-536.
- Qamar, K., Nchasi, G., Mirha, H. T., Siddiqui, J. A., Jahangir, K., Shaeen, S. K., ... & Essar, M. Y. (2022). Water sanitation problem in Pakistan: A review on disease prevalence, strategies for treatment and prevention. *Annals of Medicine and Surgery*, 104709.
- Raza, A., Razzaq, A., Mehmood, S. S., Zou, X., Zhang, X., Lv, Y., & Xu, J. (2019). Impact of climate change on crops adaptation and strategies to tackle its outcome: A review. *Plants*, 8(2), 34.
- Riaz, K., Ahmad, M., Gul, S., Malik, M. H. B. A., & Rehman, M. E. U. (2022). Climate change and its implications on health and the healthcare system: A perspective from Pakistan. *Annals of Medicine and Surgery*, 81.
- Shove, E. (2010). Social Theory and Climate Change-Questions Often. *Sometimes and Not Yet*.
- Shukla, P. R., Skea, J., Calvo Buendia, E., Masson-Delmotte, V., Pörtner, H. O., Roberts, D., . . . Van Diemen, R. (2019). IPCC, 2019: Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems.
- Szszynski, B. (2010). Reading and writing the w Saddiqa, A., Batool, S., Gill, S. A., & Khan, A. J. (2022). Water Governance and Management in the 21st Century: A Case Study of Pakistan. *Pakistan Journal of Humanities and Social Sciences*, 10(1), 29-42.

Global Climatic Transformation

- Singh, R. Bhandari, & Priya, B. (2021). Global Food Security Index 2020, *The Economist*, London, United Kingdom, 20.
- Umar, M. A. (2018, April 29). Population Control a Way to Tackle Climate Change. *The Express Tribune*.
<https://tribune.com.pk/story/1698567/population-control-way-tackle-climate-change>.
- Urry, J. (2010). Consuming the planet to excess. *Theory, Culture & Society*, 27(2-3), 191-212.