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Analyzing Climate Change and Extreme Weather Events: From a Cold Night in Swat to a Warming World

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ABSTRACT

Swat Valley used to be famous for its moderate climate and natural beauty; however, it is currently witnessing the strange extreme weather patterns that do not match the historical statistics. This article discusses the impact of climate change on the life of the Swat Valley and specifically discusses the disastrous floods of 2010 and 2022, frequent forest fires, and the recent cloudburst. Using the personal observations, field trips, and community attitudes, this study indicates the increasing susceptibility of the local community to such severe weather conditions and the inefficiency of the response to the disasters. The analysis juxtaposes the Valley scenario with the trends in climate conditions all over the world and discovers that local disasters are not accidents but a reflection of the worldwide climate crisis. It suggests a concerted response at three interdependent tiers, which include international collaboration to reduce carbon emissions, government policy focusing on adaptation and climate resilience, and individual response by practicing sustainability and activism at the grassroots level. The results highlight the importance of the fact that although climate change is a universal issue, the local grounded solutions, involvement of communities, and the awareness of the population are also essential in terms of tackling the severe problem.

Keywords: *Climate change, reshaping life, Devastating floods, Recurring forest fires, Cloudburst*

INTRODUCTION

Swat Valley, traditionally known to be blessed with a temperate climate and ecological beauty, is witnessing abnormal and extreme weather that defies the traditional trends of the place. A strange, cold, wet summer night in the middle of July 2025 was something that made the inhabitants worried, as the temperature went so low that a heavy blanket was needed, something that would have been impossible during warm summer

months. This was an extension of an irregularity in June of last year, where the highlands of Kalam and Shangla received snowfall. Such counter-cyclical weather abnormalities, a cold July night, and summer snowfall are not unique events. They are the symptoms of a larger imbalance in the climate system, which proves that we have already entered the realm of uncertainty Ullah, H., et al. (2018).

This change did not pass unchanged in August 2025, as a heavy cloud in the next-door district of Buner led to flash floods and landslides, killing more than 340 people and destroying numerous villages Bacha U. et al (2025). Although the immediate place of destruction was Buner, such drastic occurrences are slowly spreading to the larger Malakand Division, of which the Swat Valley was a part. It is worth noting that the city of Mingora in Swat was also massively affected since intense rainfall overwhelmed drainage systems, leading to urban flooding that disrupted the day-to-day life of the locals, destroyed infrastructure, and was a major blow to the local economy Qamer, F., et al. (2012).

Climate change is no longer a far off and tangible distant threat, but a reality that is approaching and is getting more intense. The most severe threats that the world faces today, according to the Global Risk Report 2025 compiled by the World Economic Forum, are Climate Change and extreme weather events Elsner M. et al. (2025). Climate change is defined as a long-term change of weather patterns and temperature. Global climatic conditions have increased the average temperature of the Earth's surface by approximately one point two degrees Celsius, on average, since the beginning of the Industrial Revolution in the early 1880s. According to a report issued by the World Meteorological Organization (WMO) 20252029 might be the hottest years on record. The cause of Climate Change has been human actions, mostly the combustion of fossil fuels, such as coal, oil, and gas. Fossil burning produces greenhouse gases, namely Carbon dioxide, methane, and nitrous oxide Khan, S. et al. (2019).

Khyber Pakhtunkhwa has been facing quantifiable climatic alterations over the last thirty years. Provincial Disaster Management Authority (PDMA) states that the average temperature of the area has also increased by 0.3 C to 1.2 C with an average precipitation rising by 11mm to 15mm over the same period. These trends are indications of a warmer climate and changing behaviours of precipitation that are leading to the rise in the frequency and severity of extreme weather events, flooding, cloudbursts, and forest fires, especially in the sensitive regions such as Swat Valley Khan, S. et al. (2019).

There is a misconception that climate change can be regarded as the raising of the temperature on the planet, and global warming is only the tip of the iceberg. Since this is a system whereby all things are interrelated, it means that a shift in one region can affect the shift in all the other areas. Climate change could also have such consequences as severe water shortage and drought, serious wildfires, an increase in sea level, floods, polar ice melting, and devastating storms, etc. It is in ours that these extreme weather events that our grandparents might have experienced at least once in their lifetime become increasingly frequent. Nonetheless, all locations will not undergo an equal impact; climate change can lead to droughts in one location and floods in another one Lindwall, C. (2022).

Despite numerous studies throughout the world revealing the reasons and effects of climate change, little has been conducted on the potential effects of the problem in countries such as Pakistan. The majority of studies emphasize the global risks, whereas the local problems are not addressed. Little attention is given to the impacts of climate change on our society and community, and less on how we should deal with these issues. This gap demonstrates the relevance of addressing the issue of climate change locally, as without this, the solutions can be tailored to the requirements of our society.

This paper takes a closer look at the ways in which climate change is altering weather patterns in the Swat region, based on personal observations and recent disasters in the region, to demonstrate the overall global

climate trends. Connecting the local experiences to scientific studies about increasing temperatures, changing the monsoon pattern, and the increasing number of extreme weather events, this study aims to draw attention to the magnitude and urgency of climate disturbance in Swat. Besides studying impacts, it also highlights the value of local awareness and adaptive strategies, and playing a role at the community level in climate action, because it acknowledges that a significant change can be achieved through global cooperation and localized efforts aimed at establishing resilience.

Statement of the problem

Swat Valley is undergoing an abnormal and fast weather transformation that comprises of cold wave during unsuitable seasons, snowfall in summer and flash floods and fatal cloudbursts that are breaking violently compared to its past weather pattern. Such incidences reveal increasing frailty of the local societies and structures, but the area does not have targeted work that links these disturbances to the general condition of climate change. Swat is experiencing a growing environmental and human risk in the absence of an effective adaptation strategy and timely analysis. This is the gap that this study fills.

METHODOLOGY

The article relies on first-hand observations, field visits, and analysis of secondary data to examine the increasing effects of climate change and extreme weather in the Swat Valley. The author personally observed and wrote of various climate-related catastrophes in the area, such as the 2022 floods, forest fires, and the 2025 cloudburst between 2022 and 2025. The author conducted field visits to various areas of the country that were affected, such as Mingora city, where he evaluated the damage, recovery efforts, and also interacted with the affected communities.

Besides the rescue efforts, the author also interviewed and had casual conversations with locals, volunteer workers, farmers, and business owners to learn the qualitative perceptions of the threat to the community.

The local events were linked to the global climate patterns using secondary sources such as reports and statistics issued by the National Disaster Management Authority (NDMA), World Meteorological Organization (WMO), World Economic Forum (WEF), and agencies of the United Nations. The pertinent scholarly sources as well as media coverage and past weather data were also consulted.

This methodology provides a grounded multidimensional analysis of the way climate change is transforming life in the Swat Valley by incorporating first-hand experience, perceptions of the community, and scientific data.

DATA ANALYSIS AND DISCUSSION

Between Floods and Flames: Swat Valley in the Age of Climate Disruption

The last ten years and a half years have seen a disturbing number of climatic disasters in the Swat Valley and its surrounding regions, in the form of a devastating flood to a steady rise in the number of wildfires. What was previously difficult to predict and was an unusual event has become quite typical in the local season.

The River of Swat has been regarded as the origin of life, belongingness and tranquility since time immemorial. Yet at the same time, this very River can nowadays serve as a symbol of devastation, since it no longer flows calmly in its course but turns into a river of blood during a more and more dramatic

monsoon season. The Swat Valley had one of the most devastating floods in history, with three days of constant monsoon rainfall striking the whole Valley between Landakey and Kalam in late July 2010 which locals now refer to as the Uniform deluge. The Pakistan country, which is vulnerable to climatic changes, was awakened by the flood, and this caused a massive destruction in the Valley. Thousands (more than 1,700) people died, and almost 20 million were impacted in the country due to harm and displacement Babar, M. (2022).

Once again, the rainy season of 2022 not only amounted to the usual downpours, but it also resulted in a humanitarian crisis on a national scale that profoundly impacted the valley and the rest of the region. The nation had witnessed relatively the most devastating and fatal floods in which 1,739 lives were lost, as well as uprooting more than 2.1 million. In this instance, the floods were not entirely due to heavy monsoon rains, but to glacial melting followed later by severe heat waves, which is a good indicator of a hot climate. The location of destruction was once again Swat Valley. The major infrastructure was re-established throughout the period up to 2022; such as new bridges and buildings were built in the region hit by the 2010 floods. Another wave of destruction of all these new constructions occurred in 2022 Lehmann, C. (2023).

Forests are also significant in the sustainability of the environment since they contribute to biodiversity, climate regulation, and the provision of products, including timber and non-timber products. Nevertheless, forest fires appear to be one of the most harmful phenomena that endanger the environment and are directly related to the overall effects of climate change. The Forestry, Environment, and Wildlife department declared climate change is the key contributor behind the unprecedented forest fires The News International, (2022).

Global warming is likely to lead to the rise in frequency and severity of such fires, which will be devastating to the atmosphere, the terrestrial ecosystems, and human societies. The report of the World Wide Fund (WWF) also reported that Pakistan had already become a forest-insufficient country, and less than 6 percent of the total area of the country was under forest cover. The Swat Valley has managed to preserve its forest cover, which has been severely impacted by frequent forest fires, particularly during the dry season, which spans from April to the end of June, a phenomenon commonly known as fire season. Another example is that in the summer of 2025, I was engaged in the active fight against forest fires in my local mountains in Swat. This personal experience provided some insights into the fact that the obstacles to response efforts were the problems related to local communities reacting to the wildfires, the deficiency of firefighting equipment, training, and institutional support, which is critical to the formulation of the proactive strategies of forest management, early warning systems, and community-based fire preparedness strategies in Swat as well as other vulnerable regions NDMA, (2025).

On the 15th of August 2025, residents of the area once more experienced a tragic accident. Suddenly, a cloudburst occurred over the area, and with an incredibly short duration of time, it caused an immense amount of rain. According to meteorologists, a cloudburst happens in a concentrated area of 30 sq km or less in an hour or two when the rainfall is 100mm or more. Readfearn, G. (2025). As a result, rivers and streams overtook in a matter of hours, and flash floods engulfed villages. Scores of people died, and others remain missing, and thousands were rendered homeless. Houses, roads, bridges, markets, fields, and livestock were damaged, and to families relying on farming and small businesses, and day-to-day labour, the loss has been literally unbearable Younas, W. (2025).

As per Pak Mission Society, according to the article, HUMANITARIAN SITUATION and NEEDS ASSESSMENT Report.

Table 1

District	Fatalities	Houses Damaged	Shops/Market	Critical Infrastructure
Swat	22	44 fully, 177 partially damaged	1,000 shops affected	36 bridges, 65 government buildings

The above-reported data by the humanitarian situation and needs assessment report by the Pak mission society indicated that there was significant damage caused by floods in Mingora, Babuzai, and Golkada. The overall number of households that have been affected is 221, out of which 44 are completely destroyed, and 177 are damaged partially, and thus there is a huge requirement of temporary shelters. There was contamination of water supply systems, and people had to use bottled water, and this aggravated the chances of getting waterborne diseases. Numerous health institutions became inoperable, and access to necessary healthcare was restricted. They also caused farm destruction orchards destruction, which resulted in a food crisis, and approximately 1,000 shops were ruined, which is detrimental to local businesses. Educational facilities were overwhelmed and are in need of temporary classes.

The disasters associated with climate do not only result in the generation of environmental losses; they also interfere with traditional livelihoods. In such areas as Swat, where handicrafts, agriculture, and tourism are the major sources of community livelihood, floods, forest fires, and cloudbursts destroy sources of raw materials and break the production cycles of crafts and also destabilize the livelihoods of the local artisans. This demonstrates that climatic instability is not a simple environmental issue but a socioeconomic challenge that has a direct impact on cultural and economic strength Khayest A. (2025).

On the same note, the rural livelihoods, mostly sustained by agriculture, have been seriously impacted by climatic disruptions. Such changes destroy crops in standing, lessen the water supply, augment pest infestations, weaken soil fertility, and disrupt supply chains. Taking into account the fact that agriculture is the main source of rural lifestyles in the area, these climatic changes endanger food security, financial stability, and the resilience of farming communities over time. The Swat valley is among the climate-sensitive valleys experiencing extreme ecological pressure in the recent decade, including Gabral. According to local accounts and records, approximately 40 percent of the agricultural land in Gabral Valley has been lost over the past few years, and this has been as a result of frequent floods, melting glaciers, and unpredictable weather Buneri, A. (2024).

Tourism is also another sector that is at risk because of climate change in the region, besides agriculture. Sudden floods, frequent landslides, collapsing glaciers, and dangerous road conditions have become common to tourists without proper warning and infrastructure to handle the consequences of those disasters. The solution to these problems is to have early warning systems and climate-resilient planning that safeguards lives and livelihoods, particularly in tourist-prone areas Alam Dr. M. et al. (2024).

During this year, 46 people died in at least 1 week of the monsoon rains that hit the country in a single week. Some of the victims included 13 tourists in one family who were swept along by the Swat River along the Mingora city. Such disastrous statistics highlight how climatic extremes, combined with the inability to prepare, are converting the natural beauty into areas of danger and loss Jamal, A. (2025).

Climate Warriors in Swat

Numerous individuals have become local climate warriors over the last couple of years, who have helped to make the environment sustainable by driving and spreading awareness of the effects of climate change via plantations. Fayaz Khan is one of them, a social media influencer who enjoys a large following because of his large plantation, as well as his effort to create awareness among the people about climate change. On

the same note, such a mission has been undertaken by Mulvi Fazal Wahab, a religious scholar of Mingora, who has demonstrated that religious leaders can also contribute to the promotion of activities that are friendly to the climate.

Together with these people, there also appeared a separate organization, named Climate Warriors Buner, and headed by a young climate activist, Shabir Khan. This group does not reduce itself to plantation; they also raise awareness of climate change. Use of seed balls in the mountains is one of their new creative practices. The seed ball consists of clay with seeds within it. The ball keeps the seed safe until it rains, when it is tossed in the land, thus an easy method of growing the plants in places that would not easily support a normal plantation.

POLICY RECOMMENDATION:

Ways to Combat Climate Change: Lessons from Swat Valley's Climate Crisis

Fighting climate change is possible on three interdependent levels, including the international level through global collaboration and international treaties like the Paris Climate Agreement, the national level through proper climate regulations and national policies, and the individual level through sustainable living practices and involvement in climate activities.

International Level: The classic example of the tragedy of the commons (when people make rational decisions in their individual self-interest, and yet act irrationally as a group by irreparably depleting a resource that is owned in common) happens at the international level. The environment is not national; hence, one state cannot overcome the issue of the climate crisis by cutting down its carbon emissions. Such a global challenge can only be dealt with in a united, cooperative, co-operative and collective move across borders. At this stage, however, there is a collective action problem. Britannica defines it as occurring when the incentives by individuals deter cooperation in pursuing a common objective. Everyone considers the costs and the benefits of their own, and when it is expensive to make the collective effort, then he or she would not wish to participate and would wish to take advantage of the work of others, otherwise referred to as free riding O'Gorman, M. (2010).

Government/National Level:

Strong policies, strategic planning and efficient utilization of resources can be used to address climate change. In the fight against climate change, the government has some roles and duties towards its citizens and towards the global community. On the lowest level, the government has the responsibility of safeguarding lives, livelihoods, and the ecosystem through minimizing vulnerabilities and providing long-term resilience. Nevertheless, as the recent catastrophes in Swat and the rest of the nation have demonstrated, the government has been fairly responsive and responsive to the situation, but not progressive and grounded in resiliency plans in the long-term. Some of the most effective tools include:

Incentives and Subsidies on Green innovation

Britannica defines subsidy as a direct or indirect payment, an economic concession or privilege provided by the government to a private firm, family or other governmental entities to advance a government goal. China and the United States use the most subsidy programs on environmental goals in the world, and then Australia, Canada, and the European countries. In the United States, Solar subsidies in China, funding new technology in the EU, Rooftop solar subsidies in India, and Ethanol subsidies in Brazil are some of the key

examples of government subsidies given to various countries in order to deal with climate change World Economic Forum, (2023).

Pakistan is an agrarian-based society, and in contribution to world carbon emissions, it produces less than one percent. The urban road traffic is also a major source of air pollutants in Pakistan, and more than 26 million two-wheelers and more than 4 million registered cars exist on the roads. Electric vehicles are quickly becoming popular in order to deter the use of fossil fuel by burning it. Switching to green energy is not a luxury but a necessity that should be done by eliminating carbon fuel. The evolution is slow and uneven in the country, but it is rather positive that the process has started. This change requires the government to offer subsidies and financial incentives Gillani, I. (2025).

Adaptation Policy

Floods, droughts, and heat waves are becoming more severe, and adaptation policies are required to minimise vulnerability. The process of adapting to the current or anticipated climate and its impacts to moderate the damage or to not miss the opportunities of a profitable business is known as climate change adaptation, which is a major process of reducing exposure and vulnerability to climate change Khavhagali, V. (2024).

To the Swat Valley and more so to Pakistan, adaptation is not only a response to disasters. The government must invest in secure infrastructure, early warning, and climate-smart farming. More so, the policies need to target defense of vulnerable and poor communities, which are the most affected in the case of a disaster occurring.

Reforestation: National and International Emergency

One of the most effective and urgent answers to climate change is reforestation. Forests around the world are carbon sinks and capture huge volumes of carbon dioxide in the atmosphere, besides offering biodiversity habitats and controlling the water cycle. Reforestation is a process involving planting trees in regions that were once forested, with its cover depleted. But the reforestation also covers plantation of all such areas too which were not previously planted United Nation (n.d) .

Reforestation is a national and international concern because trees are significant in regulating the climate of the planet, which is the greatest challenge to human life on the earth. Greenhouse gases could be best eliminated by reforestation as they are absorbed in the forest. Each 100 million cubic meters of forest stock will take in about 160 million tons of carbon dioxide. The forest is also very crucial in the conservation of varied species of animals and plants. Forests serve as food and shelter to numerous species of animals and birds. Forests also facilitate the presence of these species in the form of existence of these species through the ecological cycle by keeping the carbon-oxygen balance intact, the water cycle in control, and even ensuring that soil is not eroded Raza, A. (2025).

Individual Level

Although the role of government and international institutions influences mass actions in response to climate change, individuals have their role to play. Lifestyle modifications and sustainable ways are applicable to all members of the community to minimize the crisis. Dependence on fossil fuel, including using bicycles or other means of transportation as an alternative to personal automobiles, minimizing domestic use of energy, and purchasing energy-efficient appliances are all minor measures, but they result in gigantic shifts. Forests in areas such as Swat have a highly significant role in controlling the climate in

the area. People will be able to participate in a plantation drive, take care of the existing forests, and become environmentally friendly in their everyday lives World Resource Institute, (2026).

In addition to it being a personal choice, individuals could be the agents of awareness and resilience. Grassroots leadership has already been demonstrated by students, religious scholars, and social media activists as inspiration to make the community act collectively. The role of the individual is significant, whether it is through creating awareness or educating the community in the event of such disasters as floods and fires. These contributions are a force to reckon with in the climate change fight globally when aggregated throughout society.

CONCLUSION

The extreme weather events that have taken place recently in the Swat valley, the unusual night in summer, floods, wildfires, and sudden cloudbursts demonstrate that climate change is no longer an issue of tomorrow. It is already taking place, and it is transforming the lifestyle. The people of the region are living in uncertainty since there have been increased calamities that were previously considered rare. It is the tale of the larger picture in the case of Swat. Globally, the temperatures are increasing, weather changes are occurring, and there are increased extreme weather patterns. To Swat people, this implies loss of homes, farms, businesses, and even family members. Climate change is not all about the environment, but it is all about human life and communities.

Nevertheless, there is some hope; people living in these areas have begun to struggle their own way. Plantations are being driven by climate activists, religious leaders, and young volunteers, with information disseminated and communities trained on disaster preparedness. Their activity proves the fact that change can be achieved when people act consciously as a team.

In order to mitigate climate change, there should be action on all levels. Nations have to agree on international treaties and international conventions; the governments have to strategize and invest in secure systems and green energy; and individuals can implement environmentally friendly lifestyles and contribute to society by engaging in community work. Simple things such as planting trees, consuming less fossil fuels, and conserving nature are easy practices that can have a huge impact.

The Swat Valley climate crisis taught the lesson that climate change is a common issue that needs common solutions. Provided the local community, which has few resources, can act, the same can be done by the people all over. It is time to do something now before the abnormal weather event experienced today becomes even more massive and permanent in the future.

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