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**Climate hotspots and policy**

After years of extensive efforts to bring an evolution in scientific research, the scientific community has not only succeeded in building the trust of stakeholders in science but policies are influenced by research findings to a relatively large extent.

Researchers have been providing scientific findings to advise regarding decisions on prime issues ranging from economy and security to environment, agriculture and energy. Nevertheless, not all research is translated into actions and incorporated into the policymaking process due to multiple factors.

One of the major factors is the gap between science and policymakers. However, in recent times there has been a growing realization of translating research into action and its influence on policy and management. As climate change is taking its toll on almost all parts of the world, not only are researchers trying to effectively communicate findings to decision-makers there are also dedicated ongoing projects to bridge the gap between researchers and policymakers. Currently, many climate policies are devised on the basis of future projections of likely climatic changes which have motivated the scientists to pursue efforts in improving modelling techniques and minimizing uncertainty in the projections.

The Asia Pacific Network (APN) for Global Change has been supporting such studies in Pakistan with the objective of influencing policymaking on climate change in a proactive way. One of the ongoing APN supported projects exclusively aims to disseminate scientific research through a number of proposed activities. The objective is to make the public aware of the climate crisis and future threats arising in Pakistan from climate change.

The enhanced vulnerability of Pakistan towards the changing climate has been indicated by multiple lines of evidence while a substantial increase in the frequency and intensity of extreme weather events, ranging droughts, floods and heatwaves, with every approaching year authenticate the claim. The effects are likely to exacerbate due to geographic location, more reliance on agriculture, highest dependence on water resources, and low capacity to face the climatic emergencies thus, making the country a ‘climate hotspot’.

A study conducted by Dr Shaukat Ali (GCISC), under an APN-supported project with collaboration of scientists from China, Brazil and Korea identifies future hotspots in Pakistan along with providing robust projection of climate change in the country. The study forecasts that average temperature in the country is projected to increase by 2.6 C to 5.1 C under different emission scenarios by the end of this century.

The highest increase (5.5 C) in average temperature, however, is predicted over northern Pakistan, the coldest region of the country and a part of the third pole of the Earth. The region also displays high vulnerability to extreme weather events in the future where temperature and precipitation extremes are projected to increase at a rate higher than the rest of the country, making the region a future climate hotspot. Cities like Gupis, Drosh, Chitral and Gilgit are where the highest increase in average temperature is forecasted by the end of the 21st century, which can be attributed to elevation dependent warming.

The increasing climate extremes in the region are a leading cause of accelerated glacier melting which effect the livelihood of millions of people directly and indirectly. Thus, the accelerated warming, coupled with changing water availability in future, indicate the need to strengthen resilience and adaptive capacity to climate change impacts along with efficient disaster preparedness and response actions to confront the climate-related hazards and disasters in the mountain regions of Pakistan.

The southern region of the country, particularly Sindh, also emerges as a future ‘hotspot’ not only in terms of climate response but also on the basis of likely impacts on living standard of the population. Climate models predict that the hottest cities by the end of the century would be from Sindh as Hyderabad shows the highest average temperature in future followed by Jacobabad.

The average temperature in Hyderabad by the end of the century is projected to be 29.9 C under mitigation scenario while it is projected to reach 32 C under high emission scenario – even higher than the current hottest city of the world, where average annual temperature is observed as 30.7 C. The highest April temperature ever observed in the world has also been recorded in Nawabshah in April 2018, reaching 50.2 C.

In terms of precipitation, the driest conditions are likely to be prevalent in Dalbandin followed by Khanpur and Jacobabad. These projected hot and dry conditions are a looming threat for agriculture in the fertile regions of Sindh and Punjab as the decreased precipitation in the future and high temperatures could have the potential to affect the productivity of the soil. This highlights the importance of addressing changes in average weather in the economically important Punjab and Sindh provinces. Apart from northern and southern Pakistan, the monsoon-dominated areas of Punjab and Khyber Pakhtunkhwa also await dedicated policies to tackle the projected increase in monsoon precipitation indicated in the same research.

It has been observed that extreme precipitation in the monsoon season always poses a flood risk in Punjab and KP and, as forecast, the intensity and frequency of the extreme precipitation along with the total monsoon precipitation is estimated to increase in the future. By considering these research findings, the associated risk can be averted while devising management strategies in the susceptible areas.

As the study indicates, the impacts of the changing climate are likely to be felt in all the parts of the country where on the one side melting glaciers are posing a threat to future water availability, while on the other end temperature extremes, unpredictable monsoon rainfall can lead to food insecurity. All the sectors – including water, agriculture, livelihood and economy at large – have been and are projected to be hit hard by climate change due to which the country is in dire need of effective implementation of science-guided policies to avoid the upcoming risks and threats.

Containing the rampant increasing temperature is essential to prevent major areas of Pakistan from becoming future hotspots. The objective should not only be to prepare the more strapped areas for the adverse effects of climate change, but also to protect the economic hubs of the country. The need is for the country to engage in global climate discourse, along with mainstreaming climate change considerations in national policies and plans while addressing impacts at a local scale. Respective departments should develop tailored strategies, considering area-specific risks and vulnerabilities. Keeping in view the vulnerability of the country, it is pertinent to design water, food and energy security policies and plans with explicit recognition of the relevant risks and associated economic and social costs of climate change, and implementation of well-defined mitigation and adaptation strategies.

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