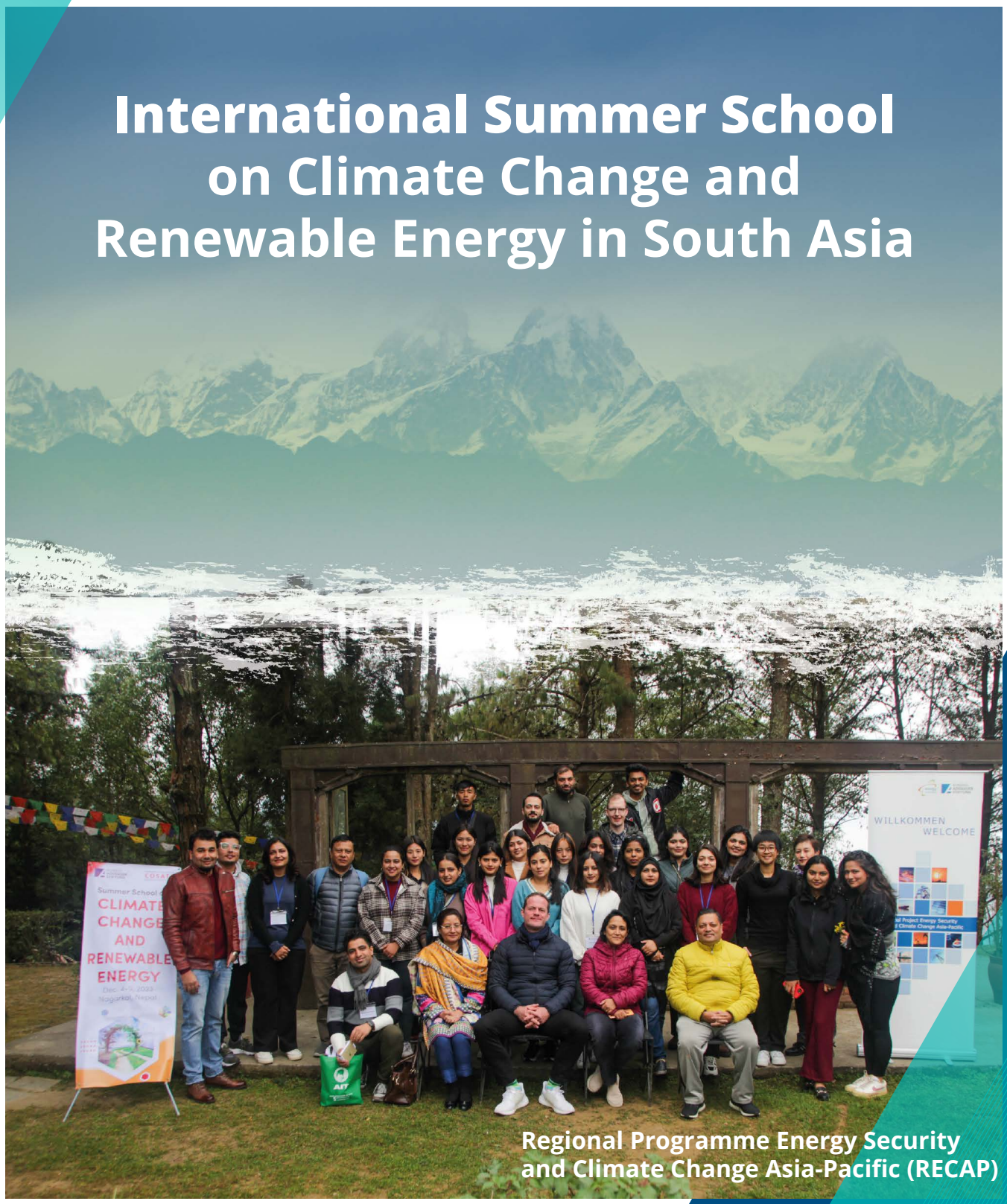
KONRAD ADENAUER STIFTUNG

International Summer School on Climate Change and Renewable Energy in South Asia



Regional Programme Energy Security and Climate Change Asia-Pacific (RECAP)

CONSORTIUM OF SOUTH ASIAN THINK TANKS

COSATT

BRIDGING POLICY RESEARCH IN SOUTH ASIA

International Summer School on CLIMATE CHANGE and RENEWABLE ENERGY in South Asia

December 4–9, 2023

Kathmandu and Nagarkot, Nepal

Organizers

Regional Programme Energy Security and Climate Change Asia-Pacific (RECAP), Konrad-Adenauer-Stiftung (KAS)

Consortium of South Asian Think Tanks (COSATT)

Introduction

The International Summer School Program on "Climate Change and Renewable Energy in South Asia" was organized by the Consortium of South Asian Think Tanks (COSATT) in collaboration with the Regional Programme Energy Security and Climate Change Asia Pacific (RECAP) of Konrad-Adenauer-Stiftung (KAS) in Nepal from 4-9 December, 2023. The program aimed to convene students, researchers, and speakers from diverse South Asian countries to delve into the intricate relationship between climate change and the promotion of renewable energy sources. It provided a platform to discuss, analyze, and comprehend the multifaceted challenges posed by climate change in the region. Hosted in Nepal, a country grappling with both climate change impacts and embracing renewable energy solutions, the program facilitated discussions, knowledge sharing, and collaboration among participants.

Climate change is a pressing global issue that affects every region of the world, but its impacts are particularly severe in South Asia. These impacts are already affecting millions of people and ecosystems in various ways, and they are projected to worsen in the coming decades if mitigation and adaptation measures are not implemented in the region. The region faces distinctive challenges concerning climate change, ranging from rising temperatures to erratic weather patterns, glacial melt, sea-level rise, and extreme weather events and moreover, compounded by an increasing need for sustainable energy sources. These issues significantly impact agriculture, water resources, biodiversity, and livelihoods across the region.

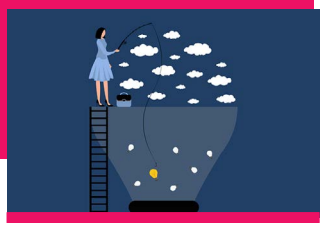
The program created a platform for interdisciplinary discussions and knowledge sharing to address these pressing concerns by focusing on the intersection between climate change mitigation, adaptation strategies, and the promotion of renewable energy technologies across South Asia. The summer school allowed young participants comprising of researchers, students and climate activists from South Asian countries to extensively learn about climate change and its impacts and observe the best practices around South Asia, particularly in Nepal, adopted by the local communities.


WILLKOMMEN
THE MALLA
HOTEL

CONTENT

SUMMER SCHOOL'S OBJECTIVE

Climate change will have far-reaching future repercussions, needing widespread youth participation and involvement at all levels, from grassroots to policymaking. The climate change summer school allows young delegates from South Asian countries, including researchers and students, to learn more about climate change and its effects, disaster risk reduction, South Asia's fragile eco-system, flood control measures, and best practices adopted by South Asian governments and local communities, particularly in Nepal, to mitigate climatic impacts. Below are the key focus of the summer school:



Educational Awareness

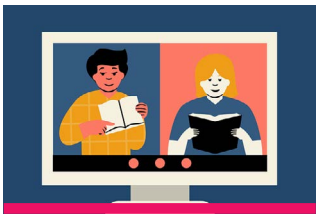
To increase awareness and understanding of climate change science, its causes, and its effects on the South Asia region.

Regional Context

To explore the specific implications of climate change on South Asia, including extreme weather events, food security, water resources, and more.

Solution-Oriented

To inspire participants to actively engage in climate action by learning about mitigation and adaptation strategies relevant to South Asia.



Youth Empowerment

To empower South Asian youth to become climate change ambassadors in their communities, schools, and universities.

Organizer
Consortium of South Asian Think Tanks (COSATT)

CONSORTIUM OF SOUTH ASIAN THINK TANKS
COSATT
BRIDGING POLICY RESEARCH IN SOUTH ASIA

KONRAD ADENAUER STIFTUNG

Supported by
Regional Programme Energy Security and Climate Change Asia Pacific (RECAP), Konrad-Adenauer-Stiftung (KAS)

PARTICIPANTS

The program welcomed students, scholars, researchers, and professionals from South Asian countries including Nepal, India, Bangladesh, Pakistan, Sri Lanka and Bhutan. Diverse academic backgrounds and expertise in climate and environmental studies, forestry, environmental law, international relations, policy-making, and renewable energy contributed to rich discussions and multifaceted perspectives on climate change impacts and mitigation strategies.

SUMMER SCHOOL STRUCTURE

The summer school invited South Asian students from diverse backgrounds who were interested in learning about climate change, global warming impacts, climate adaptation and renewable energy in the region. There were two components to the course. The first part of the course consisted of lectures, tutorials, and group activities and the second part consisted of organizational tours and field visits. The course was conducted in English. Interested applicants throughout the region applied for the summer school and qualified students were selected by a selection committee. This course was instructed by climate change experts and practitioners from the region.

MODALITY

22 scholars and 6 guest lecturers from different South Asian countries took part in the week long residential Summer School program. The expertise and pedagogical methods employed by the guest lecturers from diverse academic backgrounds and regions within South Asia played a pivotal role in shaping the learning experience and fostering a conducive environment for knowledge exchange. The guest lecturers brought invaluable expertise, practical experience, and academic knowledge to the Summer School. Their contributions encompassed various aspects of climate change, including scientific foundations, policy frameworks, adaptation strategies, and renewable energy solutions.

In essence, the collaboration between guest lecturers and students in the Climate Change Summer School not only facilitated the dissemination of knowledge but also encouraged active participation, fostered critical thinking, and laid the groundwork for future collaborations and initiatives in combating climate change and fostering renewable energy in the South Asian region.

Similarly, participants were also taken for local community visit and focused group discussions with the community people in order to understand local climate adaptation practices in Nagarkot area. Besides, field tours and community visit, organizational visit to ICIMOD-knowledge Park was also conducted.

Prior to the Summer School in Nagarkot, key note speech was delivered at the welcome dinner reception in Kathmandu by the former Minister for Water Resources of Nepal, Mr. Dipak Gyawali. Convener of COSATT, Dr. Nishchal N. Pandey, and director of KAS RECAP, Dr. Fredrick Kliem, also addressed the dinner reception and outlined the significance of the program and its objectives. The reception program was attended by other concerned stakeholders and local Nepali guests including the summer school participants.

Summer School contents and issues were explored within a multidisciplinary framework with:

Lectures

Renowned South Asian academicians

Workshops

On a group work basis on pertinent issues and planning

Practical exercises

Simulation, planning, research works

Field works and research

Understand ideas, interact with locals, feel realities

Organization visits

Navigate the existing work, listen to experiences, policies, plans and implementations

LECTURERS AND GUEST SPEAKERS

NEPAL

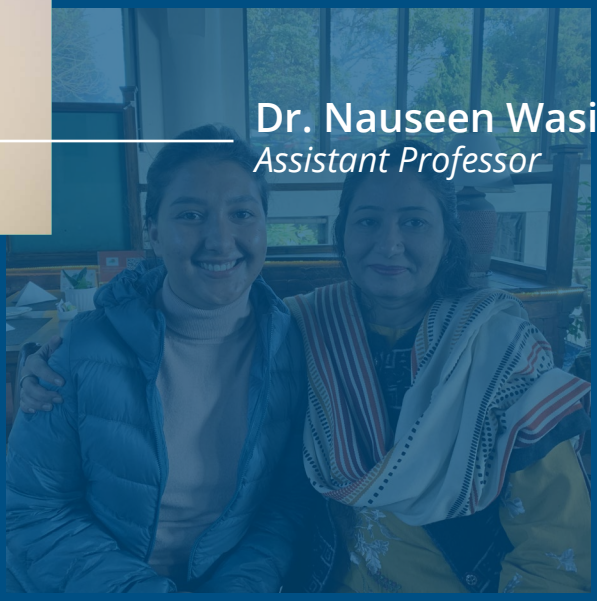
Kathmandu University

Ujjwal Upadhyay
Professor

PAKISTAN

University of Karachi

Dr. Nauseen Wasi
Assistant Professor



BHUTAN

Royal University of Bhutan

Dr. Bhagat Suberi
Head of Department of Forestry

LECTURERS AND GUEST SPEAKERS

NEPAL

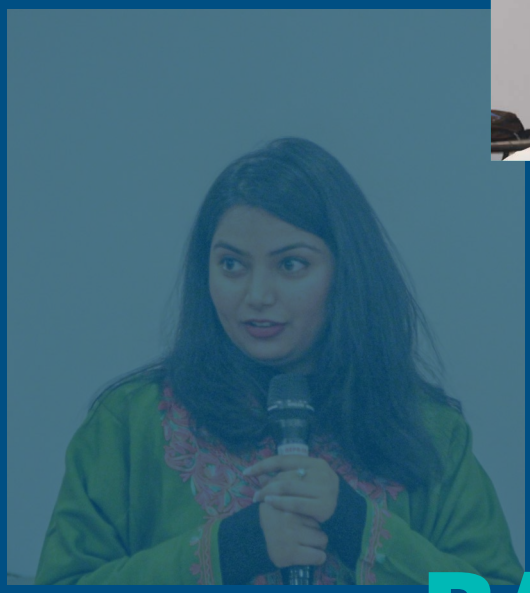
Supreme Court Nepal

Padma Rijal
Advocate

INDIA

National Institute of Advanced Studies

Akriti Sharma
Doctoral Scholar



BANGLADESH

Bangladesh Institute of International and Strategic Studies

Dr. Benuka Ferdousi
Senior Research Fellow

PROGRAM HIGHLIGHTS

The summer school program comprised a comprehensive itinerary featuring various activities, including:

Expert Lectures and Workshops: Eminent speakers and experts delivered lectures and conducted workshops on diverse topics related to climate science, environmental and climate-smart policies, adaptation strategies, renewable energy, community resilience, sustainable development and their relevance to South Asia's context.

Field Visits and Demonstrations: Participants engaged in field visits to witness firsthand the impacts of climate change on local communities, ecosystems, and vulnerable areas. They also had the opportunity to visit ICIMOD Knowledge Park, where they observed the demonstration of renewable energy technologies, water management, vegetation management, soil management, income generation (vegetables, fruits, livestock, fish, beekeeping), biodiversity conservation and ecotourism.

Group Discussions and Debates: Interactive sessions allowed participants to engage in discussions, share experiences, present research findings, and engage in debates focusing on climate change challenges and successful renewable energy initiatives specific to their respective countries. This allowed for comparative analysis and learning from best practices.

Community Research and Group Projects: Participants were divided into groups to work on collaborative community research projects addressing prevalent climate change issues and adaptation process in the communities of Nagarkot area. These projects fostered teamwork, critical thinking, and innovative problem-solving skills among the participants. Final presentations showcased their findings and recommendations.

Cultural Exchange and Networking: Beyond academic sessions, cultural evenings and activities facilitated cultural exchange among participants, promoting understanding and appreciation of diverse South Asian cultures and traditions.

ORIENTATION SESSION

An orientation session on "Climate Change and Renewable Energy from a South Asian Perspective" was provided by Mr. Ujjwal Upadhyay from Nepal with the aim of providing an overview and foundational understanding of the intertwined concepts of climate change and renewable energy, particularly within the context of South Asia.

The orientation session served as an introductory platform to familiarize participants with the key aspects, challenges, common terminologies, and opportunities associated with climate change, mitigation, and the promotion of renewable energy sources in the region. Also, a brief introduction on global warming, its cause and effects and forms of natural disasters and its impacts was given and discussed.

The orientation briefed the participants, including researchers and students, to:

- Learn more about climate change and its effects, Disaster Risk Reduction,
- See how fragile the eco-system of South Asia is,
- Disaster control measures as well as observing best policies and practices adopted by the governments in South Asia and local communities, particularly in Nepal, to mitigate climatic impacts. COP 27/28 outcomes, NDC Plans, NAPA etc.

Renewable energy as a means of sustainable solutions- the energy that does not produce any type of greenhouse gases to maintain the ecosystem integrity is the only way to curb carbon emissions to keep the earth's temperature within 1.5 Degree rise.

The orientation was followed by in-depth presentations on the effects of climate change, adaptation strategies, impacts on the livelihoods of vulnerable communities in the wider region, and the effects on SAARC countries, such as Bangladesh, Bhutan, India, Nepal and Pakistan.

CLIMATE CHANGE AND ENVIRONMENTAL RIGHTS: A LEGAL ANALYSIS

Advocate Padma Rijal, *Supreme Court Nepal*

Advocate Padma Rijal's presentation on "Climate Change and Environmental Rights: A Legal Analysis" during the summer school provided a comprehensive and insightful exploration of the legal dimensions and implications of climate change on environmental rights. Her expertise and command over the subject matter enriched the session, offering participants a profound understanding of the intersection between environmental law and the challenges posed by climate change.

She meticulously elucidated the existing legal frameworks, both at the international and national levels, addressing environmental rights in the context of climate change. She delved into key legal instruments, treaties, and conventions relevant to environmental protection and highlighted their significance in ensuring the rights of present and future generations.

She effectively outlined the adverse impacts of climate change on the environment and human rights, emphasizing the disproportionate effects on vulnerable communities and marginalized populations. Her presentation underscored the urgency to safeguard environmental rights amidst these changing climatic conditions. She also presented case studies and legal precedents, demonstrating how legal mechanisms have been employed globally and within the South Asian context to address environmental degradation caused by climate change. These examples provided concrete illustrations of the legal approaches and their outcomes. She also educated participants about the environmental laws and rights in Nepal;

Climate Change-Related Laws and Environmental Rights in Nepal

Article 30 of the Constitution of Nepal 2015 addresses constitutional environmental rights and the potential for horizontal constitutionalism of the basic rights pertaining to the environment in Nepal. The substantive right related to the environment provided by the Constitution of Nepal 2015, provides:

30. Right to Clean Environment:

(1) Every citizen shall have the right to live in a clean and healthy environment.

(2) The victim shall have the right to obtain compensation, in accordance with law, for any damage caused by environmental pollution or degradation.

(3) This Article shall not be deemed to prevent the making of necessary legal provisions for a proper balance between environment and development in the development works of the nation.

It is observed that the adjectives 'clean' and 'healthy' environment are ambiguous and based on subjective judgment. What satisfies the constitutional requirement of clean and healthy? In this compound adjective 'clean and healthy', does 'healthy' entail clean or does it impose an independent requirement? Does the healthy environment also mean the health of the environment itself? Here, 'healthy' might have some anthropocentric reference but the term 'clean' certainly qualifies the environment.

Similarly, Article 30 (2) implies the Horizontal application of the constitutional provision as the duty bearers of this right could be non-state actors like legal persons, corporations or private individuals. Under the concept of constitutionalism, one of the functions of fundamental rights is to limit the powers of the government. The effect of fundamental rights relates to the vertical relationship between the individual, who may potentially be a victim and the beneficiary of the rights, and the state, who could potentially be a perpetrator and the addressee of the rights. The constitutionalization of the polluters pay principle creates two main implications:

a. Even the non-state actors bear the corresponding constitutional duty not to pollute or the duty to uphold the right to a clean and healthy environment, thus, achieving a deterrence effect and
b. They bear the legal liability to compensate for the harm caused.

However, the execution of such a right to be compensated by the polluter may be challenging due to factors like poor implementation mechanism, trans-boundary pollution, the presence of multiple or unidentifiable sources of pollution, the quantification/calculation of both economic and ecological harm etc.

- Examination of the nature of environmental rights under the broad classification of substantive and procedural environmental rights
- Environment democracy and procedural environmental rights: right to information, right to participation and access to justice
- The Environment Protection Act of Nepal 2019 contains a dedicated chapter (chapter 4) on climate change. It provides some legally binding obligations of the government to adapt and mitigate the effects of climate change.

The Legal Rights of Nature

Advocate Rijal's discussion on the legal rights of nature added a significant dimension to the discourse on environmental law and rights. She introduced the emerging concept of recognizing legal rights for nature itself, highlighting the intrinsic value of ecosystems, rivers, forests, and other natural entities. This framework posits that nature possesses inherent rights that should be legally protected, similar to human rights. She delved into the philosophical and ethical underpinnings of the rights of nature, emphasizing the need to move away from anthropocentric views and acknowledge nature as a subject with its own rights and interests.

On the substantive level, she stated, the protection of the environment through a right-based approach has been traditionally the most popular legal solution to environmental problems. On the contrary, many scholars point out the deficiency of this approach. They argue that this approach is individualistic and supports anthropocentrism thus human mastery over nature, by creating entitlements rather than duties. There are some issues of legal subjectivity too. State and humans are the only legal subjects of law. The difficult question today is who are the subjects of environmental law? Are human beings the only possible legal subjects or does it extend to the non-human world as well? Is it possible to view 'the environment' as a legal subject? Can we create legal entitlements for the generation yet to be born? Scholars like Douglas Kysar claim that 'many of environmental law's subjects are not politically represented in the usual liberal fashion'. However, some countries like Ecuador in their constitution provide the legal right to nature. Legal personhood of nature/non-human entities is legally recognized by the Indian judiciary in many cases, she added.

Advocate Rijal advocated for a rights-based approach to tackle climate change, emphasizing the fundamental right to a healthy environment and the interconnectedness between environmental rights, social justice, and sustainable development. Her presentation shed light on the role of legal instruments in ensuring accountability and enforcement of these rights. She concluded her presentation with policy recommendations, urging for stronger legal measures, inclusive policies, and enhanced international cooperation to mitigate climate change effects and protect environmental rights.

CLIMATE CHANGE: PAKISTAN'S CASE

Assistant Professor Nauseen Wasi, *University of Karachi, Pakistan*

Prof. Nauseen's presentation on "Climate Change: Pakistan's Case" during the summer school offered a comprehensive and insightful analysis of the specific challenges, vulnerabilities, and initiatives related to climate change in Pakistan. Her expertise and in-depth knowledge provided participants with a nuanced understanding of the multifaceted impacts of climate change on Pakistan's environment, economy, and society. She elucidated how climate change affects different socio-economic sectors in Pakistan, including agriculture, energy, health, and urban development. She discussed the challenges faced by vulnerable communities and marginalized populations due to climate-induced disruptions. Prof. Nauseen provided insights into Pakistan's policy response to climate change, discussing national strategies, initiatives, and international collaborations aimed at adaptation, mitigation, and resilience-building. She highlighted key projects and policy frameworks designed to address climate change challenges within the Pakistani context.

Why Pakistan Is Extremely Vulnerable to Climate Disasters?

Pakistan is currently the fifth most climate-vulnerable country in the world. For the past 21 years, Pakistan has consistently ranked among the top 10 most vulnerable countries on the Climate Risk Index, with thousands fatalities due to climate-related disasters and financial losses amounting to billions from 175 plus extreme weather events.

Pakistan is located at a place on the globe which bears the brunt of two major weather systems. One can cause high temperatures and drought, like the heat wave, and the other brings monsoon rains. Significant factors exacerbating the effects of climate change in Pakistan include an inadequate sewage system, air pollution from industrial waste, and deforestation, the country could not afford to proactively fix these, nor prepare for flooding and heavy rains.

With 7,253 known glaciers, Pakistan contains more glacial ice than any other country on Earth outside the Polar Regions. Glaciers are melting rapidly, creating more than 3,000 lakes. Around 33 of these are at risk of sudden bursting, which could unleash millions of cubic meters of water and debris, putting millions people at risk.

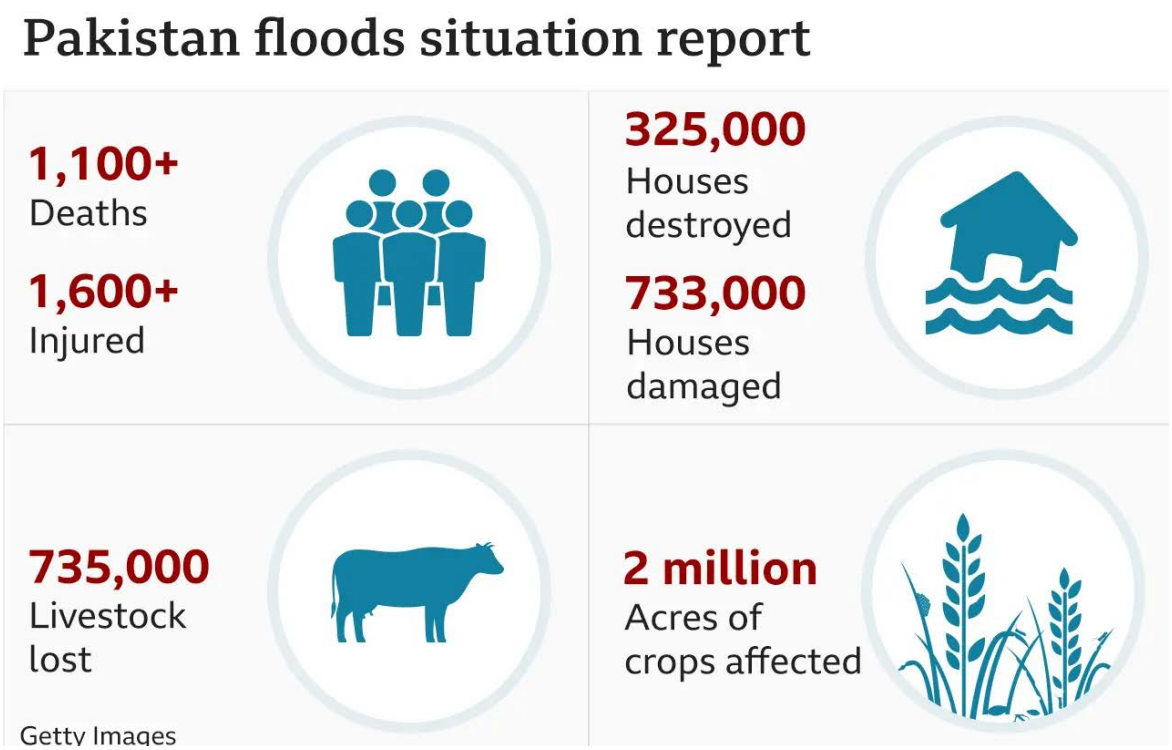


Figure 1: Areas Hit by Monsoon Rains in Pakistan
Source: BBC News (2022)[1]

Impact and Implications:

Prof. Nauseen's presentation deepened participants' understanding of Pakistan's unique challenges and responses to climate change. Her expertise and insights stimulated discussions, raised awareness, and encouraged participants to contemplate the intersection between climate change, policy interventions, and community resilience within the Pakistani context.

Changing seasonal weather patterns, rising temperatures, variability of monsoons and melting of glaciers in the north- compounded with recurrent extreme weather events and natural disasters- are just some of the effects of climate change that Pakistan has been forced to contend with in recent years.

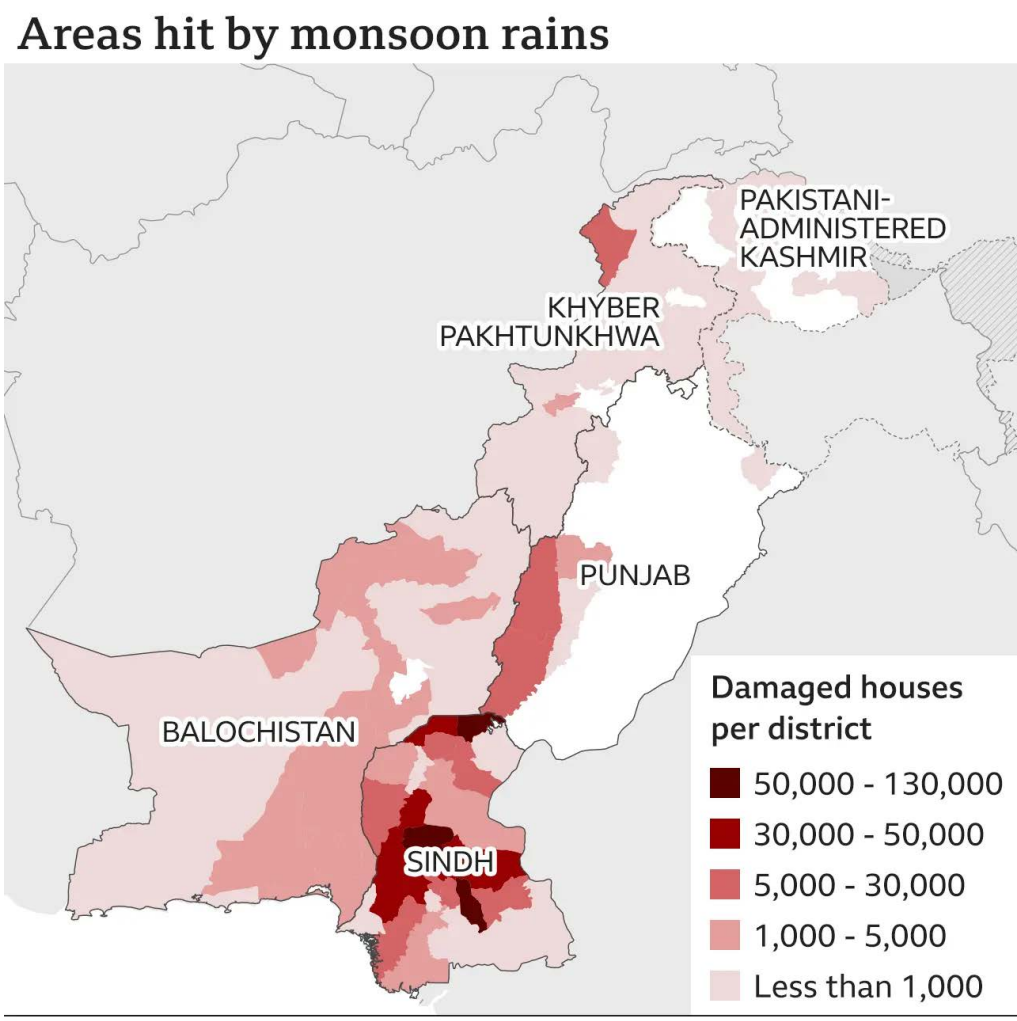


Figure 2: Pakistan Floods Situation Report
Source: BBC News (2022)[2]

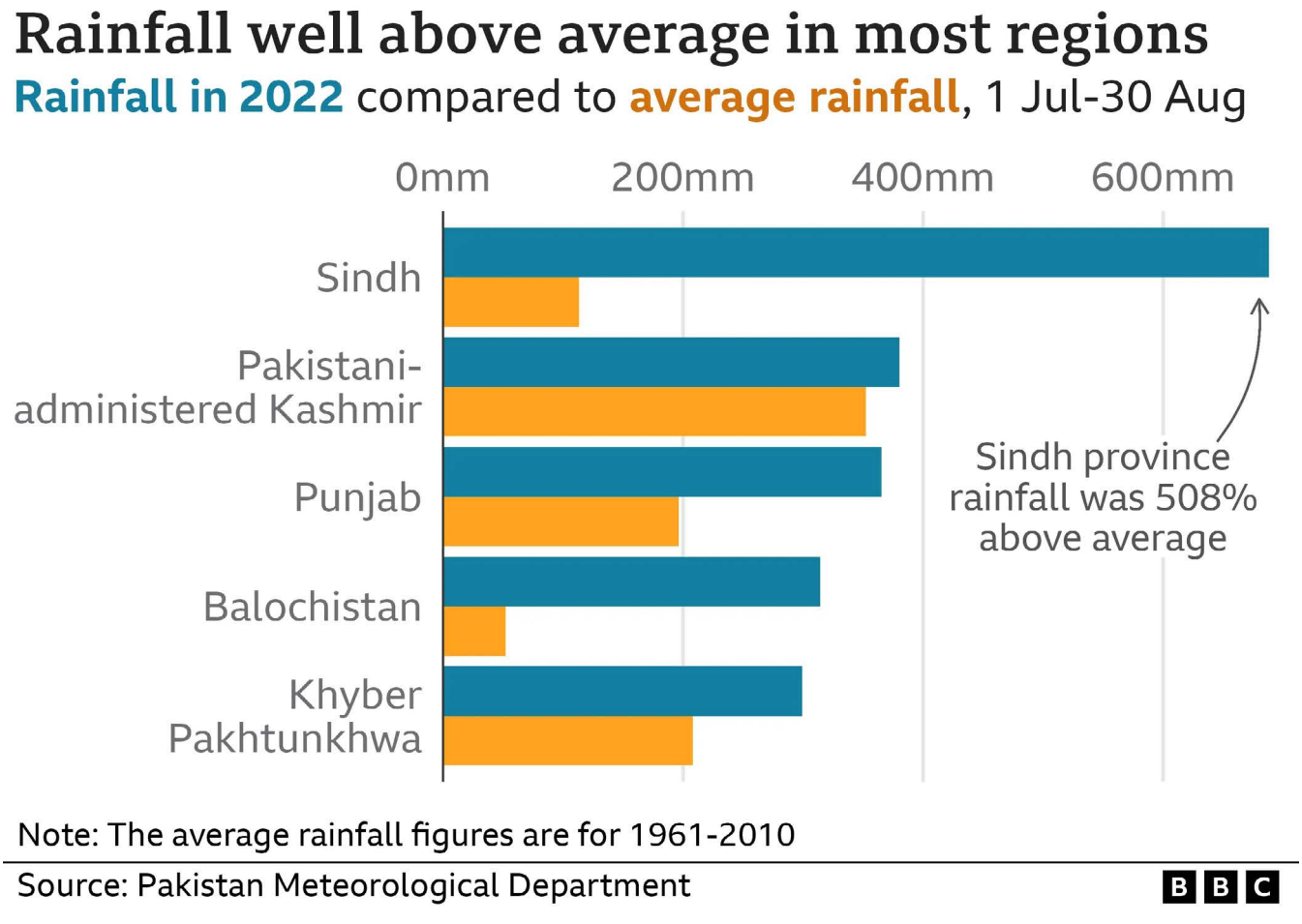


Figure 3: Rainfall Figures in Different Provinces of Pakistan
Source: BBC News (2022)[3]

Government Response

The government of Pakistan should treat these climate disasters as a full-fledged national security emergency before they stoke conflict that adds further stress amid the country's other numerous challenges.

Pakistan, like many other countries, continues to refine its strategies and policies to effectively tackle the challenges posed by climate change, however, these plans and policies are largely limited in papers and not being seriously executed. Nonetheless, some initiatives taken by Pakistan to mitigate climate change and its potential threats are:

National Climate Change Policy:

Pakistan formulated its National Climate Change Policy in 2012, outlining strategies and actions to address climate change challenges. The policy focuses on adaptation, mitigation, and capacity building across various sectors.

It aims to improve resilience in key areas such as water resources, agriculture, energy, forestry, and disaster risk reduction.

Climate Change Act:

Pakistan passed the Climate Change Act in 2017, establishing the legal framework for addressing climate change issues. The Act emphasizes mitigation and adaptation measures, climate-resilient development, and the formation of relevant institutions.

Climate Change Authority:

The establishment of the Pakistan Climate Change Authority (PCCA) aims to implement climate policies, coordinate efforts among various stakeholders, and monitor climate change-related activities across the country.

National Adaptation Plan (NAP):

Pakistan has been working on its National Adaptation Plan to enhance resilience and adapt to climate change impacts. The NAP focuses on sectors vulnerable to climate change, such as agriculture, water resources, and health.

Clean Energy Initiatives:

Pakistan has shown commitment to increasing its renewable energy capacity. The government has initiated projects in solar, wind, and hydropower sectors to reduce reliance on fossil fuels and mitigate greenhouse gas emissions.

International Commitments:

Pakistan is a signatory to international agreements like the Paris Agreement, committing to reducing its carbon emissions and taking steps to limit global temperature rise.

Community Engagement and Resilience Building:

The government has been focusing on community-based initiatives to enhance resilience at the grassroots level. This includes awareness campaigns, capacity building, and involving local communities in adaptation strategies.

Disaster Risk Reduction (DRR):

Considering the country's susceptibility to climate-related disasters, Pakistan has been working on strengthening disaster risk reduction mechanisms and early warning systems to minimize the impacts of extreme weather events.

Prof. Nauseen emphasized the importance of community engagement, local adaptation measures, and resilience-building efforts at the grassroots level. She discussed community based initiatives and highlighted the significance of involving local communities in climate change adaptation and mitigation strategies. Her presentation provided insight into the complex challenges faced by Pakistan due to climate change. Her expertise and in-depth analysis served as an eye-opener for participants, fostering a deeper understanding of the urgency and necessity for proactive measures and policy interventions to address climate change impacts in Pakistan.

CLIMATE CHANGE AND RENEWABLE ENERGY IN BHUTAN

Dr. Bhagat Suberi, Head of Department of Forestry, *Royal University of Bhutan*

Professor Bhagat Suberi offered a comprehensive insight into Bhutan's unique approach to addressing climate change challenges and harnessing renewable energy sources. His expertise shed light on Bhutan's environmental policies, renewable energy initiatives, and the country's holistic approach to sustainable development.

Bhutan, a Himalayan kingdom known for its pristine natural environment, faces several significant impacts from climate change. Despite its commitment to environmental conservation, focus on maintaining a high percentage of forest cover and its dedication to maintaining a carbon-negative status, the country is not immune to the adverse effects of global climate shifts. Some key impacts of climate change in Bhutan include:

Glacial Melting and Water Resources

Bhutan's glaciers are melting at an accelerated rate due to rising temperatures. This phenomenon has implications for water availability, affecting both hydropower generation and agricultural activities.

Changes in Weather Patterns

Bhutan experiences erratic weather patterns, including alterations in precipitation and temperature. Changes in monsoon patterns and an increase in extreme weather events like floods and landslides pose risks to infrastructure, agriculture, and livelihoods.

Health Impacts

Climate change related events like floods and landslides can have health repercussions, including increased risk of waterborne diseases and the spread of vector-borne illnesses in affected areas.

Vulnerability of Mountain Communities

Mountain communities in Bhutan, particularly those in remote areas, are highly vulnerable to climate change impacts. They often face challenges related to infrastructure damage, access to essential services, and livelihood disruptions.

Food Security and Agriculture:

Shifts in weather patterns impact agricultural productivity. Erratic rainfall, increased temperatures, and changes in crop cycles can affect crop yields, potentially leading to food insecurity in certain regions.

Tourism and Economy

Bhutan's tourism industry, a significant contributor to the economy, could be affected by changes in natural landscapes and weather related risks, potentially impacting the country's revenue and employment opportunities.

Biodiversity and Ecosystems

Climate change threatens Bhutan's rich biodiversity and unique ecosystems. Alterations in temperature and precipitation patterns can disrupt ecosystems, leading to habitat loss and affecting the country's diverse flora and fauna.

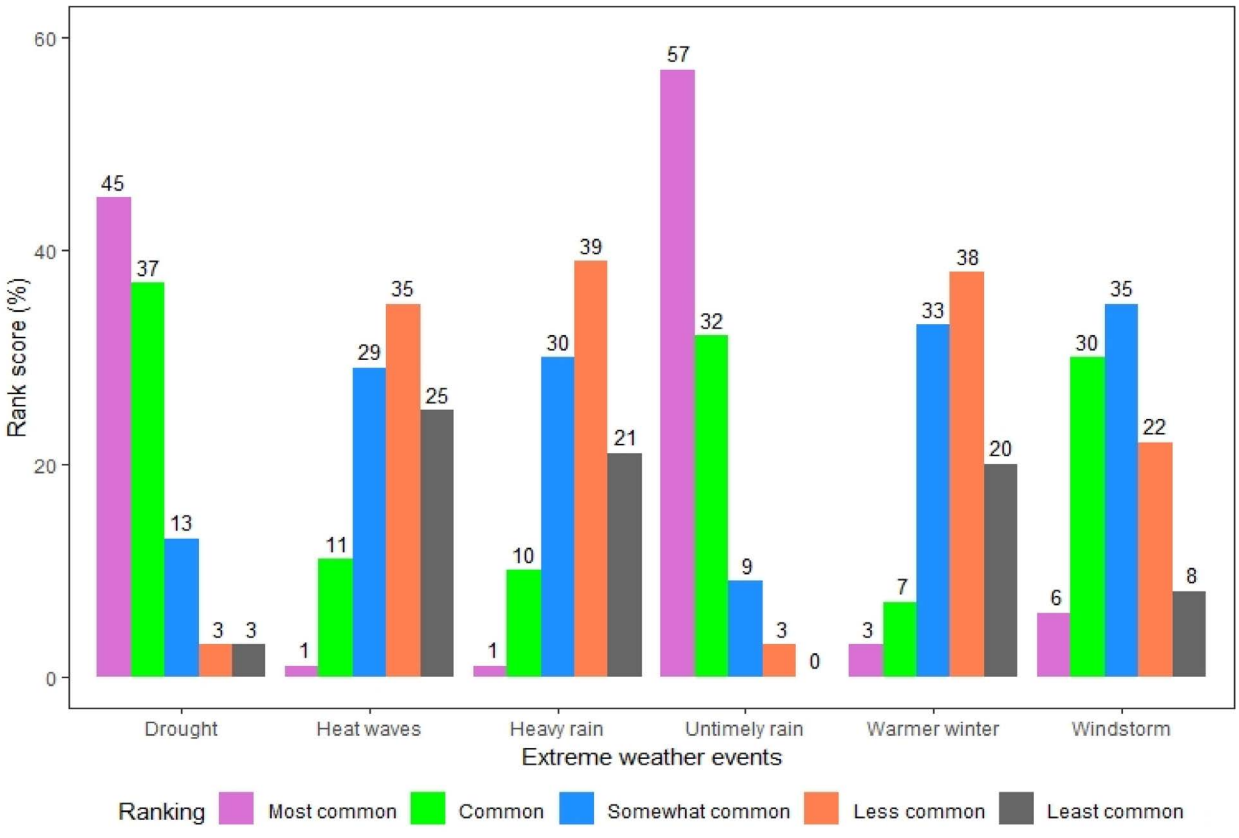


Figure 4: Consequences of Climate Change Impacts and Incidences of Extreme Weather Events in Relation to Crop Production in Bhutan

Source: Chhogyel et al. (2020)[4]

Renewable Energy in Bhutan

Bhutan, a country endowed with abundant water resources and significant renewable energy potential, has been making strides in harnessing clean and sustainable energy sources. The nation has a strong focus on renewable energy development, primarily hydropower, and is emerging as a notable player in the region's renewable energy landscape.

Bhutan's hydropower potential is substantial due to its numerous rivers and mountainous terrain. The country predominantly relies on hydropower for electricity generation. It has developed several hydropower projects, contributing significantly to its energy production. Bhutan's hydropower surplus allows it to export clean energy to neighboring country India. The country's hydropower projects have positioned Bhutan as a net exporter of renewable energy, contributing to regional energy security and sustainability.

The Bhutanese government has formulated policies and commitments promoting renewable energy development. It has set ambitious goals to increase the share of renewable energy in its energy mix, aligning with global efforts to combat climate change. Beyond hydropower, Bhutan is exploring other forms of renewable energy such as solar and wind power. While hydropower remains the primary focus, the country is exploring the potential for diversification to enhance its renewable energy portfolio. The country's renewable energy initiatives align with its commitment to environmental conservation. Hydropower projects, when implemented sustainably, have minimal greenhouse gas emissions and are considered an eco-friendly energy source.

Bhutan actively engages in partnerships and collaborations with international agencies and investors to support its renewable energy projects. These collaborations help in financing, technology transfer, and capacity building in the renewable energy sector. Bhutan's emphasis on renewable energy aligns with its pursuit of sustainable development, contributing to achieving the United Nations' Sustainable Development Goals (SDGs) related to clean energy, climate action, and environmental sustainability.

Largely, Bhutan's emphasis on renewable energy, particularly hydropower, reflects its commitment to sustainable development and environmental stewardship. The country's efforts not only contribute to its own energy security but also play a significant role in promoting clean energy regionally, fostering economic growth, and supporting global climate mitigation efforts.

Overall, Bhutan, recognizing the challenges imposed by climate change, has been proactive in implementing measures to address and adapt to the impacts of climate change. The country's commitment to sustainability, environmental conservation, and renewable energy serves as a model for integrating climate resilience into national development plans. Bhutan's emphasis on Gross National Happiness (GNH) also underscores its holistic approach, focusing not just on economic growth but also on the well-being of its citizens and the environment. Despite these efforts, ongoing global action and cooperation are essential to mitigate the continued impacts of climate change on Bhutan's fragile ecosystems and communities.

Ms. Akriti Sharma provided a comprehensive overview of India's climate challenges, the vulnerabilities it faces, and the policies implemented to address these pressing issues. Her presentation shed light on the multifaceted impacts of climate change on various sectors and the strategies employed by India to mitigate these challenges.

CLIMATE CHANGE IN INDIA: IMPACTS, VULNERABILITIES, AND POLICIES

Akriti Sharma, Doctoral Scholar, *National Institute of Advanced Studies (NIAS), Bengaluru, India*

Climate change has far-reaching impacts on India, affecting various sectors and communities across the country. Understanding the impacts, vulnerabilities, and policies related to climate change in India is crucial for comprehending the challenges and responses to this global phenomenon. Two major events have contributed to the climate diversity in the country: formation of the Himalayas and arrival of the southwest monsoons. The Indian economy is considered as one of the fastest growing major economies. However, the country is plagued by the climatic disasters that continue to wreak havoc. As a result, despite of leaping economic progress, majority of the people of India continue to live in poverty, with malnutrition and diseases corroding the society.

Climate Risk of India

According to the Global Climate Risk Index 2021 by Germanwatch, India ranked seventh globally as the country which suffered the most from extreme weather events. According to the Ministry of Earth Sciences, India's average temperature has risen by around 0.7°C during 1901–2018. This rise in temperature is largely on account of GHG-induced warming.

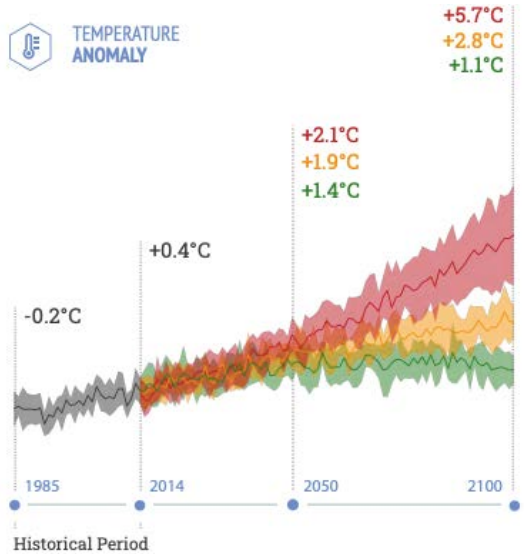


Figure 5: Temperature Projections
Source: Earth Journalism Network (2022)[5]

Climate Projections for India

Under a low emissions scenario projected temperature variations will remain contained under +1.5°C, both by 2050 and 2100. Under a high emissions scenario, with no reduction in GHG emissions, much greater temperature anomalies are expected by both 2050 and 2100.

According to the World Bank, the expected variation in temperature in 2050 in reference to the period 1985-2014 are:

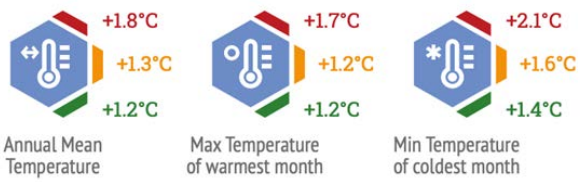


Figure 6: Expected Variation in Temperature
Source: CMCC (n.d.)[6]

Climate change in India poses a significant challenge due to its diverse geographical, social, and economic characteristics. The country experiences a wide range of climate related impacts that affect various sectors and communities.

Here are some key aspects of climate change in India:

Erratic Weather Patterns: India faces erratic weather patterns, leading to extreme events like floods, droughts, cyclones, heat waves, and erratic monsoons. These events disrupt livelihoods, infrastructure, and agriculture.

Changes in the Rainfall: The summer monsoon precipitation (June to September) over India has declined by around 6% from 1951 to 2015, with notable decreases over the Indo-Gangetic Plains and the Western Ghats. There has been a shift in the recent period toward more frequent dry spells (27per cent higher during 1981–2011 relative to 1951–1980) and more intense wet spells during the summer monsoon season.

Droughts: The overall decrease of seasonal summer monsoon rainfall during the last 6–7 decades has led to an increased propensity for droughts over India. Both the frequency and spatial extent of droughts have increased significantly during 1951–2016. Central India, southwest coast, southern peninsula and north-eastern India have experienced more than two droughts per decade, on average, during this period.

Sea Level Rise: Coastal regions face threats from rising sea levels, leading to erosion, saltwater intrusion, and risks to densely populated coastal communities and ecosystems. Sea-level rise in the North Indian Ocean (NIO) occurred at a rate of 1.06–1.75 mm per year during 1874–2004 and has accelerated to 3.3 mm per year in the last two and a half decades (1993–2017)

Extreme Weather Events: Floods, heatwaves, cyclones, wildfires are all increasing in the frequency and magnitude.

Tropical Cyclones: There has been a significant reduction in the annual frequency of tropical cyclones over the NIO basin since the middle of the twentieth century (1951–2018). In contrast, the frequency of very severe cyclonic storms (VSCSs) during the post-monsoon season has increased significantly (+1 event per decade) during the last two decades (2000–2018). However, a clear signal of anthropogenic warming on these trends has not yet emerged.

Changes in the Himalayas: The Hindu Kush Himalayas (HKH) experienced a temperature rise of about 1.3°C during 1951–2014. Several areas of HKH have experienced a declining trend in snowfall and also retreat of glaciers in recent decades. In contrast, the high-elevation Karakoram Himalayas have experienced higher winter snowfall that has shielded the region from glacier shrinkage. By the end of the twenty-first century, the annual mean surface temperature over HKH is projected to increase by about 5.2°C.

Indian Ocean Warming: Sea surface temperature (SST) of the tropical Indian Ocean has risen by 1°C on average during 1951–2015, markedly higher than the global average SST warming of 0.7°C, over the same period.

Agricultural Vulnerability: Changes in rainfall patterns and temperature affect agricultural productivity. Variability in monsoon rains and prolonged droughts impact crop yields, leading to food insecurity and economic losses for farmers. Rising temperatures with lower rainfall at the end of the growing season have caused a significant loss in India's rice production. Under 2°C warming by the 2050s, the country may need to import more than twice the amount of food-grain than would be required without climate change.

Water Stress: Climate change contributes to water stress, leading to water scarcity in many regions. This impacts freshwater availability for agriculture, drinking water, and industries, especially in areas prone to drought.

Health Risks: Climate change is expected to have major health impacts in India. Malaria and other vector-borne diseases, along with and diarrheal infections which are a major cause of child mortality, are likely to spread into areas where colder temperatures had previously limited transmission. Heat waves are likely to result in a very substantial rise in mortality and death, and injuries from extreme weather events are likely to increase.

Energy Security: Climate-related impacts on water resources can undermine the two dominant forms of power generation in India- hydropower and thermal power generation- both of which depend on adequate water supplies to function effectively. The increasing variability and long-term decreases in river flows can pose a major challenge to hydropower plants and increase the risk of physical damage from landslides, flash floods, glacial lake outbursts, and other climate-related natural disasters. Decreases in the availability of water and increases in temperature will pose major risk factors to thermal power generation.

What Is India Doing to Address Climate Change?

Key issues in India's climate standpoint:

First, viewing climate commitments as an obstruction to economic growth and development.

Second, voicing the priorities of the Global South and refraining from legally binding commitments on climate action at the UNFCCC negotiations.

Third, shifting its traditional approach and transitioning with the principle CBDR intact.

Fourth, enhancing domestic climate action to be viewed as a forerunner in climate action. Per capita emissions are less than half of the global average.

India's Policy and Response:

National Action Plan on Climate Change (NAPCC): India launched the NAPCC, which comprises eight national missions focusing on various sectors such as solar energy, energy efficiency, sustainable agriculture, water conservation, and the Himalayan ecosystems.

Renewable Energy Targets: The country has set ambitious targets to increase the share of renewable energy in its energy mix, aiming for significant capacity expansion in solar, wind, and other renewable sources.

International Commitments: India is a participant in international agreements like United Nations Framework Convention on Climate (UNFCCC) and the Paris Agreement, committing to reducing greenhouse gas emissions and enhancing climate resilience.

Climate Adaptation Measures: Efforts are underway to implement adaptation strategies, including promoting climate-resilient agriculture, water management, afforestation, and building resilient infrastructure.

Afforestation and Increase Carbon Capture: To create an additional carbon sink of 2.5 to 3 billion tonnes of CO_2 equivalent through additional forest and tree cover by 2030.

Urban Planning and Resilience: Urban areas are focusing on climate resilient urban planning to mitigate the impacts of extreme weather events and heat stress in densely populated cities.

Capacity Buildup, and R&D Focus: priority to build capacities, create domestic framework and international architecture for quick diffusion of cutting edge climate technology in India and for joint collaborative R&D for such future technologies.

In summary, India faces multifaceted challenges due to climate change, impacting various sectors and communities. The country's response involves a mix of policy initiatives, adaptation measures, renewable energy promotion, and international collaboration to address the impacts and build resilience against the changing climate scenario. Continued efforts in these directions are crucial for mitigating the impacts and ensuring a sustainable future for India.

INCLUSIVE CLIMATE ADAPTATION: THE CASE OF BANGLADESH

Dr. Benuka Ferdousi, Senior Research Fellow, *Bangladesh Institute of International and Strategic Studies (BIISS), Dhaka*

Dr. Benuka Ferdousi's presentation on "Inclusive Climate Adaptation: The Case of Bangladesh" offered valuable insights into Bangladesh's proactive measures and strategies aimed at addressing climate change impacts while prioritizing the inclusion of marginalized communities. Her presentation explored into the country's approach to building resilience, particularly focusing on vulnerable populations, and highlighted the significance of community engagement in climate adaptation efforts and resilience-building initiatives. Dr. Benuka highlighted gender-responsive adaptation strategies in Bangladesh, emphasizing the empowerment of women, their involvement in decision-making, and ensuring equitable access to resources and education for women in climate adaptation efforts. The focus on inclusivity and community engagement offered valuable lessons applicable not only to Bangladesh but also to other countries in the region facing similar challenges.

Bangladesh is one of the most vulnerable countries to the adverse effects of climate change due to its geographical location, low-lying topography, high population density, and exposure to natural disasters. The country faces a multitude of climate related challenges that significantly impact its environment, economy, and society.

Inclusive climate adaptation in Bangladesh is a critical initiative aimed at addressing the vulnerabilities of marginalized communities and ensuring their active participation in climate resilience strategies. Bangladesh, being highly vulnerable to climate change, experiences frequent natural disasters like floods, cyclones, riverbank erosions, and sea-level rise, affecting millions of people, particularly those in poverty and living in rural areas.

Why Inclusiveness Is Needed in Mitigating Climate Change?

An inclusive approach to mitigating climate change is fundamental to ensuring the effectiveness, sustainability, and fairness of climate actions. By prioritizing inclusivity, diverse perspectives and voices are heard and integrated, leading to more resilient, equitable, and successful climate solutions at local, national, and global levels. Inclusiveness plays a crucial role in effectively mitigating climate change for several significant reasons:

Equity and Social Justice: Inclusive climate action ensures fairness and equity by considering the needs, concerns, and rights of all individuals and communities, especially marginalized and vulnerable groups. It helps address existing inequalities exacerbated by climate change impacts.

Diverse Perspectives and Solutions: Involving diverse stakeholders, including marginalized communities, women, indigenous groups, and local populations, brings different perspectives, traditional knowledge, and innovative solutions to the table. This diversity often leads to more comprehensive and context-specific climate strategies.

Resilience Building: Inclusive approaches prioritize building resilience among vulnerable communities. Empowering these communities to adapt to climate change not only protects them but also contributes to overall societal resilience.

Local Knowledge and Practices: Indigenous and local knowledge often holds valuable insights into environmental conservation and sustainable practices. Incorporating this knowledge into climate strategies can enhance the effectiveness and sustainability of mitigation and adaptation measures.

Community Ownership and Engagement: Inclusive climate initiatives promote community ownership, involvement, and active participation in decision-making processes. This engagement fosters a sense of ownership, making implemented measures more successful and sustainable.

Key Aspects of Inclusive Climate Adaptation in Bangladesh:

Community-Centered Adaptation Initiatives: Bangladesh focuses on community-led approaches to climate adaptation. It engages local communities, particularly vulnerable groups like women, indigenous people, and marginalized communities, in decision-making processes for resilience-building efforts.

Promotion of Climate-Resilient Livelihoods: Initiatives are undertaken to diversify livelihoods, promote climate-resilient agricultural practices, and introduce income-generating activities that are less susceptible to climate risks. This supports the economic resilience of vulnerable groups.

Investment in Infrastructure and Early Warning Systems: Bangladesh invests in resilient infrastructure, such as cyclone shelters, elevated roads, and flood-resistant housing, to protect communities during disasters. Moreover, the country has focused in developing effective early warning systems to minimize loss of life and property during extreme weather events.

Enhancing Access to Climate Information and Education: Efforts are made to increase access to climate information and education in local languages. This empowers communities to understand and respond to climate risks effectively.

Key Aspects of Inclusive Climate Adaptation in Bangladesh (Cont'd)

Women's Empowerment and Gender-Responsive Adaptation: Bangladesh emphasizes gender equality in climate adaptation efforts. It supports women's empowerment, ensuring their active involvement in decision-making and providing access to resources and education.

International Collaboration and Support: Bangladesh collaborates with international organizations, donor agencies, and development partners to access funding, technology transfer, and capacity building for effective climate adaptation measures.

Policy Integration and Mainstreaming: Climate adaptation is integrated into national policies, development plans, and strategies to ensure a coordinated and mainstreamed approach to resilience-building efforts across sectors.

Challenges and Future Directions

Despite these initiatives, challenges persist in implementing inclusive climate adaptation. These challenges include limited resources, capacity constraints, and the need for sustained efforts to address the multifaceted nature of climate risks faced by vulnerable communities.

In the future, continuous efforts towards enhancing community resilience, scaling up successful adaptation practices, strengthening governance mechanisms, and furthering international cooperation will be essential to ensure inclusive climate adaptation in Bangladesh. The focus remains on protecting the most vulnerable communities and ensuring their active participation in building resilience against climate change impacts.

In conclusion, Bangladesh faces severe climate related challenges that threaten the livelihoods and well-being of its population. The country's response to climate change emphasizes community engagement, resilient infrastructure, sustainable agriculture, and policy integration to build resilience and adapt to the changing climate. Continued efforts and international cooperation are crucial to addressing the impacts of climate change in Bangladesh.

FIELD VISITS

Key Highlights of the Community Survey:

Community Engagement: Students interacted closely with villagers, including farmers, women, residents and local leaders to understand their lived experiences and how climate change has affected their daily lives, livelihoods, and environment.

Impact Assessment: Through surveys and interviews, they gathered valuable information on the village's vulnerabilities to climate change. They assessed the changes in weather patterns, agricultural practices, water availability, biodiversity, and any observed alterations in the ecosystem.

Economic and Social Impacts: Their survey findings shed light on the economic challenges faced by the community due to climate-induced disruptions in agriculture, changes in crop cycles, and the socio-economic implications for the villagers.

Community Adaptation Strategies: Students learned about the innovative adaptation strategies adopted by the community to cope with the impacts of climate change. This included changes in farming techniques, water management practices, and alternative livelihood initiatives.

Documentation and Observations: Students documented their findings through photographs, notes, and recordings to capture the visual and anecdotal evidence of climate change impacts and the community's responses.

Following the day long field visit and engagement with the community people, the group presented the results to summer school faculty members. Each group gave a 15 minute presentation, followed by questions and feedback. The survey provided students with a deeper understanding of the real-life implications of climate change at the grassroots level. They got to observe the resilience and resourcefulness of the community in adapting to changing environmental conditions. The students were encouraged to reflect on the knowledge gained from the fieldwork and consider how they can integrate these insights into their research, projects, and advocacy efforts related to climate change in the future.

Community Survey

On December 7, the summer school students held study survey in the neighboring community of Nagarkot to understand firsthand the impacts of climate change on local communities and ecosystems as well as the mitigation strategy being adopted by the local people. The fieldwork involved an immersive study of the village, engaging with community residents, and conducting surveys, interviews, and observations to comprehend the tangible effects of climate change.

Over twenty households were covered by the five group of students. Various questionnaires were developed to address key issues such as changing weather patterns in recent decades, how they have impacted the overall lifestyle and ecosystem of the village, what are the key crops and agricultural harvest, the impact on the agro-economy, and what are the coping mechanisms and best practices to overcome.

Visit to ICIMOD Knowledge Park, Godavari

On December 8, as part of the field excursion, the summer school participants were taken to the International Centre for Integrated Mountain Development (ICIMOD) Knowledge Park in Godavari. The visit to Knowledge Park was an enriching experience for all participants as it serves as a hub for research, education and practical demonstrations related to climate change and sustainable development in the South Asian region.

During the visit, the participants had the opportunity to engage in a variety of activities and they were given a guided tour of the Knowledge Park's various sections, showcasing innovative exhibits and information panels illustrating the impact of climate change on mountain ecosystems, biodiversity, water resources, and local communities. The site provides different technologies and farming and other practices useful for sustainable development. Additionally, the participants got the chance to learn about the water management system, soil management, renewable energy technologies, revenue generating from cattle, fish, vegetables, and beekeepers, biodiversity conservation, and ecotourism. The participants observed and learned about over thirty different eco-friendly technologies; these included the Trombe wall (solar technology), nursery propagation, 3D or vertical farming, green house vegetable cultivation, prototype flood early warning system, carbon monitoring, soil erosion monitoring, trans-boundary air pollution station, photovoltaic electricity, Puxin biogas plant, renewable energy technology, and many more. These technologies were mostly related to farming and livelihood options that are useful for sustainable development. The entire day was dedicated to visiting and sightseeing at the Knowledge Park.

The visit to ICIMOD Knowledge Park was not only educational but also inspirational. It offered participants a deeper understanding of the complexities of climate change in mountainous regions and the innovative approaches being implemented for sustainable development. Participants expressed to reflect on the knowledge gained from the field visit and consider how they can integrate these learnings into their individual research, studies, and future endeavors related to climate change and environmental sustainability.

Corporate Support for Climate Change Adaptation Initiative

After the half day educational tour visit to ICIMOD, the NMB Bank Ltd. sponsored an engaging lunch session for international and local participants attending a Climate Change Summer School. The lunch event was an evidence to the bank's commitment to environmental consciousness and fostering knowledge sharing initiatives.

The CEO of the bank virtually briefed the Summer school participants about the bank's innovative initiatives to protect the environment and promote renewable energy in different parts of the country. The lunch also provided an excellent opportunity for networking and discussion among the participants, scholars, and the CEO of the Bank. The participants had the chance to engage in insightful conversations, exchanging ideas and experiences and question-answer with the CEO related to climate action and sustainability.

NMB Bank's sponsorship of a lunch for Summer School participants stands as a significant gesture of their Corporate Social Responsibility (CSR) commitment. The Bank's support not only demonstrated its dedication to CSR but also highlighted its proactive role in supporting educational initiatives focused on addressing crucial global challenges like climate change.

Summer School's Outcomes and Impact

The Summer School Program concluded with different outcomes and impacts:

Enhanced knowledge and understanding

Participants gained a deeper understanding of climate change issues, mitigation process, renewable energy technologies, their interconnectedness, and their implications for South Asia.

Knowledge exchange

Valuable insights and knowledge were shared among participants from different countries, fostering cross-border collaborations and networking.

Networking opportunities

Participants established professional networks and friendships, laying the foundation for future collaborations and initiatives in the field of climate change and sustainability.

Capacity building

Participants honed their skills in climate change adaptation, mitigation strategies, renewable energy solutions and interdisciplinary approaches through discussions and practical experiences.

CONCLUSION

The Summer School Program on “Climate Change and Renewable Energy in South Asia” held in Nepal served as a crucial platform for fostering awareness, collaboration, and actionable solutions towards mitigating the impacts of climate change in the South Asian region. The collective efforts and insights gained during this program are expected to contribute significantly to advancing sustainable practices and policies in combating climate change challenges across South Asia.

Throughout the program students delved into multifaceted discussions, engaging in in-depth analyses of climate change impacts, vulnerabilities, and adaptation strategies specific to the South Asian region. The insights shared by esteemed speakers and through interactive sessions broadened the participants’ understanding of the complexities surrounding climate challenges and renewable energy solutions in this context. Similarly, the field visits, including the educational trip to ICIMOD Knowledge Park and on-site fieldwork, provided students with hands-on experiences, allowing them to witness firsthand the realities of climate change impacts on local communities. These experiences were invaluable in bridging theoretical knowledge with practical applications.

In its second year, the COSATT-RECAP International Summer School on Climate Change has successfully enabled young participants from all around South Asia to learn about climate change and its effects, as well as experience best practices from throughout the region. This summer school program perhaps served as a stepping stone for the participants to continue their commitment to sustainable practices, promote renewable energy solutions, advocate for inclusive climate action, and work towards a more resilient and environmentally sustainable future for South Asia and beyond.

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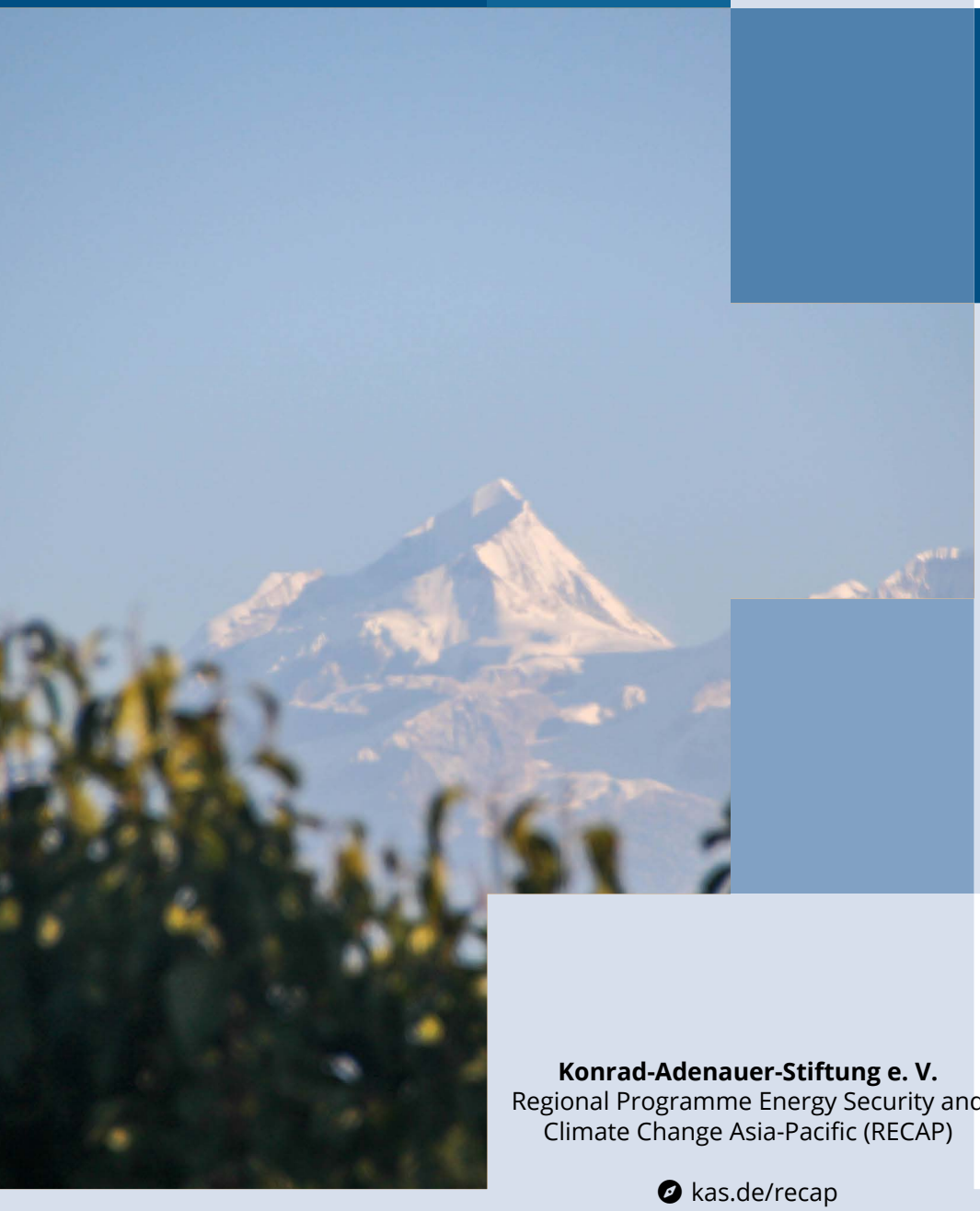

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