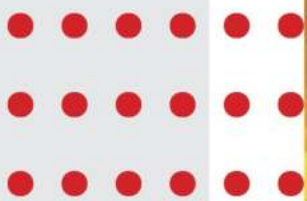




# International Summer School on CLIMATE CHANGE



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# CLIMATE CHANGE

September 11 - 17, 2022

Kathmandu and Nagarkot, Nepal

## Organizers

Regional Project Energy Security and Climate Change Asia Pacific (RECAP),  
Konrad-Adenauer-Stiftung (KAS), Hong Kong SAR, China

Consortium of South Asian Think Tanks (COSATT), Kathmandu, Nepal

National College, Kathmandu University, Nepal

# Foreword

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The adverse effects of climate change are already changing the basis of human life to a considerable extent. The reduction of CO2 emissions is therefore an important goal in order to reduce further warming of the climate in the medium to long term. Irrespective of this, we must also deal with the immediate effects of climate change and develop suitable adaptation strategies. However, qualified people are needed to implement such strategies.

The Regional Project Energy Security and Climate Change Asia Pacific (RECAP) of the Konrad-Adenauer-Stiftung and the Consortium of South Asian Think-Tanks (COSATT) therefore organized its first international Climate Change Summer School that took place in Nagarkot, Nepal in September 2022. We invited participants from six South Asian countries to attend this capacity-building program. Through lectures, tutorials and group activities, participants were brought together to learn more about global warming and adaptation and to explore the environmental, societal, and economic implications of climate change.

The Summer School had a focus on the challenges confronting South Asia. From the world's highest mountains in the Himalayas up north to the lowland around the Bay of Bengal in the South, South Asia is a geographically versatile and complex region. It is threatened by all sorts of geological hazards such as earthquakes or tsunamis as well as hydro-meteorological hazards and disasters amplified by climate change such as floods, landslides, droughts, heat waves or avalanches. Populous countries like India, Bangladesh or Pakistan are some of the countries which are most vulnerable to those hazards. With a combination of densely populated areas and comparatively high rates of poverty, they also present risks to the overall security and development of this region of 1.8 billion people which is increasingly exposed to risks as a result of climate change. Disasters caused by extreme weather have not only been increasing year by year in South Asia but are also getting more severe. A significant portion of the region's GDP has to be allocated to manage natural disasters, re-build critical infrastructure and reduce impacts on people's livelihoods.

This publication summarizes the Summer School's activities and, we hope, it can serve both as a reflection and an outlook for future climate related youth engagement programs in South Asia.

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# REPORT



# Introduction

Climate change is a pressing global issue with long-term ramifications for the sustainable development of all countries. It is one of the most serious environmental threats that humankind has ever encountered. Climate change's effects are global in scope and unparalleled in scale, ranging from altering weather patterns that imperil food production to rising sea levels that increase the risk of catastrophic flooding.

Without immediate global, national, and local action, these effects are projected to worsen over time. People living in the underdeveloped and poorest countries are disproportionately affected by the negative outcomes of these issues, despite having contributed little to them.

Climate change awareness creation is pivotal to adaptation strategies. For that purpose, raising awareness and effective dissemination of knowledge, particularly among students and the younger population, is crucial. The summer school aimed to bring together a multidisciplinary group of participants from South Asian countries and organized a week-long residential program providing a space for teamwork to strengthen collaborations between different fields and foster networking in this space.

## Summer School's Objective

Climate change has far-reaching consequences for the future, necessitating widespread youth participation and involvement at all levels, from grassroots to policymaking. The summer school on climate change allows young delegates from South Asian countries, including researchers and students, to learn more about climate change and its effects, Disaster risk reduction, see the fragile eco-system of South Asia, flood control measures as well as observe best practices adopted by the governments in South Asia and local communities, particularly in Nepal, to mitigate climatic impacts.

## Summer School Structure

The summer school invited students from diverse backgrounds who were interested in learning about climate change and global warming as well as addressing problems in climate adaptation.

There were two components to the course. The first part of the course consisted of lectures, tutorials, and group activities and the second part of the course consisted of an organizational tour 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.

## Summer School Content

Overall, the summer school explored the environmental, societal and economic impacts and implications of climate change. Different topics related to climate change, global warming, and environment protection were discussed, amongst others:

- General introduction to climate change
- Causes and effects
- Social, economic and political impacts
- Environmental impacts
- Modelling and prediction
- Adaptation of catastrophic events
- Management of water resources and rainfall changes
- Best practices and lessons learned for South Asia as a region



## Modality

16 scholars and 7 faculty members altogether from South Asia took part in the Summer School. Moreover, there was also a lecturer on disaster management and preparedness from the Nepal Army. It was a weeklong residential program in Nepal.

Participants were also taken for local community visits and Focused Group Discussions with the community people in order to understand local climate adaptation practices in Nagarkot, Nepal. Besides, field tours and a community organizational visit to ICIMOD-knowledge Park was also conducted. In addition, prior to the Summer School, a key note speech was delivered by the former Environment and Population Minister of Nepal, Mr. Ramesh Nath Pandey. High profile individuals and multiple concerned stakeholders also gave presentations.

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

- Lectures: from internationally renowned academicians
- Workshops: on a group work basis on pertinent issues and planning
- Practical exercises: simulation, planning, research works
- Field works: Understand ideas, interact with locals, feel realities
- Organization visits: Listen to experiences, policies, plans and implementations.

## Orientation Session

South Asia faces a range of natural hazards. Hurricanes, floods, wildfires, cyclones, heat waves, droughts, landslides, and storms are just a few of the extreme weather-related disasters that are becoming more frequent and severe each year in the region. Natural disasters are becoming more frequent, intense, and expensive as a result of rapid and unplanned urbanization, environmental degradation, climate change, and socioeconomic conditions that increase citizen exposure to and risk from natural hazards. The management of natural disasters, the reconstruction of vital infrastructure, and expenditures to lessen the effects on people's livelihoods have all required a sizeable portion of the GDP of South Asian countries.

The orientation session therefore started with a general overview and knowledge sharing about climate change and forms of natural disasters and its impacts, particularly in South Asian countries. Also, a brief introduction on global warming and its cause and effects was given and discussed.

**Global Warming:**

Global warming is an aspect of climate change, referring to the long-term rise of the planet's temperatures. It is caused by an increase in

greenhouse gas concentrations in the atmosphere, primarily as a result of human activities like burning of fossil fuels.

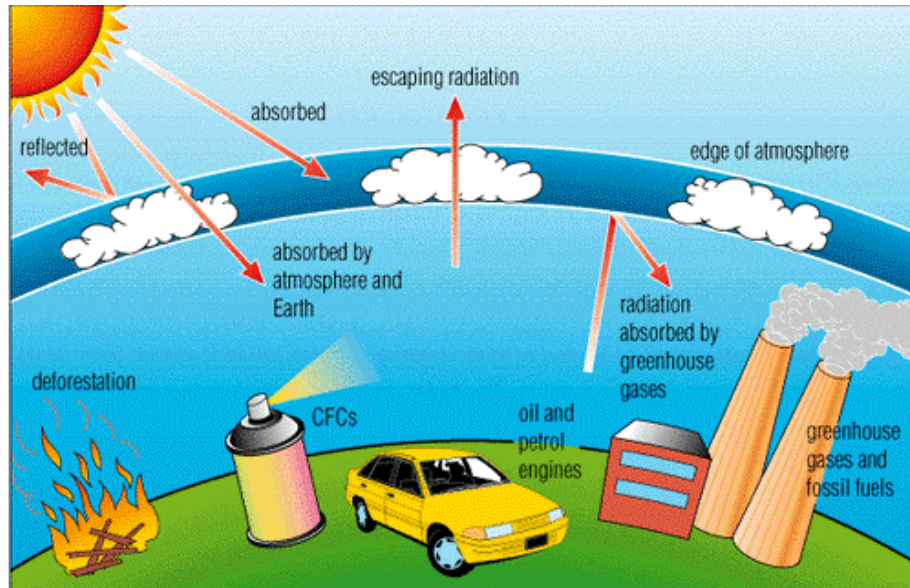


Figure 1

**How does warming affect the climatic system?**

The atmosphere is sensitive to temperature. Fractional change in temperature can significantly baffle the climatic system causing monsoon,

western disturbance, cooling winters and springs and humid autumns. It can bring extreme weather events like cyclones, cloud burst, droughts etc.

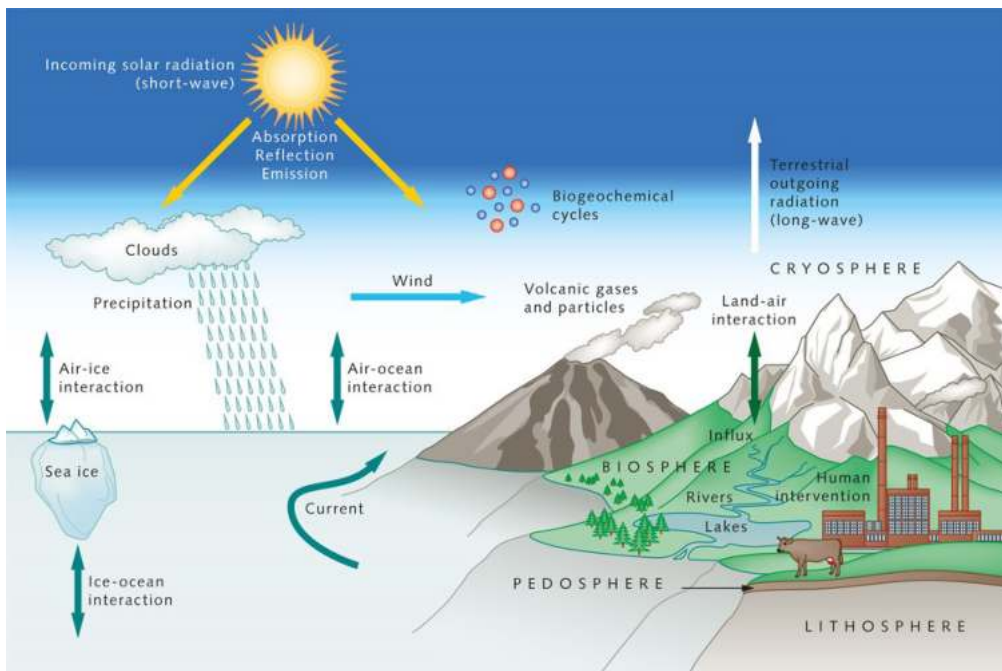


Figure 2



### Climate Change: Some Observations

Badri Dev Pande, PhD,  
Chairman, National College, Nepal

Global climate change has become the most visible environmental concern of the 21st century transforming the environmental and social landscape of the entire world. The changes that are being noticed are in an environmental component that basically consists of temperature, precipitation, humidity, and air triggering extreme weather events at phenomenal landscapes influencing both micro- and macroclimates. Changes in such parameters are a natural phenomenon as the climate has been changing ever since the origin of the earth. However, the natural rate of climate change was very slow and species would have enough time to adapt to the change. Since the past few decades, the world has been experiencing a significant increase in global temperature as a result of climate change.

Global warming is being experienced across the world and mainly happened in Europe and the UK during the summer of 2022 when all previous temperature records were broken. The weather projected for the year 2050 (as being extremely hot) by the UK Met Office in 2020 turned out true within just a couple of years after it had been predicted. The main cause behind such warming are greenhouse gases which have been emitted so much in the atmosphere that even absolute halting of its emission will not be able to stop the global warming for the next two decades. (IPCC 2019). Many countries considered that a level of global warming close to 2°C would not be safe and, at that time, there was only limited knowledge about the implications of a level of 1.5°C of warming for climate-related risks and in terms of the scale of mitigation ambition and its feasibility.

### Nepal and SDG-13 Climate Action

Nepal, despite insignificantly contributing to the factors that cause climate change, is already suffering from it. The country is ready to cooperate at regional and global levels to strengthen resilience and its adaptive capacity to climate-related hazards and natural disasters through the

transfer of technology and financial support from advanced countries.

### Nepal's National Five Year Plan

Nepal minimally contributes to climate change but is suffering from its consequences in agriculture, livelihood, disease control, watershed management, and environmental protection. Contributing just 28 MT CO<sub>2</sub> (0.056% of World's), it has been one of the worst affected countries in terms of climate change.

Nepal is prepared to mainstream climate change issues in national and sub-national level planning and implement interventions to improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, and impact reduction. The transfer of technology and financial support from advanced countries in this area is very necessary for Nepal.

### Efforts to Adapt to Climate Hazards in Nepal

National Adaptation Program of Action Projects (integrated)

- Promotion of community based adaptation through integrated management of agriculture, water, forest and biodiversity sector
- Building and enhancing adaptive capacity of vulnerable communities
- Community based disaster management
- GLOF (glacial lake outburst floods) monitoring
- Adapting to climate challenges in public health

### Constraints to Adaptation

Some of the key constraints that Nepal has been facing are:

- Dependence on subsistence agriculture
- Challenging geopolitical conditions
- Population growth in urban centers
- Institutional failures and weaknesses
- Constantly changing organizational structures
- High turnover of government personnel
- Failures of public institutions
- Ineffective to non-existent coordination
- Deficient capacity

### Promising Indicators

Despite challenges there are certain positive indicators in the country. To achieve these positive indicators, multiple stakeholders including the non-governmental agencies have played key roles.

Some of the encouraging facts are:

- Nearly 25% of the land is designated as protected areas
- Around 45% of the land is covered with forests
- Efforts to conserve biodiversity have increased
- Increased use of hydropower for lighting, cooking and transportation
- Integration of environmental education in formal and nonformal education programs

### Climate Change: Myth! or Reality?

Ayreen Khan

Founder, iCan Foundation, Dhaka

Researcher

Bangladesh is rich with many natural resources like wetlands, rivers, hills, forests, sea and maintains a rich, diverse, and unique form of ecosystem. There are five types of ecosystems in Bangladesh including coastal and marine ecosystems, inland freshwater ecosystems, terrestrial forest ecosystems, hilly ecosystems and man-made homestead ecosystems. Hundreds of species of microbes, plants, insects, amphibians, reptiles, birds, fish, mammals, flora and fauna are part of this rich ecosystem. Lives and livelihood in Bangladesh are largely dependent on nature. For instance, 110 million people live around the water bodies and 87% of rural households rely on agriculture for their income.

### Impact of Climate Change on Bangladesh

Bangladesh is one of the most vulnerable countries in the world due to climate change. It is witnessing extreme climate conditions with frequent floods, storms, cyclones, heavy rain, sea level rise and heat waves. Last year Bangladesh recorded the highest temperature in seven years.

The economy of the country gets highly affected by climate change. Over the past 40 years the damage caused by the climate is 12 billion U.S. dollars which is 0.5 per cent to 1 per cent of the Gross Domestic Product (GDP). In 2007, Cyclone Sidr caused damage of 1.7 billion U.S. dollars or about 2.6 per cent of the GDP. In May 2009, cyclone Aila caused damage to assets of 270 million U.S. dollars. These cyclones have left permanent damage in the region. People lack fresh drinking water, and water for irrigation.

### Environmental Condition of Bangladesh

Bangladesh is the world's largest delta, at the junction of three important rivers of South Asia, the Ganges, the Brahmaputra, and the Meghna. The country is crisscrossed by hundreds of rivers, their banks and tributaries. Two out of three people,

110 million, live around the water bodies and are dependent on them for their lives and livelihood. This in itself exposes us to a diverse range of vulnerabilities and natural hazards.

Bangladesh has the biggest portion of the largest mangrove forest of the world on its southwest side. This forest is a sanctuary for a variety of wildlife and rare species of plants. This forest works as a frontline defender against tidal surges and cyclones. The northwestern part is the food granary that produces various kinds of crops and vegetables for the country. This part of the country is prone to drought during dry seasons and river erosion during monsoons.

Rivers are the lifelines of Bangladesh. Thus, rivers are the most essential part in any climate discussion. Rivers are important not only for the livelihood of the people but are also essential in maintaining the ecosystem and coexistence with nature. Bangladesh has 54 trans boundary rivers with India. These rivers carrying freshwater push back the saltwater of the sea from the land. Because of global warming, sea levels are rising. When the rivers get dry or they lack proper flow of water, seawater enters in the mainland.

Two-thirds of Bangladesh is 5 meters above sea level. This makes the country one of the most vulnerable countries of the world due to climate change. About 19 million people live around the coastal areas. Water in the rivers of Bangladesh comes from melting icecaps in the Himalayas and rain. On one side, there is a higher flow of water in the rivers during monsoons and to the south the sea level is rising. Upper riparian countries are building more dams on international rivers. China has built over 4,800 dams and over 80,000 reservoirs. India has built many dams to divert water from the Trans boundary Rivers. When the river is blocked in the upper riparian region the flow is hampered in the lower regions. Thus rivers easily dry out during the dry seasons.

### How Bangladesh is dealing with climate change:

The government of Bangladesh has adopted many policies, plans and projects over the years for environmental governance, conservation and protection of the natural resources.

Some of the key policies are:

- Environment Conservation Act 1995
- The Environment Court Act 2010
- The Forest Act 1927
- The Brick Manufacturing and Brick Kilns Establishment Act 2013
- The Bangladesh Biodiversity Act 2017,
- Bangladesh Water Act 2013
- National Conservation Strategy
- National Environment Policy 1992
- Signatory of Ramsar Convention 1992, Sustainable Environment Management Program 1996

The country has achieved outstanding success in climate adaptation especially in the agricultural sector. Bangladesh now grows seeds that can survive under water for three months. Other hybrid seeds have also been developed to maximize food production. However, due to the extreme weather conditions caused by global warming the country is coming under attack by nature more frequently and in various forms. The country has declared its first ever techno-economic mega project, Bangladesh Delta Plan 2100 to better manage its water, environment and economy. This project aims to eliminate extreme poverty and unemployment, and sustain GDP growth above 8 per cent until 2041. This project also plans to reduce urban migration by 60 per cent, displacement of coastal people due to climate change by 50 per cent, and displacement around river areas by 50 per cent.

At the same time, the government needs to promote green financing, foster green banking and establish dedicated funds. But no country can tackle climate change alone. The whole world, neighboring countries, rich economies and international organizations should provide monetary, political, business and technological support to help Bangladesh make peace with nature.



**Climate Change and its Impacts in Bhutan**

Karma Yangzom Dorji  
 Researcher, Bhutan

The Kingdom of Bhutan, nestled in the Eastern Himalayas, spans 14,824 square meters. The northern parts of the country arise from the Himalayas, whereas the country's southern parts end in the subtropical plains. Bhutan's development is based on the four pillars of Gross National Happiness, namely (i) cultural preservation, (ii) environmental conservation, (iii) good governance, and (iv) sustainable socio economic development. Article 5.3 of the Constitution of Bhutan mentions that the country maintains a forest cover of 60 per cent. In 2016, national forest coverage was recorded at 71 percent. Bhutan maintains its status as the world's only carbon negative country in the world, with forest sequestration at 9.38 million gigatons of CO<sub>2</sub>e.

**Natural Disasters that Arise from Climate Change**

Bhutan is already facing the impacts of climate change through increasing incidences of declining water availability and decreasing snow cover. Climate models have predicted that by the end of the century, Bhutan will experience higher average temperatures ranging from 0.8°C to 3.2°C, which will be more prevalent in the spring and winter seasons.

Bhutan's geographic disposition makes it vulnerable to natural disasters that arise due to climate change. These disasters include:

- landslides
- flash floods
- glacial lake outburst floods (GLOFs), and
- windstorms

**Disaster Management and Climate Change Regulations**

Bhutan has adopted certain mechanisms and regulations to control natural disasters.

Some of these key mechanisms are:

The Rules and Regulations for Disaster Management 2014- disaster management governance framework

The Disaster Management Act of Bhutan 2013 (DMA) establishes and strengthens institutional capacity for disaster management

The Local Government Rules and Regulations 2012 (LGRR)- Local operational disaster management

The Climate Change Policy of the Kingdom of Bhutan 2020 (CCP)- climate mitigation and adaptation policy

The National Disaster Risk Management Framework 2006 outlines the situational analysis of disaster management, the disaster management framework, and the implementing agencies

**Disaster Management**

Bhutan uses a decentralized approach to managing disaster management. The Dzongdas of the 20 dzongkhags are responsible for managing their disaster risk management for their respective dzongkhag. This includes building protective structures such as mitigatory flood structures, advising local populations living close to rivers banks on evacuation procedures and processes, and rebuilding and repairing structures damaged in a disaster. Individual dzongkhags are also required to send their budgets for disaster management to the Ministry of Finance to receive funding. Bhutan also uses Community Based Disaster Risk Management to manage its disaster risk.

**Disaster risk management includes:**

- Building protective structures
- Educating local populations living close to river banks on evacuation
- Rebuilding and repairing structures damaged in a disaster

The National Environment Commission (NEC) is the central agency responsible for all environmental matters, including policies related to climate change and water management, among other matters. The NEC is responsible for the formulation and regulation of policies relating to climate change. This includes formulating the National Adaption Plans and the National Adaptation Programme of Action (NAPA), among other programs to combat the adverse effects such as increasing incidences of floods, GLOFs, and landslides as well as mitigation measures to transition to low carbon development strategies.

### **Climate Change and Disaster Management: Pakistan Perspective**

Prof. Shaheen Akhtar

National Defense University, Islamabad

Pakistan's vulnerability to climate induced disasters is very high. Over the past decade, it has ranked among the top 10 on the Global Climate Risk Index. Reducing disaster risk and increasing the resilience of people and systems are essential for the national development of the country. Various types of disasters cost Pakistan 1.2 to 2 billion U.S. dollars annually.

### **Mapping Pakistan's Vulnerability to Climate Induced Hazards/Disasters**

Pakistan is situated in a vulnerable geographical location, where the intensity and frequency of extreme weather events is high. Over the past decade it has been ranked among the top 10 on the Global Climate Risk Index. A joint study by ADB-WB (2021) placed Pakistan among the top risk-prone countries in terms of increase in average temperatures and resultant economic and social losses. Pakistan lost 9,989 lives, suffered economic losses worth \$3.8 billion and witnessed 152 extreme weather events from 1999 to 2018. Climate change is responsible for an annual economic loss of \$1.3-1.9bn, equivalent to 0.5 to 0.7 per cent of GDP.

### **Pakistan's Climate Crisis 2022: Shifting Monsoon Pattern**

Pakistan is experiencing the first serious disruption in the functioning of the monsoon weather system. This is also the first time that Pakistan has been hit by non-riverine floods of this magnitude, probably indicating a change of pattern in the monsoon. Typically, the riverine floods that have occurred in the past, are relatively easier to predict and prepare for, but torrential rains, glacial melt, flash floods and cloud outbursts are not. Normally, as the monsoon currents start from the Bay of Bengal, they enter the Indus Valley from Kashmir, which serves as the gateway to KP and down to northern Punjab.

The downpours during the journey of the clouds and currents meet the needs of human settlements, standing crops, and also replenish the rivers and their tributaries. By the time they reach Sindh and Balochistan, the monsoon currents are weakened and they seldom give heavy downpours. But this time all changed. The climate change has resulted in a 100 kilometers spatial shift towards the west in the overall monsoon pattern in Pakistan. The monsoon changed its centuries-old passage: instead of following the traditional route, it entered Sukkur, Khairpur and the neighbouring districts of central Sindh, short of Karachi, directly from Rajasthan and Gujarat in India.

#### **Pakistan's Disaster Risk Reduction Approach**

Pakistan is trying to develop a comprehensive National Disaster Risk Reduction Policy that increases the resilience of communities and the physical infrastructure at local and national levels and is in line with the Sendai Framework for Disaster Risk Reduction, the United Nations Sustainable Development Goals (2015–2030), the Paris Agreement on Climate Change 2015, and Pakistan Vision 2025. The government has adopted the Sendai Framework for Disaster Risk Reduction 2015–2030 which is the global blueprint for disaster risk reduction. The Sendai Framework that succeeded the Hygo Framework for Action 2005–2015 reinforces the shift from managing disasters to managing risk, and also establishes resilience building as a shared vision of the 2030 Agenda.

#### **Way Forward**

With increased frequency and intensity of disaster events, emergency response capacity and more amplified preparedness interventions have to be strengthened, especially for floods as recurrent hazards. The same applies for an effective utilisation of early warning systems. Climate vulnerability is fundamentally a local issue and local government institutions are the most important building block for climate resilience. The local administration hardly has the capacity to distribute relief goods or offer emergency services.

The federal and provincial governments should create new special-purpose institutions for risk

transfer and insurance. It should cover for five key losses: i) human lives, starting with the life of the breadwinner; ii) shelter/housing; iii) livestock; iv) standing crops; and v) mini and micro-enterprises. Pakistan should also invest in reclaiming and strengthening the banks and shoulders of rivers. Ambiguities from laws can be removed and compliance regimes strengthened.

There is a need to revisit and revise construction standards, specifications and materials. This is particularly important for water-related infrastructure in the monsoon and non-monsoon areas, and in high altitude mountains. Given the fast expansion of urban areas and growing cities, Pakistan requires rapid risk reduction initiatives conducted in the urban context. Enforcing existing building codes and improving the drainage capacity are among key aspects to mitigate the flood and seismic risks.



## Climate Change & Disaster Risk Reduction: Maldives

Dr. Rashida Didi,  
Academic  
Male', The Maldives

Climate change is the biggest environmental challenge for Maldives. It affects almost every aspect of the country, including its economy, livelihoods, habitats, and water and food security. Though a small island nation, Maldives has had its share of disasters. With a registered population of 374,775 in 2018, Maldives is a vulnerable, low lying nation in the Indian Ocean, where the most disturbing hazards are induced by climate change, one of which is global warming that is a result of sea level rise. Because of this, Maldives continues to experience warming trends, with increases of 0.8°C between 1978 and 2018. In fact, the country has been identified as one of the most vulnerable to threats posed by climate change.

The most significant factor associated with vulnerability is the low elevation, with an average of 1.5 meters above sea level, the highest point being approximately three meters which strengthens the impacts of the hazards. Moreover, the geological structure of the country that creates vulnerability results in a lack of disaster resilience and environmental sustainability which are perceived as threats to development.

Emphasizing the vulnerability and delicateness of Maldives in connection with climate change, Former President Mohamed Nasheed said, "the Maldivian people will be among the world's first climate refugees due to sea level rise if global warming is not averted." This notion comes from scientists' belief that if sea levels continue to rise, Maldives would be completely submerged. Scientists believe that 15% of Malé will be submerged by 2025.

### Disaster Risk Reduction in Maldives

As Maldives is believed to be submerged by 2100, taking disaster risk reduction steps is crucial to the country's existence. Initially, it was the Indian Ocean Tsunami of 2004 that brought disaster management to the forefront. With the intention of working for

continued survival, the Disaster Management Act (the Act) was passed by Parliament on 6 September 2015 and under this, on 30 December 2018, the National Disaster Management Authority (DMA), the main coordinating body for disaster activities at the national level, was promulgated. Furthermore, under Article 9 of the Act, on 14 June 2019, the National Disaster Management Council (the Council), the main organ in the government responsible for disaster risk reduction (DRR) was formed with the objectives of mitigating the effects of disaster and responding to policy decisions on the recurrence of disasters. The importance given to the Council is demonstrated by its high powered composition, which includes the President, Minister of Defence and other leading ministers connected with disaster.

### Sendai Framework

As a signatory to the Sendai Framework, the Maldivian government recognizes the importance of Sendai and other related international bodies and frameworks established to work on disaster risk reduction. This recognition is demonstrated by the Minister of Defence and National Security, Honourable Adam Shareef Umar's statement at the Asian Ministerial Conference on Disaster Risk Reduction, New Delhi, India, 2–5 November 2016: "The Sendai Framework and the Sustainable Development Goals, along with the Paris Agreement on climate Change are vital for the survival of Maldives in the face of climate change and extreme disasters."

### Challenges to DRR

There are many challenges to disaster risk management. The biggest is the geography of the country which is composed of islands scattered in the Indian Ocean. As a result, in times of disaster, travel is difficult as the ocean can be rough with sea swells and other disturbing phenomena that hinder inter island travel for the purposes of risk management.

### A Country Specific Approach to Disaster Risk Reduction & Management: Nepal

Veera Lamichhane

Senior Research Professional

Disaster-risk, Gender & Development,  
Kathmandu

Nepal remains a disaster prone country as it has had to suffer major disasters in recent years. The major earthquake of 2015 put the spotlight on, and acted as a catalyst for the country to be better prepared for disasters. Building resilience and building back better have become key themes. Major disaster risks remain, including the recurrence of fires, floods, landslides, droughts, GLOFs as well as earthquakes. Nepal is prone to disaster due to various factors, such as difficult geological terrain, unplanned settlement, poor construction practices, cultivation of unsuitable land, and so on.

Several approaches have been made in regard to Disaster Risk Reduction Management (DRRM) by local institutions such as the National Strategy for Disaster Risk Management (2009) and Nepal Risk Reduction Consortium while international help from INGOs, such as UN agencies have been instrumental. Yet the sturdiest step forward so far has been the endorsement of the Sendai Framework. Nepal, as a member state, follows the Sendai Framework, which was endorsed by the UN General Assembly following the 2015 Third UN World Conference on Disaster Risk Reduction. The Framework advocates “the substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries”.

#### Disaster: Transcending Borders

Disasters spill over borders, overflowing political, social, and economic boundaries. The occurrence and impact of disasters due to natural hazards are not confined to a country's political boundary. Floods, earthquakes, forest fires and volcanoes have significant cross border impacts. Some examples of cross border impacts of disasters include Koshi floods in Nepal India (2008), Kashmir

earthquake (2005), Indian Ocean Tsunami (2004), and recurrent tropical cyclones in Bangladesh and India. Good governance, regional stability, economic prosperity and sound environmental management are required to have minimum impacts of a disaster. The recurrence of similar disasters in the South Asian region means that there is room for best practices to be shared in order to be better prepared.

#### Regional Cooperation

Some attempts at regional cooperation have been made by institutions such as the SAARC Disaster Management Centre; however, these efforts have been neither cohesive nor consistent to compensate for the management gaps in the whole region. Data integration and analysis at the regional level are important and need to be strengthened in order to help reduce the risks and impacts of water related disasters, including floods, landslides, and droughts, the prediction of which rely greatly on science and technology for early warnings. There is a desperate need for a sole platform which acts as a “one stop” for South Asia on the knowledge and data sharing of disasters.

#### Recommendations

- Communication between the scientists who create the data and the policymakers who use the data must be improved
- Improved equipment and technological systems are needed in order to predict patterns and produce data more accurately
- There is a demand for improved collaboration and communication between regional science centers
- Basing government policies on science would bridge the gap between idea creation and implementation
- Smoother trans-boundary data sharing channels are needed
- Both users and providers of data must discuss what data are useful from a policy context vs. what data is possible to provide

### Disaster Risk Governance in India

Dr. Nihar R Nayak

Research Fellow, MP-IDSA, New Delhi

Given the complex geomorphic profile, India experiences a wide range of natural disasters, from hydro meteorological threats such as flooding, cyclones, droughts, heat waves, landslides, to other hazards like wildfires, earthquakes, and epidemics.

About 58.6 per cent of the landmass of India is prone to earthquakes of moderate to very high intensity. An area over 40 million hectares (twelve per cent of land) is prone to floods. Out of the 7,516 kilometers long coastline, close to 5,700 kilometers is prone to cyclone and tsunamis. About 68 per cent of cultivable land is vulnerable to drought. About 15 per cent of our country covering over 0.49 million square kilometres is prone to landslides. The Himalayan and Trans Himalayan mountains are susceptible to avalanches.

Besides, around 19 states and union territories have mountainous regions with 65,000 villages that are prone to landslides. Above all, India is vulnerable to challenges emanating from epidemics, pollution, and industrial accidents. These disasters have economic, social, and health impacts. Since the country has a population of 1.3 billion and limited social and economic infrastructure, reducing the risks of disasters has remained challenging. Disaster risks are further compounded by increasing vulnerabilities related to a changing demography due to migration and socio economic conditions, unplanned urbanization, and development within high risk zones, environmental degradation, and climate change. Climate change impacts have doubled the risks, especially with an increase in the frequency of hydro meteorological hazards. Several research studies have found that these natural disasters might worsen in the future.

In addition, some of these disasters have trans border implications. For example, flash floods, glacier outbursts, and landslides in Nepal inundate a large portion of the UP and Bihar states of India. Tsunamis in the Indian Ocean affect equally the sea coasts of Sri Lanka, the Maldives, and India. The landfall of a tropical cyclone in Bangladesh

brings devastating destruction in the eastern part of India. Locusts breeding in Pakistan destroy crops and plants in north western India. While the magnitude of these disasters is similar in the affected regions, their preparedness, management, and responses do not follow similar lines in all regions. Therefore, no single country can mitigate these challenges alone. In that case, sharing data, disaster management experience, and framing a common policy will help to reduce disaster risks in South Asia in general and individual countries in particular.

### Challenges for India

- Mismanagement of disaster funds and assistance at the local administrative level
- Non-cooperation in implementing disaster management policies due to ideological differences
- Trust deficit among the concerned authorities and departments
- Illiteracy, population density, lack of public awareness about disaster preventive measures, and poverty
- Lack of data to develop scientific models
- Slow progress in updating disaster management plans at the district level
- Coordination problems and information sharing between the federal and union government
- Debate over jurisdictions in the State and Union lists
- Reconciling public and state machinery understanding on disasters
- Absence of real-time data sharing arrangement between neighbouring countries
- Lack of regional cooperation due to asymmetry in resources & territorial size between India and other SAARC countries

### Key Recommendation

India has to draw a fine line between 'proactive role' and 'cooperation' while extending humanitarian assistance and DRR programmes to other countries.



## Climate Change through a Human Security Lens: Case Study of Sri Lanka

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### Core Argument

Climate change from a human security approach can provide better understanding of climate change from the perspective of the individual, the community, the region and the nation.

### Justification

*Climate change is a Threat Multiplier*

United Nations Trust Fund for Human Security (UNTFHS) has placed climate change as “one of the most pressing issues of our time” ([un.org/humansecurity](http://un.org/humansecurity)), citing how the climate changes, with its complexity and “interrelated causes and consequences” ([un.org/humansecurity](http://un.org/humansecurity)).

The risks climate change poses to individuals and communities include threats to livelihoods, culture, and political stability.

Human Security “in the context of climate change, is a condition that exists when the vital core of human lives is protected, and when people have the freedom and capacity to live with dignity. In this assessment, the vital core of human lives includes the universal and culturally specific, material and non-material elements necessary for people to act on behalf of their interests. Many phenomena influence human security, notably the operation of markets, the state, and civil society. Poverty, discrimination of many kinds, and extreme natural and technological disasters undermine human security” (Adler, et al. 2014, p. 759).

The impact of climate change will challenge and reduce the resilience of people and communities to varying degrees. In some situations, it will cause extreme disruption with which people simply cannot cope, as it overwhelms them and renders their homes and livelihoods unviable. If the governance structures that the community regards as safeguards of their human security are not up to the task, climate change will weaken confidence

in the social order and its institutions and damage the glue that holds societies together. In some contexts, this can increase the risk of instability or violence (Vivekananda 2011, p. 8).

### Disaster Contours in Sri Lanka

Being a small island situated in the middle of the Indian Ocean, hydro meteorological hazards are by no means novel to Sri Lanka. From the very dawn of time, the monsoon has been the most formidable external force that exerts a decisive impact on the life and death of the people of the Island.

As a country in the tropical region, most of the disasters in Sri Lanka are mainly hydro meteorological related. These include cyclones, floods, landslides, droughts, and coastal erosion. Another category of disasters that Sri Lanka frequently encounters during rainy seasons is mosquito borne illnesses such as Dengue fever and rodent borne diseases such as Leptospirosis.

The most devastating natural disaster that Sri Lanka has experienced in the recent past is the Tsunami of December 2004, with over 35,000 dead and almost a million displaced. It affected two thirds of the coastline of the country, over 1,000 kilometers in total. Nearly 234,000 families were affected and over 1,000,000 houses were destroyed. Over two thirds of the country’s fishing boats were wrecked. It highlighted the need for a systematic disaster risk management approach to face such a massive catastrophe.

### Disaster Management Policies

- Natural disasters were handled by a number of institutions under the rubric of Social Service
- The high human toll, massive economic cost, and deep social impact caused by the 2004 Tsunami highlighted the need for a systematic & comprehensive policy framework
- Local communities have developed knowledge and skills to cope with the challenge posed by nature
- Disaster Management Act: Set up National Council for Disaster Management headed by President and Prime Minister

- Disaster Management Center- Implement national & sub-national disaster management programs
- Role of NGO: Enhance community capacity through Community-based Disaster Risks Management (CBDRM)

### Recommendations

- Unpack the traditional knowledge acquired on how to live with the environment and synergize it with modern technology
- The political body plays a crucial role in building social resilience and mobilizing of civil society
- An organic articulation between the civil and political domains is essential
- Mechanism should be in place to avoid confusion and duplication of disaster management responsibilities between ministries
- Coordination and collaboration between state institutions and NGOs needs to be developed
- It is necessary to pay attention to the traditional knowledge systems

### Nepali Army on Disaster Management Especially during the Earthquake of 2015

Directorate of Disaster Management  
Nepal Army

### NA's Role and Responsibilities on Disaster Management

The Constitution of Nepal, Part 28, 267(4) has defined the role of Nepal Army (NA) in any kinds of disaster management in the country. NA under MoHA is tasked with SAR (Search and Rescue), air rescue operation, relief operation, camp management, opening line of communication, assist in reconstruction and other forms of disasters.

### NA's Contributions in Disaster Management

Nepal Army has been the first and key responder to any disasters that take place in the country.

Some of the key involvement of NA's are:

- Mega earthquake of 1934
- Earthquake of Udayapur in 1988
- Massive floods in the central region in 1993
- Flooding in the Koshi Barrage area in 2008
- Epidemic in Jajarkot in 2009
- Landslide in Jure of Sindhupalchowk and blizzards in the Mt Annapurna region in 2014
- Mega earthquake of 2015 and many more

Similarly, NA has also extended its support at international level and some of the examples are:

- Mobilized in rescue and relief operations after the devastating earthquake in Haiti in 2010
- NA's Aviation Wing supplied relief materials after Pakistan's earthquake in 2005
- In 2011, after a devastating earthquake in Japan, a 12 member NA SAR team was put on standby

**Roles of NA Outlined in NDRF**

Primary responsibility

- Coordination of Multinational/Bilateral Military Humanitarian Assistance

Secondary responsibilities

- Health Care
- Airport Security and Air traffic management
- Restore road communications
- Assist in developing TIA disaster response plan and upgrade regional airports as alternative response hubs as well as preposition adequate ground handling and other equipment at airports
- Coordination and deployment of relief consignments
- Electricity services to be made available to hospitals/health centers/medical centers/IDP camps, schools
- Establishment of field hospitals
- Maintenance of Law and Order (Warehouse, IDP Camps, personnel, humanitarian convoy, protect property and security in affected areas)
- Assist in providing/distribution of basic food items for survivals and IDPs
- Assist in dead body management
- Set up of temporary shelter in the pre-determined safe and open/evacuation sites for displaced families
- Preposition of SAR Kits at 75 districts of Nepal
- Development of USAR capacities (one medium and ten light team) as a national, regional and local response team

**Gorkha Earthquake and the role of NA**

Brief:

Date: 25 April

Time: 11:56 AM

Scale: 7.8 Magnitude Earthquake with Epicenter in Barpak, Gorkha District

12:30 PM- Magnitude 6.6 aftershock on the same day

12 May- Magnitude 6.8 aftershock

**Factors that Influenced Response**

In Favour

- Day/Time of Earthquake
- Season
- Location of Epicenter
- Only International Airport fully functional
- Public telephone service fully functional and other utilities restored within a few days
- Not the worst case scenario

Challenges

- Most GoN Offices particularly that of the NA were severely damaged
- Disaster Management Act not approved by the Government
- NA Air assets at the lowest

**NA's Concept of Operations**

NA has three key phases and approaches to respond any kinds of disaster;

Phase 1 – Immediate Response

Phase 2 – Coordinated Rescue & Relief

Phase 3 – Rehabilitation & Reconstruction

**NA Achievements**

Live CSSR	Rescue by Air	Dead bodies recovered	Relief Material delivered	Shelter, food & water	Medical Services
1336	2928	1731	5707 tons	15000 persons	35282

Source: <https://www.nepalarmy.mil.np/>



### What Went Well

- National Disaster Relief Framework in place
- National Emergency Operations Centre was functional
- The Central Natural Disaster Relief Committee met within 2 hours
- The NA, NP and the APF were mobilised immediately
- MNMCC functional within the first few hours
- Humanitarian Staging Area at TIA already identified
- 83 Open Spaces in Kathmandu valley already identified
- Model Agreement on customs in place
- Hospitals were prepared to receive large scale casualties
- Effective public communications particularly through FM stations and social network
- Effective control over mass exodus of over one million people out of Kathmandu valley
- Successful epidemic control
- Guidelines for dead body management in place
- Supply of water and utilities restored very quickly
- No black-marketing or queues in banks and shops

### What Could Have Been Done Better

- Damage Assessment was slow
- NEOC did not have SOPs
- OSOCC established on day four
- No dedicated USAR teams & no medium or heavy SR capabilities in country
- Lack of air assets and airport ground handling equipment
- GoN policies were more response focused so not much effort on building resilient communities
- Lack of pre-positioned material
- Lack of community preparedness for disaster
- Disaster politics and disaster tourism
  - o At the international level
  - o At the national level
  - o At the local level

### Lessons Learnt

#### Lesson 1:

The resilient nature of uniformed forces makes them the most prepared to take on immediate disaster management responsibilities, but ultimately the civilian authorities will have to take charge. This must be clearly spelt out in the disaster relief framework.

#### Lesson 2:

The disaster relief framework will have to set clear guidelines on the transition of responsibilities.

#### Lesson 3:

A Civil Military Coordination Centre can be a very helpful addition to the disaster relief framework.

#### Lesson 4:

Our experience has shown us that it will be the countries in the immediate neighborhood that will be the first to respond, hence the importance of regional disaster management exercises, which include both the military and civilian partners, cannot be overstressed.

#### Lesson 5:

Airspace de-confliction and ground handling priorities will lead to a lot of friction between the various agencies involved in the response.



# Field Visits

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## Field Visits

### Visit to ICIMOD Knowledge Park, Godavari

On September 14, as part of the field trip, the summer school participants were taken to International Centre for Integrated Mountain Development (ICIMOD) Knowledge Park at Godavari, where they were briefed by the Knowledge Park tour guide and visited different sites. The participants also had the opportunity to learn about the water management system, renewable energy technologies, soil management, income generation (vegetables, fruits, livestock, fish, beekeeping), biodiversity conservation, and ecotourism. As the entire day was dedicated to the knowledge park visit and sightseeing, the participants observed and learned about over 30 different eco-friendly technologies including Trombe wall (solar technology), nursery propagation, 3D or vertical farming, green house vegetable cultivation, prototype flood early warning system, carbon monitoring, soil erosion monitoring, transboundary air pollution station, photovoltaic electricity, Puxin biogas plant, renewable energy technology and many more, mostly related to farming and livelihood options useful for sustainable development.

It was informed that the Knowledge Park has played a significant role in informing and advancing initiatives and technologies used by other regional member countries to improve mountain livelihoods. It also helps ICIMOD in promoting the establishment of a sustainable mountain ecology and improving the living conditions of mountain inhabitants in the Hindu Kush Himalaya. The participants also had the opportunity to interact with the in-house staff and workers who are directly involved in the preservation and safeguarding of the knowledge park. The tour concluded with a brief documentary watching a show about the knowledge park and the work of ICIMOD as well as the impacts it has created on people's livelihoods and the overall ecosystem of South Asia.

### Community Survey: Visit to Khadka Village

On September 15, the summer school students conducted a brief study survey in the nearby village of Nagarkot. The objective of the study was to understand the overall impact of climate change in the village. Students were divided into five clusters and they covered around 50 households. Different questionnaires were developed covering key issues like changing weather patterns in the past decades, how it has impacted the overall lifestyle and ecosystem of the village, what are the key crops and agricultural harvest, impact on the agro-economy, and what are the coping mechanism and best practices to overcome.

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. Overall, the research shows that there has been a steady temperature rise compared to previous years, as well as irregular and unseasonal rainfall, longer droughts, and greater humidity that impairs food productivity and eventually leads to a food crisis in the village.

Overall, the summer school explored the environmental, societal and economic impacts and implications of climate change. Different topics related to climate change, global warming, and environment protection were discussed. Some of the covered key topics related to climate change were but are not limited to:

- General introduction to climate change
- Causes and effects
- Social, economic and political impacts
- Environmental impacts
- Modelling and prediction
- Adaptation of catastrophic events
- Management of water resources and rainfall changes
- Best practices and lessons learned for South Asia as a region









## Images

1. 'himalayas-mountains'. trilemedia. (Pixabay). [download].

Available at: <https://pixabay.com/photos/himalayas-mountains-everest-hills-5817277/> [Accessed 16 Feb. 2023]

*Appears on p.5 of this report.*

2. 'nepal-village-mountain'. Nishan\_Reshmi. (Pixabay). [download].

Available at: <https://pixabay.com/photos/nepal-village-mountain-landscape-7107323/> [Accessed 16 Feb. 2023]

*Appears on p.22 of this study.*

## Figures

Figure 1. Illustration of Global Warming.

K-12 students' misconception ability on global warming: a case study - Scientific Figure on ResearchGate. Available from: [https://www.researchgate.net/figure/Illustration-of-Global-Warming\\_fig1\\_337444368](https://www.researchgate.net/figure/Illustration-of-Global-Warming_fig1_337444368) [accessed 8 Mar, 2023]

Figure 2. The global climate subsystems and relevant interactions.

Implementing fuzzy decision making technique in analyzing the Nile Delta resilience to climate change - Scientific Figure on ResearchGate. Available from: [https://www.researchgate.net/figure/b-The-global-climate-subsystems-and-relevant-interactions\\_fig12\\_279313086](https://www.researchgate.net/figure/b-The-global-climate-subsystems-and-relevant-interactions_fig12_279313086) [accessed 8 Mar, 2023]

# Imprint

Date of Publication: February 2023

**Cover Illustration:** provided by COSATT  
Other sources indicated accordingly.

**Editor:**

Dr. Nishchal N. PANDEY  
Dr. Christian Hübner

**Project Coordination:**

Timm Anton

**Design / Layout Implementation:**

Yili Yao | With reference to KAS Design Guidelines

**Graphic Design**

<https://infobrandz.com/> | With reference to KAS Design Guidelines

This publication of the Konrad-Adenauer-Stiftung e. V. is solely intended for information purposes. It may not be used for the purpose of election advertising. This applies to federal, state, and local elections as well as elections to the European Parliament.

The publication was funded by the Federal Ministry of Economic Cooperation of the Federal Republic of Germany (BMZ).

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