Chapter 1
South Asian Stories of Climate Resilience

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Key Messages

- South Asia is faced with both climate change threats and pre-existing development challenges such as poverty reduction, natural resource management, and social equity.
- Community-based adaptation initiatives in vulnerable communities of South Asia represent examples of multifaceted and holistic approaches.
- Lessons from grassroots responses in South Asia can be a source of knowledge and potential solutions for other developing countries.

1.1 Climate Resilience at the Community Level

Building resilience in communities against climate-induced disasters is a priority in many South Asian countries. These countries are also committed to attaining

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the sustainable development goals (SDGs) by 2030. Community-based programmes offer promising opportunities for both these ends. When local communities become intimately engaged in adaptation initiatives, they can instill local and traditional knowledge, take advantage of existing networks, stimulate local capacity, and reduce dependence on long-term external support. Engaging with people at the grassroots level, empowering local institutions and building resilient communities will therefore be critical for humanity to navigate the journey into an uncertain climatic future.

This book documents how communities in South Asia are building climate resilience. At a time when climate change presents humanity with an uncertain and gloomy future, the stories of innovation, creativity, grassroots engagement, and locally applicable solutions in this book provide hope and pathways for sustainability. Grassroots initiatives already in place in South Asian countries suggest that locally engaged programmes often generate more effective solutions at lower costs. The narrative of writing makes the volume accessible to a diverse audience—from academics, researchers, and students to practitioners in various governmental, non-governmental, and international agencies.

1.2 Global Struggle with Climate Change

After many years of negotiations and failed attempts, the international community finally reached an agreement on a strategy to address climate change. The Paris Agreement was signed by 197 countries in December 2015 (UNFCCC, 2015). Nations around the world agreed on a plan of action to contain the global average temperature increase within 2 °C above pre-industrial levels by the end of the century. Although many of the vulnerable countries lobbied for keeping the temperature increase within 1.5 °C, they finally settled for a non-binding 'good faith' agreement where everyone would strive to reach this lower threshold.

While the Paris Agreement offered tangible hope for humanity to address climate change, it is still too little and too late to prevent significant human, ecological, and economic impacts. The risks posed by climate change are no longer distant phenomena and many countries are already facing the uproar of nature due to global warming. There has been an increase in the frequency of extreme events all over the world. The global North has experienced it through hurricanes and super storms in the USA, persistent heat waves in Europe, and unprecedented forest fires in Australia. The South has been subjected to multiple natural hazards such as severe cyclones, extended droughts, high-intensity rainfall, flooding, and landslides. These have caused widespread ecosystem degradation, loss of agricultural productivity, salinity intrusion, and erosion of soil in riparian zones. Between 1999 and 2018, about 495,000 lives were lost worldwide as a direct result of more than 12,000 extreme weather events, causing economic losses of US$ 3.54 trillion (in purchasing power parities) (Eckstein, Hutfils, & Winges, 2020). The overall impact on people in the South has been more severe due to direct loss of livelihoods amid pre-existing levels of poverty and the slow pace of development.

1.3 South Asia: A Climate Hotspot

Nowhere has the rage of climate change erupted with more vigour and multifaceted threats than in South Asia, a region enclosed by the Himalayas in the North and the Indian Ocean in the South. Here, a quarter of the global population resides in 3.5% of world's land area, making it the most populous and most densely populated region of the world. According to the Global Climate Risk Index, it is the most impacted region of the world in terms of fatalities and economic losses that occurred between 1998 and 2017 due to climate change. The region has been subjected to floods, landslides, cyclones, and heavy rainfall. Bangladesh, India, Nepal, and Pakistan are among the top 20 countries that have been most severely impacted by extreme weather events. India, Bangladesh, and the Maldives have been identified as the most vulnerable countries to rising sea level and increased river flooding, with Pakistan appearing in the top ten list (Eckstein et al., 2019).

A 2018 IPCC report provides a comprehensive account of the impacts expected even if the goal of the Paris Agreement to contain global warming at 2°C is achieved. The key findings of the report that apply to climate change impacts and responses in South Asia are summarised below (IPCC, 2018).

- Extreme temperatures and increase in frequency and intensity of heavy precipitation and drought.
- Higher levels of heavy precipitation associated with tropical cyclones and a larger fraction of the global land area affected by flood hazards.
- Amplified exposure of small islands, low-lying coastal areas and deltas to the risks associated with sea level rise for many human and ecological systems, including increased saltwater intrusion, flooding, and damage to infrastructure.
- Increasing risks to fisheries and aquaculture via impacts on the physiology, survival, habitat, reproduction, disease incidence, and risk of invasive species.
- Several hundred million people at disproportionately higher risk of adverse consequences and poverty by 2050, including disadvantaged and vulnerable populations, indigenous peoples and local communities dependent on agricultural or coastal livelihoods.
- Overlapping risks across energy, food, and water sectors spatially and temporally, creating new hazards and exacerbating current ones, exposures, and vulnerabilities for increasing numbers of people and regions.

While the above examples highlight the major shocks that South Asian countries have experienced in recent decades and are expected to confront in years to come, climate change also contributes to slow and persistent impacts on livelihoods and economies in the region through gradually declining flow of ecosystem services, reducing agricultural productivity, and increasing coastal and river erosion. Discourses of climate justice suggest that the worst impacts of climate change will be borne by some of the most vulnerable and poorest populations of the world. The livelihood impacts are already displacing a large number of people who have become internally or externally displaced climate refugees. As the world continues to warm,

many more people are expected to be disenfranchised and displaced within the timeline of the Paris Agreement. Even if they are able to survive the wrath of violent wind or water, they will still be subject to the gradual loss of livelihood–gram by gram of grain and inch by inch of land–slowly, but surely.

1.4 South Asian Stories of Resilience Building

Given the geographic diversity of South Asia spreading from the Everest to the islands in the Indian Ocean, the heterogeneity of communities with diverse languages, ethnicities, lifestyles, and cultures, this region offers unique opportunities for studying community-based initiatives on building climate resilience. This book tells stories of climate change adaptation initiatives in seven South Asian countries highlighting grassroots level solutions, documenting lessons learned, and identifying gaps and opportunities. There are 27 studies selected from the island nations of Maldives and Sri Lanka, the floodplains of Bangladesh, India and Pakistan, and the mountainous countries of Bhutan and Nepal. These studies, which highlight how communities have been working to deal with climate change, are designed to guide others who are searching for examples to replicate in their own communities. These case studies highlight that win–win solutions may exist for communities battered by climate change, poverty, and environmental degradation.

The book is organised into six thematic areas—each constituting an important area for climate change and sustainability that is of concern in South Asia.

The book begins with a section on *Concepts and Models* to introduce issues related to building climate resilience at the community level. An integrated framework is developed that connects community-based climate adaptation (CBA) with the UN Sustainable Development Goals (SDGs) and principles of resilience and efforts at disaster risk reduction. A review of academic and grey literature offers insight into the concept, application, barriers, and opportunities for CBA along with a few case studies from outside South Asia to situate the stories in this book in the broader context of global grassroots resilience building initiatives. This section also develops the taxonomy related to resilience building efforts at the community level. Agriculture is an important sector which will be severely impacted by climate change and India is a large economy with a variety of agricultural products. Adaptation strategies are very important for agricultural communities. Therefore, a literature review of adaptation practices in Indian agriculture is also presented in this section. The section ends with an example of the application of a resilience analysis protocol in Bangladesh as a model for resilience building that can be applied elsewhere as a tool for community-based climate adaptation.

Communities across the regions in South Asia have used indigenous and traditional knowledge to combat many challenges of nature. Paddy growers in Bhutan have been growing traditional rice varieties to deal with water scarcity. It has given them a ‘safety net’ against shortage of irrigation water. Farmers in Pakistan facing floods have used local knowledge to develop resilience, using both individual wisdom

as well as community knowledge to deal with flash floods. Similarly, farmers in Kerala formed collectives to manage the impact of massive flooding with a variety of post-flood measures in conjunction with the state. Farmers in Maldives use innovative local knowledge to grow vegetables. They learn from each other to build an agricultural practice to withstand the onslaught of sea waves. Similarly, stories from agriculture in India further suggest that farmers need to adapt to use water sustainably in order to protect their income. Hence, there is a genuine need to find water-saving technologies using traditional varieties of crops rather than using modern varieties which are water-intensive. The *Traditional Knowledge and Sustainable Agriculture* section highlights the value of local knowledge, autonomous adaptation, conservation initiatives, and water resource management.

Throughout human civilization, technology has been the foundation for change and progress. Facing harsh environmental conditions, human civilization has depended on technology adaptation. An array of modern technologies as well as indigenous know-how is explored in the section under *Technology Adoption*. Communities living in areas far from the influence of government institutions have used traditional knowledge to harvest rainwater for sustaining their agriculture-based livelihoods during the dry season and to protect riverbanks. This section also shows how markets often facilitate adoption of technologies that might build resilience in communities faced with the threat of cyclones. It shows how farmers in Sri Lanka used a cascading tank system to continue to irrigate their crop land for thousands of years. The cas studies show how markets and institutions facilitated adoption of modern technologies like LPG and Solar Home Systems in traditional and rural communities.

The section on *Disaster Risk Reduction* shows how communities have worked together to deal with natural disasters. It shows how communities in the coastal areas of Bangladesh used help from NGOs to build a resilient community in a cyclone-affected area. It also provides evidence on the value of mangroves on the coast of Odisha in India, in reducing damage caused by super-cyclones, and shows how in Bangladesh, villager's decision to adapt against cyclones depends on natural capital like the mangroves. It shows how farmers and the entire value chain in agriculture use seasonal weather forecasts to reduce risks and how farmers in Sri Lanka adapt locally to deal with soil erosion.

As more and more people migrate to urban areas, *Urban Sustainability* against climate change has become a major issue. In particular, it is more important for the people who are poor and living in slums and the low-lying flood prone areas. This section highlights creative approaches to water and waste management as part of climate adaptation in urban areas. This helps communities to reduce the risk of urban flooding and waterlogging due to events of high-intensity short duration rainfall. A case study also illustrates how local communities can come together and sustainably manage the supply of drinking water when natural springs are drying up in the mountains. Cases from Bangladesh, India, and Nepal show how waste management remains an important component for building resilience in urban settlements against climate extremes and how these can be addressed locally using market signals and by building awareness which not only reduces the risk of urban flooding and

water logging but also provides a way of sustainable financing of municipal waste management.

Finally, the section on *Alternative Livelihood* documents how people in vulnerable communities are adjusting traditional practices and using innovation in new enterprises to cope with the inevitability of ongoing climate stresses. The section highlights win–win strategies for local communities to find alternative livelihood options using natural capital like mangroves and mountains to diversify income which is threatened by climate change. It also shows how agricultural diversification is used by farmers in Sri Lanka and Pakistan to build resilience.

1.5 The End of the Beginning

The Paris Agreement brought hope that bold initiatives through Nationally Determined Contributions (NDCs) would help combat climate change. While developed countries are better prepared to provide direct assistance and support services towards adaptation and mitigation activities, developing countries need financial and technical support to do so. This has been recognised in all international agreements and conventions related to climate change. Unfortunately, the focus has been on public interventions which often are biased towards major economic centres, and people and communities living away from the centre are left to find support on their own. Communities living in these areas often use their collective wisdom to address problems. The stories included in this book document the experiences to learn what worked and what did not in a variety of cultural, ecological, and geographic circumstances.

This book illustrates the promising opportunities for grassroots initiatives to become a significant part of climate adaptation in developing countries while also addressing other developmental needs in an integrated way. It provides locally grounded community solutions to climate change in different institutional settings, binding the geographical diversity of the region thematically. We anticipate that the case studies discussed here will become essential reading for anyone looking for examples from the grassroots in South Asia.

In the process of writing this volume, we were able to gather 58 researchers from the region to be part of a shared project with a shared vision. We envision the stories and experiences shared in this book as part of a broader movement to situate community-based climate adaptation as a mainstream approach to building climate resilient across communities in South Asia and beyond.

References

Eckstein, D., Hutfils, M., & Winges, M. (2019). *Global climate risk index 2019: Who suffers most from extreme weather events? Weather-related loss events in 2017 and 1998 to 2017*. Briefing Report, Germanwatche.V.

Eckstein, D., Künzel, V., Schäfer, L., & Winges, M. (2020). *Global climate risk index 2020: who suffers most from extreme weather events? Weather-related loss events in 2018 and 1999 to 2018*. Briefing Paper, Germanwatche.V.

Intergovernmental Panel on Climate Change. (2018). *Global warming of 1.5°C: An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*, IPCC.

United Nations Framework Convention on Climate Change. (2015). *The Paris Agreement*. https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement. Last accessed 9 Feb 2020.

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