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Chapter 1 - Drought risks in developing regions: challenges and opportunities

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Drought is a hazard that affects most settled areas on a periodic or occasional basis. Even places we associate with being mostly cool and damp—think Ireland, for example—or where the most notorious hazard is flooding as the result of an abundance of precipitation—think Bangladesh—experience sometimes devastating droughts. They can disrupt agricultural production, cause wells and ponds to run dry, force governments to mobilize relief efforts, stimulate migration from affected areas and, in the worst cases, trigger competition and conflict over suddenly scarce resources. Although drought has historically been a rural hazard, disproportionately affecting farmers, pastoralists, and villagers, as cities swell and their water needs grow, large-scale rainfall depression is becoming an urban hazard as well. Most worryingly, the number of people and places that grapple with drought is expected to grow rapidly this century from the combined effects of continued global population growth, their interventions in local eco- and water systems, and changes in the climate caused by continuously growing greenhouse gas emissions. (excerpt from Chapter 1 - Drought risks in developing regions: challenges and opportunities

Chapter 2 - Drought, migration, and conflict in sub-Saharan Africa: what are the links and policy options?

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Droughts are becoming more frequent and severe due to ongoing global climatic changes, contributing to the loss of farmland, declining crop yields, and loss of livestock in especially arid and semiarid areas across the globe. Drought affects water availability and quality, pastoral livelihoods, and hydroelectric generation in sub-Saharan Africa (SSA). Rural societies in SSA have long adapted to droughts, but growing impacts on food security, water, and rural livelihoods, combined with population growth and natural resource scarcity, are leading to increases in the number of internally displaced persons and in migration more generally.

Many believe that drought-induced mobility leads to competition and stress in resource-scarce areas and increases the tendency for competition to degenerate into violence and conflicts. In the Sahel, East and Southern Africa, drought-related farmer–herder conflicts and water tensions have become common and widespread, raising concerns that such tensions have been major precursors for violent conflicts and human insecurity on the African continent. However, this chapter suggests that the link between drought, migration and conflict is complex and is influenced by a multiplicity of environmental, socioeconomic, and political factors. Based on a critical review of empirical research on the subject across SSA, this chapter prescribes policy options that include the need for integrated early warning systems, the promotion of weather-based crop insurance schemes, the development of drought mitigation tools, and the need to incorporate disaster risk reduction components into long-term development planning. Such measures would contribute to addressing the direct impacts of droughts, migration as an adaptation strategy, and conflict prevention and resolution in vulnerable regions.

Chapter 3 - Lessons from the El Niño–induced 2015/16 drought in the Southern Africa region

<https://www.sciencedirect.com/science/article/pii/B9780128148204000031>

The Southern Africa region experienced a severe El Niño–induced drought during the 2015/16 season which adversely affected many sectors of the regional economy. There is convergence on the idea that droughts have intensified in terms of their frequency, severity, and geospatial coverage over the last few decades. Weather-related emergencies have become recurring phenomena over most of the Southern African region with the 2015–16 El Niño–induced drought emergency highlighted as the worst such phenomena in 35 years. The impacts of the 2015/16 drought were widespread and diverse including on food and nutrition security. It is estimated that the drought resulted in 40 million people being acutely food insecure as a result of widespread crop failure. Relying mainly on review of scholarly literature and interviews with selected key informants in the agriculture, disaster management, and humanitarian sectors in the southern African region, this chapter first characterizes the phenomenon of droughts in Southern Africa focusing on the frequency and impact. The main part of the chapter places focus on analyzing and reviewing the impacts and institutional characteristics of response

processes to the 2015–16 El Niño–induced drought at various levels including at national, regional, and local levels examining the policy, program, project. The chapter also presents a synthesis of the lessons that can be learned from both the emerging character and response frameworks to drought in Southern Africa.

Chapter 4 - Drought preparedness and livelihood implications in developing countries: what are the options?—Latin America and Northeast Brazil

<https://www.sciencedirect.com/science/article/pii/B9780128148204000043>

This chapter discusses droughts and drought policies in the Americas and the Caribbean region and presents the case of Northeast Brazil, which has a long experience in dealing with droughts.

Chapter 5 - Drought in the Yucatan: Maya perspectives on tradition, change, and adaptation

<https://www.sciencedirect.com/science/article/pii/B9780128148204000055>

The impacts of climate change on Indigenous peoples' livelihoods are often overlooked in academic research. In Yucatan (Mexico), Maya communities, which continue to be centered on millennia-old milpa-based agricultural systems, are particularly vulnerable to climate change-related impacts such as drought. The Yucatan Peninsula is located between the Gulf of Mexico (to the North) and the Caribbean Sea (to the South), covering an area of nearly 44,000 km². Geopolitically, the Peninsula incorporates parts of the Mexican states of Yucatan, Campeche, and Quintana Roo, in addition to northern Belize and Guatemala's El Petén Department. Scientific evidence shows that the Yucatan's climate has been getting hotter and drier, with more frequent unpredictable weather patterns. It is also clear that the effects and impacts of climate change in the Yucatan, such as drought, will continue to increase in severity in coming years and decades. Thus, climate change will increasingly pose a challenge to the Yucatec Maya in their milpa-based land-use patterns and activities. However, what is less clear is how exactly climate change is influencing and reshaping Maya land-use patterns and practices. In this chapter, I present new empirical data about how climate change affecting the relationships between the Maya and the land, particularly in their traditional milpa farming practices, as well as some possible policy implications of community-based adaptations to climate change in the Yucatan.

Chapter 6 - The shifting limits of drought adaptation in rural Colombia

<https://www.sciencedirect.com/science/article/pii/B9780128148204000067>

This chapter explores an El Niño drought in the subsistence farming region of El Carmen de Bolívar, Colombia. Specifically, families with greater resources migrate temporarily as an adaptation in the early stages of drought while the most vulnerable families adapt in situ, migrating permanently as drought drags on if in situ adaptations fail. These findings nuance our

understanding of migration during drought by exploring how families weigh their own adaptive capacities. In El Carmen de Bolívar, households' perceptions of their risks and resources are critical to the adaptation strategies they deploy. For the most vulnerable households, adapting in situ during drought depletes families' capital, thus entrenching existing inequalities. As climate change increases drought frequency and severity, each drought intensifies households' social vulnerability to future environmental stressors. In similar droughts in developing areas, basic humanitarian aid, including potable water and food for consumption, could be key to allaying drastic capital depletion and, in some cases, even preventing desperate migrations of last resort.

Chapter 7 - Drought and the gendered livelihoods implications for smallholder farmers in the Southern Africa Development Community region

<https://www.sciencedirect.com/science/article/pii/B9780128148204000079>

Droughts have serious livelihood implications for and within the developing countries. The default assumption is that droughts are perceived as affecting all people in the affected countries equally. This chapter seeks to debunk the myth that droughts affect all people equally and develops a more nuanced understanding of how the gendered power dynamics and power differentials play out in the drought arena to differentiate impacts for different population subgroups. The chapter particularly argues that drought impacts are gendered affecting women, men, children, youth, and the elderly people differently. It further argues that due to the gender differentiated drought impacts men and women respond to drought based on their access to assets to help build their resilience and coping mechanisms to drought. Although the drought experienced might be the same, the assets and resources available will determine the differential resilience opportunities across the different actors within society. Unpacking the gendered complexity will enable a better understanding of how men and women are best able to cope with droughts in the developing world. Such a gendered understanding is not only important for the pursuit of academic endeavors but for policy makers and development partners, to develop better solutions which help to minimize drought risks for all community members alike. The conclusions identify some practical policy opportunities on how to best ameliorate the gendered impacts of droughts within the developing countries.

Chapter 8 - Integrating regional climate and drought characteristics for effective assessment and mitigation of droughts in India

<https://www.sciencedirect.com/science/article/pii/B9780128148204000080>

In India, the occurrence of drought is linked with the amount, distribution, time of onset, and withdrawal of monsoon rainfall. Since monsoon rainfall is highly erratic and unevenly distributed, drought conditions may prevail in almost any year in one part of the country or another. Droughts have substantial economic, environmental, and social impacts, especially in

arid and semi-arid regions of India where rainfed agriculture predominates. For example, persistent drought conditions between 2001 and 2003 resulted in serious crop losses and contributed to mass migration of people and livestock in the states of Rajasthan and Gujarat.

Chapter 9 - Assessment, monitoring, and early warning of droughts: the potential for satellite remote sensing and beyond

<https://www.sciencedirect.com/science/article/pii/B9780128148204000092>

The intensity and frequency of droughts is increasing worldwide and triggers the demand to understand the characteristics of a drought event and its impacts on the environmental and social system. Ranking among the most severe large-scale extreme weather events with highest impacts on livelihoods, there is an increasing demand to understand the characteristics of droughts. A number of countries express their great concern about the challenges posed to their sustainable development agenda due to droughts, as well as to desertification and land degradation and their relations to drought, especially in Africa. By monitoring related climatic conditions and their impact on the ground, remote sensing (RS) serves as an outstanding tool to monitor changes on the land surfaces without being in situ. It allows to cover large areas and to detect impacts on different land variables such as water bodies, soil conditions, and vegetation. Depending on different sensors and various spatial and temporal resolutions, analyses can be carried out from local to national and even to global scales. In addition, with the combined use of archived and up-to-date satellite data, it is possible to compare the geographical extent and severity of droughts in different years. The overall aim of this chapter is to review the role and contribution of satellite RS data for assessing and monitoring droughts and their impacts, its potential to provide early warning of future drought events, and remaining challenges. We explore additional information that needs to be provided in order to complement RS-based information for assessing impacts on human livelihoods, using the conceptual framing of hazard, exposure, and vulnerability. An example of a comprehensive analysis framework is the EVIDENZ (Earth Observation–based Information Product for Drought Risk Reduction on the National Level) project which takes advantage from the integration of RS information and socioeconomic data.

Chapter 10 - Development of a system for drought monitoring and assessment in South Asia

<https://www.sciencedirect.com/science/article/pii/B9780128148204000109>

Monitoring of drought and associated agricultural production deficits using meteorological and vegetation indices is an essential component for drought preparedness. More than 40 drought indices have been developed in past decades for monitoring the onset, duration, and intensity of drought in various agro-climatic regions. There are several advantages to using remote sensing to monitor drought conditions in near real-time in developing regions with limited historical meteorological records. The South Asia Drought Monitoring System (SADMS) was

established in 2014 as an online platform that allows users to generate reports at the local administrative level, facilitating decision-making during drought emergencies. SADMS operational system consist of four components: (1) a daily update of meteorological drought indices using satellite-based rainfall estimates with quality checks and bias correction; (2) an estimation of 10-day soil moisture using ESA's ASCAT data to derive Soil Water Anomaly Drought Index; (3) calculation of an integrated drought severity index that includes a vegetation condition index, precipitation condition index, temperature condition index, and a soil moisture index; and (4) classification of five drought classes ranging from “extreme” to “watch.” This chapter details the steps undertaken in creating SADMS and describes how the various components were derived and tested.

Chapter 11 - Early warning systems for drought and violent conflict—toward potential cross-pollination

<https://www.sciencedirect.com/science/article/pii/B9780128148204000110>

Among all natural hazards, drought is one of the most severe due to its long-lasting negative impacts such as loss of life and livelihoods, economic losses, and adverse effects on social and ecological systems. Droughts kill proportionately more people than other disasters and are particularly deadly in Africa, with over 800,000 deaths directly attributable to drought between 1970 and 2010. In addition to its severity, drought is a “creeping” or slow-onset disaster and usually affects larger land areas than other types of disasters, making mitigation and adaptation strategies difficult to implement. Many of the negative effects of drought often accumulate slowly and may persist for years after the event has ended.

Chapter 12 - Making weather index insurance effective for agriculture and livestock forage: lessons from Andhra Pradesh, India

<https://www.sciencedirect.com/science/article/pii/B9780128148204000122>

The agricultural insurance system has taken various changes in India during the last five decades. Lack of location specific insurance contracts, modest awareness, absence of transparency, and delay in settling claims are being cited as key obstacles in large-scale/widespread acceptance of agricultural/crop insurance by the farmers. In order to boost the adoption of the insurance products, the insurance system has gone through various phases and was revised from a very general insurance corporation to the village level weather index insurance (WII). The chapter deals with the development of suitable insurance product to the farmers as per the local weather conditions. The crops covered for the WII were rice, cotton and chillies for addressing the flood and low temperatures and livestock forage option for dryland of Andhra Pradesh, India. The premia calculated for rice, cotton and chilli crops were Rs.1,937, Rs.2,807 and Rs.2,565 per ha respectively with a uniform assured sum of Rs.25,000 per ha. Similarly, the insurance premium calculated for livestock forage was Rs.1,875 per ha

with assured sum of Rs.12,500 per ha. Phase-wise term-sheets would be beneficial for the risk management to overcome prolonged dry spells. The timely pay-out to the farmers also created interest on WII. The study suggests that the present insurance program named Pradhan Mantri Fasal Bima Yojana (PMFBY) can take up such relevant products through the revised weather based crop insurance scheme and develop awareness among the farmers to upscale the adoption. It is further recommended that the agricultural insurance company of India should continuously monitor for timely settlement of claims to improve the adaptation of the weather insurance products by the farmers.

Chapter 13 - Drought risk insurance and sustainable land management: what are the options for integration?

<https://www.sciencedirect.com/science/article/pii/B9780128148204000134>

Preparedness for drought can reduce the often disastrous but preventable consequences of droughts on people's livelihoods and ecosystems. Risk transfer through insurance is one of the policy options for reducing vulnerability, especially for agricultural losses due to droughts. One of the recent innovations is agricultural index insurance. Rainfall index, Normalized Difference Vegetation Index, and area yield agricultural index are three of the most common indices used to build agricultural index insurance contracts. This chapter focuses on rainfall index which links insurance payouts to historical rainfall data from reliable weather gauging stations and relates it to crop and livestock losses. The system works in such a way that if the data show the rainfall amount is below the threshold, the insurance pays out. If implemented effectively, it has the potential to revolutionize access to formal insurance by smallholders. It has a drawback in that it depends on the availability and reliability of quality data, which is a significant challenge in most developing countries. But perhaps most importantly, index insurance is vulnerable to basis risk (the remaining risk from other rainfall deviations and from other hazards) such that insurance payouts do not match actual losses. Accordingly, the selection of an appropriate index is important not only to reduce crop and livestock losses due to low rainfall but also to minimize the basis risk.

Designing an innovative insurance product which addresses not only ex post drought impact but also reduces land degradation through adoption of appropriate ex ante strategies is crucial to forming holistic policies for reducing vulnerability to drought. To achieve the twin goals of land sustainability and resilience to drought, sustainable land management practices can be used as a condition or contractual obligation to provide a reduced or free premium to farmers who decide to participate in the insurance scheme. This chapter attempts to address the importance of designing such an innovative insurance product which does not only address drought impacts but also minimize land degradation.

Chapter 14 - An assessment of drought monitoring and early warning systems in Tanzania, Kenya, and Mali

<https://www.sciencedirect.com/science/article/pii/B9780128148204000146>

Agricultural economies in sub-Saharan Africa are highly sensitive to climatic variability. Drought represents one of the most important environmental factors contributing to malnutrition and famine in many parts of the region. This chapter reviews steps taken in Tanzania, Kenya, and Mali, countries that have made investments in advanced drought early warning systems for use by farmers, fishermen, and pastoralists. Information has been gathered through a review of current knowledge of practices and approaches, policies, and opportunities for early warning systems in the three countries. The findings of this chapter provide recommendations that address gaps identified in drought risk management in the three countries.

Chapter 15 - Impact of drought-tolerant maize and maize–legume intercropping on the climate resilience of rural households in Northern Uganda

<https://www.sciencedirect.com/science/article/pii/B9780128148204000158>

Seventy percent of all economic losses in sub-Saharan Africa (SSA) are solely attributed to droughts and floods. A considerable challenge for policy in SSA, therefore, relates to identifying and promoting options that could address climatic shocks. Climate-smart agriculture (CSA)—an approach seeking to sustainably increase agricultural productivity and enhance resilience of households while reducing emissions of greenhouse gases—is an appropriate option. Using a panel dataset from 655 rural households in northern Uganda, this study assessed the effect of two increasingly promoted CSA technologies (drought-tolerant (DT) varieties of maize and maize–legume (M-L) intercropping) on resilience to climatic shocks (drought and unpredictable rainfall). Resilience was estimated using a theory-based approach consistent with recent literature. Two-stage least squares (2SLS) regression with limited information on maximum likelihood was then employed to infer causal effects. Using the Foster–Greer–Thorbecke analogy of head count index, we estimate that approximately 10% of the sample households were resilient to climatic shocks in 2017. Estimates from the 2SLS showed that resilience increased by about 9% points, on average, for adopters of DT maize in isolation and 28% points for adopters of a combination of DT maize and M-L intercropping but decreased by about 10% points when farmers practiced M-L intercropping in isolation. Kinship networks increased the likelihood to implement the CSA technologies, whereas prolonged periods of food shortage discouraged adoption. The study discusses policy implications of the results.

Chapter 16 - Can social protection schemes contribute toward drought resilience? Evidence from rural Ethiopia

<https://www.sciencedirect.com/science/article/pii/B978012814820400016X>

Ethiopia has introduced a number of policies and strategies toward tackling food insecurity, combating drought emergencies, and assisting vulnerable rural households, maintaining their livelihoods in the face of frequent drought disasters. As part of the long-term rural development program, the country has pursued a country-wide social protection scheme, the Productive Safety Net Program (PSNP), with substantial support from development partners. The aim of the program is to assist chronically food-insecure households bridge their food gaps while providing long-term solutions through the creation of community assets and (to a lesser degree) household assets. A number of studies have documented the achievements of the program over the years. However, very few of these studies had explicit focus on the role of the program in drought resilience. Motivated by some of PSNP's past success stories and the existing knowledge gap with respect to the potential contribution of the program toward drought resilience, this chapter primarily aims to assess Ethiopia's PSNP against some of the key lessons that can be learned from the 2015/16 drought in the country. The study finds that a “stand-alone” approach to drought resilience can hardly succeed in the face of frequent droughts and its associated multifaceted negative impacts. The study proposes, PSNP should continue to improve its internal implementation capacity while enhancing its linkage with other drought resilience programs to bring a stronger and meaningful impact on drought resilience at national, subnational, and community levels.

Chapter 17 - Drought preparedness and livestock management strategies by pastoralists in semi-arid lands: Laikipia North, Kenya

<https://www.sciencedirect.com/science/article/pii/B9780128148204000171>

Drought is a major threat to people's food security and livelihoods in arid and semi-arid lands in drought-prone developing countries. The traditional responses to drought management have been largely reactive. The purpose of this study is to investigate the determinants of the choice behind the various livestock management of pastoralists in Laikipia North, Kenya, as a proxy for understanding their preparedness to cope with future droughts. Households in this semi-arid area ranked drought as the most important climate shock because it was the principal cause of the loss of their livestock. Using a multivariate probit model, the study revealed that access to private ranch grazing increased the adoption of modern livestock management strategies in the study area. The study also found that early warnings of drought allowed for better water management, adoption of improved species/breeds, and early selling of livestock or destocking as strategies to enhance livestock management. Another finding was that, as distance to market increased, pastoralists' market participation decreased, driving them to stick to traditional livestock management practices, which in turn exacerbated the households' exposure to climate shocks. Thus, improving access to markets could play a significant role in improving pastoralists' livelihoods and their traditional livelihood systems within the framework of climate change. In addition, although early warning system (EWS) is not well known in Laikipia North, there is a need for well-managed EWSs to enable households to act early on an announced drought. Since the main source of early warning information after government channels was community leaders, targeting such leaders with this information could reach

many households and help them prepare adequately for climate shocks especially, severe droughts.

Chapter 18 - Building resilience to drought among small-scale farmers in Eastern African drylands through rainwater harvesting: technological options and governance from a food–energy–water nexus perspective

<https://www.sciencedirect.com/science/article/pii/B9780128148204000183>

While Africa is among the most vulnerable regions to climate change, relevant scenario models suggest that Eastern Africa will be among the regions with the largest decline in agricultural yields in the continent due to increasing mean surface temperatures and greenhouse gas concentrations. Climate change impacts in the Eastern African region will include an acceleration of the hydrologic cycle, occasioning increased variance in rainfall. This will particularly impact dryland environments due to their climate-sensitive production systems and low adaptive capacities. Context-specific adaptive responses will be necessary to reduce vulnerability of communities to environmental change, hence increasing their resilience to climate variability. Such adaptive solutions will require, among others, the building of institutional capacity in technology and governance, particularly in the food, energy, and water nexus. Appropriate technologies, such as rainwater harvesting systems, can be applied for supplemental irrigation and in conjunction with good agricultural technologies, would ensure food, energy, and water security at the household level among the small holders. This chapter discusses regional strategies to address food security, energy needs, and water resources in the Eastern African region. It postulates that current sectoral approach is not sustainable and therefore provides a nexus perspective, based on use of rainwater harvesting technologies at the farm level, as a step toward sustainability.

Chapter 19 - Drought management in the drylands of Kenya: what have we learned?

<https://www.sciencedirect.com/science/article/pii/B9780128148204000195>

The countries of the Horn of Africa face shared regional challenges to enhance proactive management of drought hazards. These include financing challenges to reduce reliance on emergency relief aid, as well as needs to enhance the use of information to trigger interventions and learn from implementation experiences. This chapter reflects on a decade of experience gained in building institutional capacity for drought management and preparedness in the Kenyan arid lands during 2008–18. It reviews lessons learned and their significance for the wider region. It concludes that to end drought emergencies by 2022 will require the use of participatory scientific methods and capacities to monitor, model, and manage the hydrological systems in the arid and semi-arid lands. This is needed urgently as growing economic water demand and extractions may already exceed predicted increases in precipitation and the costs of hydrological droughts are increasing.

Chapter 20 - Achieving policy coherence for drought-resilient food security in SSA—lessons from Ethiopia and Kenya

<https://www.sciencedirect.com/science/article/pii/B9780128148204000201>

Unlike rich countries, drought in poor countries is a direct threat to food security. Pastoralists, agropastoralists, and the rural poor, especially those living in arid and semi-arid areas, are particularly threatened. That threat is both a short-term threat for immediate well-being and survival, and for long-term development of livelihoods and resilience-building. Drought policies in poor countries must address these threats by integrating appropriate measures into drought strategies, from early warning and vulnerability assessment to emergency and development planning and implementation. Measures must link across many sectors and policy levels. Ethiopia and Kenya in the Horn of Africa provide useful case studies for comparison and contrast because they share similar risks but have different economic and political settings. Both have achieved remarkable progress in establishing proactive drought policies and drought cycle management strategies, but there is also a lot more to be done, particularly in creating bottom-up household resilience. This chapter provides 10 lessons for improving policy coherence, expanding upon research published in Duguma et al. (2017).

Chapter 21 - Drought adaptation when irrigation is not an option: the case of Lincoln Co., Colorado, USA

<https://www.sciencedirect.com/science/article/pii/B9780128148204000213>

This chapter describes drought impacts and adaptation in a dryland agricultural county in Colorado, USA, where there is insufficient ground and surface water to support crop irrigation. Water scarcity is an ongoing challenge for farmers, ranchers, and small urban centers in the county, with periodic droughts testing the limits of local adaptive capacity. Important factors in adaptation include crop insurance, government subsidies, and flexible agricultural practices. In Colorado, water is a shared common resource administered by the state, creating an added layer of complexity in water management and use. The experiences documented here are ones that many dryland agricultural regions in other parts of the world can expect to encounter in coming decades as changing climate, demographic characteristics, and socioeconomic factors take hold.

Chapter 22 - Drought challenges and policy options: lessons drawn, and the way forward

<https://www.sciencedirect.com/science/article/pii/B9780128148204000225>

The preceding chapters of this volume have detailed the challenges and various policy options to mitigate the impacts of droughts that are becoming more frequent, severe and long lasting as a result of climatic and ecological system changes. The impacts include threats to water supplies needed for domestic and livestock consumption, reduced agricultural production, energy, transportation, sanitation, human health, tourism and other sectors. Drought-induced water scarcity adversely affects food security in developing countries through direct impacts on food availability and reducing agricultural incomes, and indirectly by exacerbating food price volatility. This can in turn raise migration pressures and trigger resource conflicts and civil tensions in high-risk areas. Yet despite these well-documented impacts, progress on drought preparedness has been slow. With the impacts of climate change and land degradation being increasingly felt, a paradigm shift from “reactive” and “crisis-based” approach toward a more “proactive” and “risk-based” drought management approach is indispensable. The critical components of a *proactive* approach to drought management combine monitoring and early warning systems with impact and vulnerability assessments and risk mitigation measures. These enhance not only the capacity to forecast and monitor the onset, location, and intensity of droughts but also improve communications and coordinate actions between governments, institutions, and vulnerable communities. Although good progress has been made in drought monitoring and management, there remain many challenges. This book has identified and described many of the more pressing challenges and readers will hopefully benefit from the empirical insights and examples from across the globe. The various policy options that have been suggested, which may be taken up and adapted for more effective management of drought in the future, can contribute to sustainable development and enhanced well-being of vulnerable populations. In the remainder of this chapter, we summarize the key messages and lessons learnt and offer some concluding remarks for moving forward.

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