
Editors' Preface

The early part of the twenty-first century has begun with a lot of change. Some of the change is good but regrettably there are ominous signs of things not going well. This is especially true in the world's drylands (aridlands), where human populations continue to rise and where livestock inventories are at record levels. All of this is occurring at a time when the impact of global change (including climate change) is being felt and awareness of further likely impacts have heightened. Many aridland regions are home to ethnic minorities who are marginalized not only geographically but also socially, politically, and economically. Poverty is widespread in such regions and is likely to deepen and encroach upon people who may have recently been lifted out of poverty. This reversal of fortune will come from an accelerated land and water degradation, from a restricted supply of water for basic human needs, and for irrigation to produce food crops, fodder for the burgeoning livestock populations, and cash crops that may hold some hope of allowing poverty to be averted.

In this book, we draw upon experiences from many countries and examine the implications of climate variability (including prolonged drought) and extended cold spells that wreak havoc in North Asia (in particular High Asia) (Kreutzmann 2012) and in cold arid regions in South America.

Climate change is affecting the culture, health, economies, and lifestyles of peoples in the drylands. We are already observing and experiencing the impacts of climate change. Environmental degradation exacerbated by climate change is threatening vital community infrastructure and is leading in some places to forced displacement and relocation. Reductions in precipitation and continued experiences of prolonged drought affect soil quality and herding and agricultural practices. Drought impacts have been worsened by increasing evapotranspiration rates, reduced soil moisture, and intensified stress on vegetation and local water sources. The influx of invasive species and prolonged drought are disrupting subsistence practices. These impacts threaten traditional knowledge, food security, water availability, historical homelands, and territorial existence and may undermine traditional ways of life that have persisted and adapted for thousands of years. In some areas of High Asia, permafrost melting and glacial retreat are making it more difficult for hunter/gatherers and transhumant herders to access traditional habitats and are changing the migration patterns of certain species as well as threatening the age-old seasonal migration by herds and flocks of seminomadic herders.

Insights about how these impacts are affecting herders and agropastoralists in the world's drylands can contribute to the development of policies, plans, and programs for adapting to climate change and reducing greenhouse gas (GHG) emissions. A growing body of literature examines the vulnerability, risk, resilience, and adaptation of peoples to climate change (Williams 2012; Norton-Smith et al. 2016). The knowledge and science of how climate change impacts are affecting peoples in the drylands contributes to the development of policies, plans, and programs for adapting to climate change in vulnerable locations and reducing greenhouse gas emissions.

Vulnerability is not characteristic of a community but is the product of systems of inequality. Herders and agropastoralists differ in their vulnerability to climate change based on their distinct cultural practices and economies, and the vulnerability of a particular ethnic group's sociopolitical, economic, and eco-cultural systems may differ by geography and climate regime. Although groups may face similarities in terms of how climate change may affect their socioeconomic status and dependence on natural resources, distinct cultural practices influence how climate change vulnerability is experienced. Despite this variability, similarities among dryland communities may exist in terms of the institutional barriers – including legal, and administrative, policies – that affect adaptation and resilience among land users. Government policies may have unintended consequences of limiting or removing climate adaptation options and in turn constraining, restricting, and undermining adaptation efforts within local dryland communities.

Not all drylands are unproductive, and where irrigation water is available, high levels of productivity can be realized. Concerns about glacial melt and thawing of the permafrost relate to water supplies for basic human needs and for irrigation. Already irrigators in dryland communities are adapting to the changed circumstance of reductions in the supply and quality of water.

Dryland communities are also adapting to the climatic variability by altering cropping patterns including the switch to new crop plants, changes to tillage practices that conserve moisture, water-saving agriculture, and soil conservation measures. Herders and other livestock owners are making adjustments too, e.g., a switch from raising cattle to sheep or goats (or camels) and better winter housing for livestock to conserve energy and ease the burden of supplementary feeding. These winter “barns” (often built using a greenhouse design that captures solar energy) can be used in summer/autumn for vegetable production for either subsistence (own use) or for barter or sale. Other adaptations include accepting the principle of “more from less” (Michalk et al. 2011). This involves focus on reducing livestock inventories and providing fewer animals with a high plane of nutrition and better winter housing that saves energy and leads to lower mortality, higher birth weights, and faster compensatory growth in spring and summer. The ability to turn off animals at a younger age reduces pressure on winter fodder needs and generates cash flow sooner (Squires et al. 2010).

Where land degradation is a problem (over 50 % of the world's drylands have varying degrees of land degradation), the impact of climate change, reduced precipitation (or the disruption to the seasonal distribution), rising temperatures,

increase in frequency of droughts and longer duration, changes in pasture structure and botanical composition, and loss of biomass production will hamper efforts to arrest land degradation and make it even harder to reverse it.

Much can be learned from traditional knowledge held by land users in drylands, but regrettably there is a limit to how far this transfer of local ecological knowledge (LEK) can be applied to the present and future crises that land users face under the global change (including climate change) regimes. There is no doubt that LEK has a place in the planning of mitigation and adaptation strategies. Some observers point out that the sorts of challenges occurring now bear little resemblance to those dealt with in the past and that it may be asking too much of traditional herders and even long-term farming households to come up with appropriate coping and adaptation strategies to deal with challenges of global change (including climate change).

The post-2015 era has begun. The international agreement was reached on a climate accord¹ in Paris on climate change mitigation and adaptation, and the UN in New York issued its development goals that inter alia stressed arrest and reversal of land degradation.

This book is timely and should prove valuable to scholars, graduate students, UN and other aid agency personnel, NGOs, natural resource managers, and policy makers. If it can do this, we, as editors and authors, along with other contributors, will be very pleased.

Jodphur, Rajasthan, India
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¹The accord was ratified and came into force in 2016. The Conference of Parties to the Climate Change Convention (COP22) met in Morocco in November 2016 to oversee development of an implementation pathway.

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