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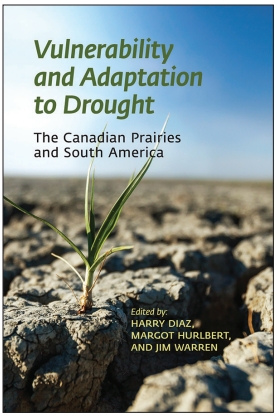

VULNERABILITY AND ADAPTATION: The Canadian Prairies and South America Edited by Harry Diaz, Margot Hurlbert, and Jim Warren

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PART 7

CONCLUDING REMARKS

CONCLUSION

Margot Hurlbert, Harry Diaz, and Jim Warren

In a recent survey of people's perceptions about the most pressing risks facing society conducted by the World Economic Forum, *water crisis*, of which drought is one aspect, is ranked as the number one societal risk (WEF 2015). The water crisis, however, is a crisis with multiple contributing factors: increasing economic development, population growth, rapid urbanization, climate change, and governance issues to name a few. People cause and contribute to these factors; therefore, people have a large role to play in whether in fact a "crisis" occurs. The greatest environmental risks come in the form of extreme weather (of which drought is an example) and failures to adapt to climate change (WEF 2015). The high levels of awareness identified in the World Economic Forum survey suggest a widely held sense of urgency for discussing the topic of drought in the context of future climate change, social vulnerability, and adaptation.

This book underlines the need for an interdisciplinary approach to understand drought—the most significant natural hazard affecting livelihoods on the Canadian Prairies and other parts of the world. It builds on historical and empirical field studies focused on the social and economic impact of droughts in some of the semi-arid regions of Canada, Argentina, and Chile, and the capacity of local people and institutions to

reduce the severity of these impacts. The uniting methodological approach to droughts in this book is that of a vulnerability perspective, wherein droughts are viewed through the lens of vulnerability—vulnerability as a function of both natural conditions and human occupancy, as well as the ability of natural and social systems to adapt. The chapters in this book detail drought impacts that have occurred and are yet to occur. In relation to those changes that have occurred, many agricultural producers and communities have demonstrated a substantial capacity to adapt and cope with these impacts in the context of other stressors. However, many farmers and ranchers have disappeared from the rural scene as a result of changes to the economic and political context during the last 50 years. An important lesson we have learned is that vulnerability is fluid, increasing or reducing the exposure of producers as a result of new social conditions.

A central concern that has informed the need for these studies is the threat of climate change. Most climate change scenarios developed for the three regions covered in this book indicate that future climate variability ranges will exceed those we have experienced in the recent past. These forecasts mean more frequent and severe droughts, a context wherein drought-related risks are potentially significant and cannot be ignored (see Chapter 3 by Wheaton et al. for the Canadian case). Four major "hotspots of vulnerability," summarized below, increase the seriousness of droughts in the context of increasing climate change.

Access to Natural Capital: Increasing Water Scarcities

Water resources constitute a natural capital that is fundamental to many human activities. A reduced availability of this capital is certainly problematic for many human activities, such as agriculture. The certainty of climate change and its impacts, as well as the human incapacity to mitigate them, makes access to this capital a highly risky enterprise in semi-arid regions. The impacts of droughts and the adaptations made in the three regions over recent decades are described in many of the preceding chapters (Chapters 4–8, 11, 13, and 14). In the Canadian case, these adaptations contributed to enhanced drought resilience in many rural communities. Those adaptations include changes in practice, such as the adoption of min till and irrigation described by Warren in Chapters 5 and 6. However,

despite the high levels of technical, social, and institutional adaptation that have occurred over the past decades, Prairie agricultural producers and their communities remain vulnerable to drought.

The findings of paleoclimate research (discussed in Chapter 2 by Sauchyn and Kerr), together with projections based on future climate change scenarios (outlined in Chapter 3 by Wheaton et al.), suggest that droughts could become more frequent, more severe, and longer in duration in the Canadian Prairies over the course of the twenty-first century. As these authors point out, "dry times are expected to become much drier, and wet times wetter." Severe droughts are expected to become a more permanent feature in some areas of the Canadian Prairies as well as in the Maule and Mendoza regions of Chile and Argentina (Chapters 13 and 14, respectively). As pointed out by Kulshreshtha et al. in Chapter 4, drought, such as the one of 2001–2, has disastrous implications for Canada, the provinces, the communities, and the economic returns to agricultural producers. This is troubling, given the current drought resilience threshold of two to three years for agricultural production units identified by many research projects and reported in Chapter 9 by Hurlbert. This constitutes an adaptive range that is not sufficient to face the projected longer and more severe droughts predicted in Chapters 2 and 3.

Some of the chapters also indicate the high variability in access to water resources among rural people. By virtue of where agricultural production units are located in regions characterized by different geographical characteristics and microclimates, some producers have greater access to natural capital, such as adequate precipitation and reliable surface water and groundwater resources. Physical location in the water basin is sometimes a key for success, as demonstrated in the cases of Argentina and Chile. Chapter 14 by Montaña and Boninsegna highlights the dramatic situation of small producers in the tail end of the basin, who never seem to receive the necessary amount of water, while rich wine producers located on the other side of the basin seem to have ample access to water resources. Chapter 13, by Hadarits et al., reveals a similar situation in the Chilean region of Maule, where proximity to main irrigation canals influences exposure to drought. However, access to irrigation is not always the solution. As Warren demonstrates in Chapter 6, investment in irrigation infrastructure does not always ensure drought resilience. These problems seem to be more institutional in nature rather than just locational issues.

And, clearly without changes to the institutional context they present, cleavages among producers in accessing natural capital will be multiplied under future climate conditions.

Access to Economic Capital: The Threat of Double Exposure

It is not difficult to argue that agricultural producers' exposure to drought affects their economic capacities. Drought stress contributes to a significant reduction of productive assets, reducing the adaptive capacity of producers to respond to future droughts and other climate events. However, the relationship between droughts and economic processes is not unidirectional. Rather, these two dimensions are interlocked in complex ways and affect people's vulnerability in similarly intricate ways. For communities and individual producers, a reduction in the availability of economic capital due to economic stress imposes a significant constraint on their adaptive capacity in the face of prolonged drought. In this case, the overlap between climate and economic stressors multiplies the negative impacts of each of them.

The predominant source of economic stress in the Canadian case has been the unequal relationship between input costs and commodity prices—traditionally defined as the "cost-price squeeze"—over recent decades, which has limited the amount of capital available to withstand back-to-back crop failures. Until recently, the prices available for the commodities produced by Canadian farmers and ranchers in the Prairies have been poor. Prices for cereal grains experienced a brief peak in 1975, and that price level was not achieved again until the 2000s. In the case of cattle prices, the recent bovine spongiform encephalopathy (BSE) crisis (2003–7) produced a significant decline in producer incomes when important export markets were closed. At the same time, commodity prices have been excessively low, for decades, relative to increasing input costs. Prices for machinery, fuel, fertilizer, labour, and many herbicides and pesticides rose apace for decades, while agricultural product prices remained low by comparison. This strain on economic capital was historically a contributing issue to the disaster of the 1930s drought in Canada, as indicated by Marchildon in Chapter 8. Risks associated with reduced access to economic capital are perceived currently by producers as a significant

exposure in a future characterized by climate change, as argued by Kulshreshtha et al. in Chapter 4, due to the increasing advent of free trade and exposure of Canadian producers to world market prices.

The cases from Argentina and Chile show that opportunities to have consolidated access to economic resources follow different paths for small and large producers. While large producers have permanent and secure access to economic assets, small producers have a reduced capacity to secure the same assets due to socio-economic segregation. This segregation is leading to a situation in which small producers have to neglect their productive units and search for non-agricultural jobs that can provide the family with a minimal income, a path that is becoming increasingly familiar to many rural families in Canada. This constant threat of double exposure—to drought and limited economic conditions—is increased by institutional failures.

Institutional Capital: Absent Governments

As identified by Hurlbert in Chapters 9 and 10, and by Marchildon in Chapter 8, institutional capital—those organizational resources and capacities that support decision making and manage risk in relation to drought and climate variability—is essential for community adaptation. In the three regions covered in this book, this capital is available to producers through a variety of local, regional, and national organizations and agencies. Significant changes in the fabric of government programs and policies in later years have not only diminished their capacity to reduce rural vulnerabilities but also have impeded the development of proper climate policies for facing the threat of climate change.

In relation to the Canadian case, Marchildon, in his historical account of the 1930s, covers two institutional adaptations from the 1930s, the Special Areas Board and the creation of the Prairie Farm Rehabilitation Administration (PFRA). Although the former is still in existence, the latter has been disbanded, with many negative consequences for the local community (see Chapter 6 by Warren). Aggravating the loss of the PFRA is the reduction of government staff, including engineers and scientists, in federal government agencies, such as Environment Canada, Natural Resources Canada, and Agriculture and Agri-Food Canada, and over the last few decades at all levels of government. In addition to this loss of personnel,

Fletcher and Knuttila (Chapter 7) point out the loss of significant historical programs that assisted agricultural producers, including the Canadian Wheat Board single-desk system and the Crow Rate, which assisted grain transportation, while Hurlbert (Chapter 9) mentions reduced payouts under AgriStability, an important government program designed to reduce the impacts of declines in producer incomes. In the cases of Argentina and Chile, the existence of a formal institutional framework oriented to ensure the economic viability of large producers to the detriment of small producers is clearly a significant institutional gap in the development of a robust, coordinated, and anticipatory approach to reduce the risks associated with climate events.

In this context, there is a clear need for a more profound analysis of neo-liberalism and its adoption into government policies, programs, and practices. The adoption of this strategy by governments involves minimal government intervention in business and reduced public expenditures, and favours markets and individual responsibility over social welfare spending. Chile has been more radical in its commitment to neo-liberalism, with its own particular impacts on natural resources such as water. Canada and Argentina, on the other hand, have redefined and shaped many of their economic programs and policies according to the fundaments of liberalism but still maintain many of their social programs. However, in both countries, the market and the private sector have taken a central role in economic development, while the government is increasingly focusing its energies and efforts on establishing a proper normative and institutional framework for the development of a liberal economy.

Social Capital: Disempowered Communities

The existence of social capital ensures the availability of collective resources and capacities to deal with a variety of stressors. Local institutions, including informal social networks, contribute significantly to strengthening this social capital in rural society. Work-trading arrangements and labour-sharing activities, such as community brandings and firefighting, strengthen community bonds, and networks for mutual support provide forums for knowledge sharing and for the existence of a social capital fundamental to facing the hazards of climate and other stressors.

However, several trends are foreboding for social capital: the increase in farm size and corresponding decrease in the number of farmers (cited by Fletcher and Knuttila in Chapter 7 and Marchildon in Chapter 8), and the increase in farm debt (cited by Fletcher and Knuttila in Chapter 7). The first trend was also identified by Corkal et al. in Chapter 11 as threatening a highly valued way of life and heritage as reduced population increased the prospect of losing community schools and having churches close. Depopulation would reduce a variety of institutions and practices, including local hockey teams and intercommunity sporting events. Ultimately, local networks of strength and social support (the community safety net) would suffer. In Chapter 7, Fletcher and Knuttila also identify the trend of increasing debt as threatening the support network of farm women. Social capital in Argentina and Chile is following a similar path, where an increasing process of differentiation between modern and traditional agriculture is eroding the fabric of rural communities.

Although the four "hot spots of vulnerability" identified above are cause for serious concern, two developments related to the buffering of social capital show cause for optimism. First, as reported by Hurlbert in Chapter 10, Warren in Chapter 5, and Corkal et al. in Chapter 11, some very promising displays of strong social capital have emerged during times of water scarcity. The most significant example is water sharing by irrigators and communities, which occurred during the 2001–2 drought. Not only did irrigators share, transfer, assign, and optimize water interests regardless of legal rights to optimize returns and benefits during this time, but local communities also entered into voluntary water-sharing arrangements and water-reduction strategies to preserve this important resource.

The next significant development of social capital is recounted by Pittman et al. in Chapter 12. Bottom-up local governance initiatives to respond to drought have occurred with increasing frequency in the Prairie provinces to plan proactively for times of water shortages. New groups of actors are emerging with new roles in navigating drought risks. Knowledge-bridging activities between diverse stakeholders through local watershed stewardship organizations are not without difficulties, but they show great promise and increasing value in building social capital, enhancing resiliency, and reducing vulnerability to anticipated future droughts.

Overall, the chapters in this book increase our understanding of drought and its impacts on natural and social systems. Furthermore, this

book outlines adaptations that have been made by people to cope with drought and improve resiliency, increasing our ability to understand the hazard of drought and transform its impact by proactively planning for drought and creating and taking advantage of opportunities. Future research surrounding drought is needed to clearly identify opportunities associated with our increasingly wetter and drier climate and to take advantage of them. More information is needed not only on changes in agricultural production techniques, crops, and geographical area, but also on the specific configurations of social and governance arrangements that can take advantage of opportunities. In addition, this book has demonstrated that studying changes in adaptive capacity over time, as was done here by comparing adaptation to the drought of the 1930s to that of 2001–2, can provide useful information. A time-path study of changes in adaptive capacity and changes in the capitals (economic, technological, human, natural, infrastructure, and institutional) of communities would provide invaluable information for policy planners. This study could also provide information on the cumulative impacts resulting from recurrent drought. Further comparative case studies of the adaptation of irrigated agricultural producers, the adaptation of dryland producers, viticulture and horticulture, or the specific type and duration of drought together with adaptive strategies in different communities would offer insight into contextual and institutional determinants of adaptation.

In the context of comparative studies, it is fundamental to understand the cases of other regions and countries. In the same way that we pay attention to future climate scenarios to identify future vulnerabilities, the social and economic situation of other countries could be analyzed as potential social scenarios for Canada. Given the process of neo-liberalization of Canadian society, the restructuring of the agricultural sector, and the increasing reduction of state services, the cases of Argentina and Chile appear as concerning probable scenarios for Canada's rural people. The chapters on Argentina and Chile provide illustrative insight into what maladaptation might look like as a result of economic, social, and institutional decisions, such as the complete privatization of water in Chile and its impact on human and social capital. These chapters also provide insight into the growing inequity between capitalized irrigators and smaller irrigators in Argentina and the associated spatial inequality.

This book provides insight into the conditions generating challenges for the future regarding droughts and the measures required to reduce the vulnerability of rural communities to them. Meeting these future challenges will require developing a greater understanding of the social forces and conditions that have contributed to enhanced resilience, as well as those which detract from successful adaptation. The most important conclusion of this book is that the problem of drought is a vast and pernicious problem. However, solutions lie within the actions and planning of people, as well as local, municipal, provincial, and national governments. As humans we have perceptions that exceed our immediate needs, which allow us to understand the world around us. This same ability will allow for consistent, principled, and far-sighted action plans needed to combat the problem of drought in the future. This book moves us down that path.

References

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