

# Community-based Natural Resource Management: State of the Science—Global Perspectives<sup>1</sup>

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## *Abstract*

How can communities of resource users effectively organize to self-regulate use of shared resources? Can community-based natural resource management (CBNRM) fulfill its promise of enhancing resource management and conservation while improving human lives and livelihoods? These are the central questions driving much research on CBNRM around the world. Since the 1970s, a large volume of mostly case-study-based research has examined the conditions for successful collective action in natural resource management, leading to the identification of over 30 factors that help explain the success or failure of such efforts. However, few studies have used a large number of cases (over 50) to rigorously examine the causal relationships among these factors and the role of context in the performance of CBNRM organizations. Study of contemporary CBNRM organizations is more recent and after a number of initial “success stories,” much current literature has been less positive. Recent work has highlighted the need to critically examine the concept of “community,” and to pay close attention to profound differences within communities in resource access and use, voice, and power along gender, age, ethnic, religious, class, or caste lines. Resilience scholars have also pointed to potential linkages between community-based management and the resilience of social-ecological systems. Few studies have investigated long term ecological or socio-economic outcomes of CBNRM, or compared the outcomes of CBNRM efforts with the status quo or other alternative management regimes. These weaknesses point to the inherent challenges of researching the effectiveness of these organizations. Among these challenges are the great variation in organizations and their ecological and social contexts, and the difficulty of linking observed changes causally to CBNRM organizations and their activities. Mongolia offers a unique opportunity to learn from recent CBNRM initiatives using research approaches that help overcome some of these limitations, and to advance the science and practice of CBNRM in Mongolia and beyond.

## *Introduction and Definitions*

The central question driving much research on community-based natural resource management (CBNRM) is: How can communities of resource users effectively organize themselves to self-regulate their use of shared resources? These shared resources are often referred to as *common pool resources* or CPRs. Extensive rangelands are considered CPRs because it is difficult to exclude potential grazers from these areas, and use by one individual reduces the amount of forage available for other herders. In the absence of any rules that limit who may graze and place restrictions on the amount, timing or spatial distribution of grazing, there is a risk of overuse and subsequent degradation of the forage resource. This absence of rules is referred to as an *open access* situation. Most rangelands are not open access, however. Instead, they are subject to

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some type of *property regime*, that is, a set of formal or informal rules that define the rights and obligations of specific individuals or groups with respect to access, use, and management of the resource in question. *Private property* gives an individual the exclusive right to use and manage a resource, and the right to sell, lease, or transfer their property to another person. In many countries cropland is private property, as is the land on which a permanent home is built. *State property* is owned and managed by the government on behalf of a nation's citizens. National parks are one example of state property. *Common property* occurs where a group of resource users collectively holds the rights to use and manage a specific resource, including the right to exclude non-members from use.

*Community-based natural resource management* has been defined as, "a process by which landholders gain access and use rights to, or ownership of, natural resources; collaboratively and transparently plan and participate in the management of resource use; and achieve financial and other benefits from stewardship" (Child and Lyman 2005). *Community-based conservation*, a closely related approach, focuses explicitly on biodiversity conservation as the objective of management, involves people who directly affect and are affected by conservation decisions in planning and stewardship, and strives to provide direct economic and social benefits to communities while increasing or maintaining biodiversity (Western and Wright 1994). *Co-management* refers to a management regime where decision-making authority is shared between local people and local, regional or national government (Pinkerton 1989). Benefits attributed to these related approaches include: 1) increased implementation of and compliance with management decisions (Western and Wright 1994; Ostrom 1990), 2) application of diverse knowledge sources to management, including both local ecological knowledge and science (Berkes, Colding, and Folke 2003), 3) improved on-the-ground resource management, 4) increased monitoring and adaptive management, 5) decreased conflict over resources, 6) increased trust and strengthened relationships (*social capital*) within the community (Pretty and Ward 2001), 7) improved livelihoods, 8) greater community capacity, 9) improved environmental conditions, and 10) more resilient social-ecological systems (Walker and Salt 2006). These claims lead to a suite of important research questions, such as: Does CBNRM live up to its promise? How should "success" be defined and who should define it? What factors influence the process and outcomes of CBNRM? Are the outcomes of CBNRM really different or better than existing management regimes?

### ***Legacy of Research on Long-standing CPR Institutions***

There is a long tradition of theory development and empirical research on CBNRM that spans many disciplines, including political science, anthropology, economics, sociology, and various natural resource sciences. Many of these investigations were launched in the 1970s, following the publication in 1968 of Garrett Hardin's famous article, "The Tragedy of the Commons." In response to Hardin's assertion that the only ways to overcome the incentive for individuals to overuse shared resources were either privatization or government regulation, many scholars set out to document successful common property regimes and identify design principles for successful community-based resource management (Baland and Platteau 1996; Bromley 1992; McCay and Acheson 1987; Ostrom 1990; Wade 1994). Studies of CPR

management regimes include investigation of institutions for the management of forests (Gibson, McKean, and Ostrom 2000), fisheries, rangelands (Lane 1998), and irrigation systems (Lam 1998), among other resources. Most research was based on qualitative case studies, and the most influential of these works is Elinor Ostrom's 1990 book *Governing the Commons*, in which Ostrom analyzed 14 long-standing common property management systems and proposed 8 key design principles for successful CPR management institutions (Ostrom 1990). More recently, drawing on Ostrom's work and that of others, Arun Agrawal (2002), distilled this vast literature to identify 6 categories and 35 specific variables that help explain the performance of common property management regimes. In this chapter, Agrawal also highlighted some important weaknesses in existing research on common property institutions, including a narrow focus on institutions at the expense of understanding the context in which these institutions arise. A second major weakness identified by Agrawal is the lack of completely specified causal models that systematically test the relative importance of different factors in explaining the performance of CPR management regimes (Agrawal 2002). Agrawal calls for studies that use large samples (over 50 cases) and more in-depth case studies, to advance understanding of both context and causal relationships among the multiple factors that may explain the outcomes of CBNRM (Agrawal and Chhatre 2006).

### ***State of Science on Contemporary CBNRM Institutions***

In addition to research on long-standing and traditional community-based management institutions, there has been growing interest in understanding the process and performance of contemporary, recently-established CBNRM, community-based conservation and co-management institutions. Initially, much of the work on CBNRM and its sister institutions was positive and somewhat promotional in nature, featuring many success stories (Child and Lyman 2005; Western and Wright 1994). More recently, much of the scientific literature has been more critical of CBNRM and questioned whether the promise of these approaches can really be achieved (Brosius, Tsing, and Zerner 2005; Kellert et al. 2000). An important contribution of this work is the growing awareness of the importance of understanding the historical, cultural and social-political contexts of specific CBNRM cases. Further, much recent work calls into question conventional definitions of "community" as a territorially-defined social group bound by common values and norms. Such conventional notions of community often obscure profound differences within communities in resource access and use, voice, and power along gender, age, ethnic, religious, class, or caste lines (Agrawal and Gibson 2001). They also fail to account for the temporally dynamic composition of many pastoral social groupings, where membership may shift annually, seasonally, or more often (Fernandez-Gimenez 2002; Niamir-Fuller 1999; Scoones 1994).

### ***Linking CBNRM and Resilience***

On the frontier of research on CBNRM are investigations of the relationship between CBNRM and the resilience of social-ecological systems. Resilience thinking is a cutting-edge area of interdisciplinary theory-building and research. Most of the work on resilience is still largely conceptual, and where empirical studies have been done, they are primarily descriptive and qualitative (Walker and Salt 2006). Among the leading thinkers

on these themes are Berkes, Colding and Folke (Berkes, Colding, and Folke 2003), Gunderson and Holling (Gunderson and Holling 2002), and Walker (Walker and Salt 2006). The existing literature on resilience in social-ecological systems strongly suggests that community-based institutions may play a key role in fostering the resilience of communities and the ecosystems they inhabit. Davidson-Hunt and Berkes (Davidson-Hunt and Berkes 2003) suggest that local management institutions enhance resilience because 1) management practices are locally adapted and based on local ecological knowledge, 2) local institutions are “close to the ground” and able to observe and adapt rapidly, making and learning from small mistakes where centralized bureaucracies make large ones, and 3) there is a tremendous diversity of institutional arrangements among local CBNRM groups, and such diversity increases the likelihood of learning what works. In addition, we propose that 4) CBNRM has been shown to strengthen social capital (Wagner and Fernandez-Gimenez In Press), and social capital, in turn, is thought to be a key to adaptive capacity in communities (Adger 2003; Berkes, Colding, and Folke 2003; Walker and Salt 2006). Further, we suggest that 5) some CBNRM organizations promote *social learning*, an intentional process of collective self-reflection through interaction and dialogue among diverse participants (Keen and Mahanty 2006). Social learning is promoted in part due to CBNRM groups’ attention to monitoring and adaptive management, and their emphasis on learning and education. We hypothesize that this attention to monitoring and collective learning through adaptive management strengthens feedbacks between social and ecological systems. As rural communities face increasing environmental stresses as well as unpredictable economic and political shocks, the ability to learn and adapt is critical to their sustainability and resilience.

### ***Challenges of CBNRM Research***

Research on CBNRM is challenging. Although many participants in CBNRM are convinced of its benefits, there is still relatively little empirical scientific evidence to support claims that CBNRM improves environmental or social conditions. Changes in environmental conditions are difficult to measure directly, in part because the environment may respond slowly to changes in management. Even when changes are documented, variation in environmental conditions among case study sites and other confounding factors make it difficult to establish causal links between an improved environment and community-based management. Social outcomes can also be difficult to measure. For example, how do we measure intangible variables such as trust and hope? It may also be difficult to identify the appropriate spatial scale or level of social organization for measuring social outcomes. Are household-level indicators sufficient? Is it possible to detect community- or regional-level changes in economic and social conditions related to implementation of CBNRM? Finally, a basic principle of scientific research is the use of “control” or “comparison” cases where the intervention under study does not occur. This enables the researcher to determine whether the observed changes would have happened anyway, even in the absence of the intervention. Very few studies of community-based resource management effectively compare CBNRM to alternative management regimes in similar social and environmental settings. In addition, there are few longitudinal studies of CBNRM, especially longitudinal studies of multiple cases, that would help clarify the pathways and causal mechanisms for success or failure.

### ***Opportunities for CBNRM Research in Mongolia***

Mongolia offers unique opportunities to address many of the gaps in existing research on CBNRM. First, the relatively homogenous environmental and social context in much of the country means there is less potential for confounding variation among study sites. Second, over 2000 CBNRM groups have been established across Mongolia in the past 5-10 years (Mau and Chantsalkham 2006), offering a large study population from which to sample and the opportunity for a well-replicated study. Third, because many of these groups were established with assistance from several major donors or NGOs, the groups vary somewhat consistently in key design elements, depending on the facilitating organization. This creates an unusual opportunity to compare among multiple groups in similar contexts established with different designs. Fourth, because of the wide spatial dispersion of existing CBNRM groups, there is an excellent opportunity to compare adjacent communities with and without active CBNRM projects or organizations. Fifth, many of Mongolia's ecosystems appear to respond relatively rapidly to changes in management, suggesting that if CBNRM results in a shift towards more sustainable management practices, the environmental outcomes of these changes may be detectable over relatively short time periods (e.g. 5-10 years), at least in some parts of the country. Finally, Mongolia is subject to relatively frequent climatic disasters and a volatile economy, and may be particularly vulnerable to the effects of global climate change. This challenging set of circumstances make it an especially compelling and well-suited location to examine the relationship between CBNRM and resilience. This combination of factors makes Mongolia an ideal place in which to learn from on-going efforts to develop community-based natural resource management. From a researcher's perspective, Mongolia offers a situation with many potential study cases that span a range of ecological conditions and design approaches, allowing for a well-replicated and powerful study. The opportunity for a "case-control" comparison further strengthens the potential for a robust research design. Perhaps most important, however, is that key facilitating organizations and community participants have indicated an interest in supporting and participating as partners in such research, providing a truly unique opportunity to jointly reflect, learn, and apply learning to improve the practice of CBNRM in Mongolia—and in the world.

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