

# Key Principles of Community-Based Natural Resource Management: A Synthesis and Interpretation of Identified Effective Approaches for Managing the Commons

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**Abstract** This article examines recent research on approaches to community-based environmental and natural resource management and reviews the commonalities and differences between these interdisciplinary and multistakeholder initiatives. To identify the most effective characteristics of Community-based natural resource management (CBNRM), I collected a multiplicity of perspectives from research teams and then grouped findings into a matrix of organizational principles and key characteristics. The matrix was initially vetted (or “field tested”) by applying numerous case studies that were previously submitted to the World Bank International Workshop on CBNRM. These practitioner case studies were then compared and contrasted with the findings of the research teams. It is hoped that the developed matrix may be useful to researchers in further focusing research, understanding core characteristics of effective and sustainable CBNRM, providing practitioners with a framework for developing new CBNRM initiatives for managing the commons, and providing a potential resource for academic institutions during their evaluation of their practitioner-focused environmental management and leadership curriculum.

**Keywords** Community-based environmental initiatives · Community-based natural resource management · Environmental curriculum · Interdisciplinary Process · Social ecologic systems · The Commons

## Introduction

### An Emerging Model and the Promise

Community-based natural resource management (CBNRM) is an emerging international model for natural resource management. During the past 20 years it has become an increasingly popular resource management approach that promises to address both social justice and environmental protection (Brosius and others 1998). It is an alternative model to centralized approaches of resource management that some have cited as achieving dismal outcomes after decades of intrusive systems of sanctions and top-down decrees (Agrawal and Gibson 1999). These centrally planned natural resource management systems frequently had faulty designs, inefficiencies, and sometimes corruption (Agrawal and Gibson 1999). Indigenous communities were sometimes viewed as the major hindrance to successful outcomes rather than a necessary part of any sustainable solution. In contrast, CBNRM initiatives have as a core value the positive transformation of the relationship between rural (and sometimes urban) people and the environment (Hackel 1999). Emerging CBNRM initiatives support the principles of participatory democracy and of building networks and linkages among different constituency groups, interdisciplinary groups, levels of governments, and economic sectors. Several disciplinary areas are also often involved with and instrumental to the success of CBNRM initiatives. As recognized by Berkes and others (2003), “a complex social-ecological system (SES) cannot be captured using a single perspective. It can be best understood by the use of a multiplicity of perspectives.” Many CBNRM initiatives tend to recognize the need for various vantage points and seek to incorporate the disciplines of environmental

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economics, conservation biology, ecology, organizational management and leadership, political science, sociology, and environmental education. Collaboration between experts from these disciplines with each other, as well as with nonexperts and members of other constituency groups, has been instrumental to developing effective CBNRM initiatives (Child and Lyman 2005; Borrini-Feyerabend and others 2004).

Due to early successes and a more democratic approach to change, CBNRM systems are at the epicenter of conservation thinking and are promoted and benefit from enormous efforts and funds from international aid agencies. For example, 50 countries have moved ahead with devolution of authority on forest management. Currently an estimated 500,000 new local environmental management organizations have been established (Armitage 2005). Although CBNRM has proven to be a successful model in numerous cases, this approach may be outpacing a critical analysis of the key characteristics of effective community based environmental initiatives that can ensure long-term successful and sustainable programs in a variety of settings.

Critics of CBNRM frequently base their arguments on concerns about efficacy, political economics, lack of trust, and philosophies of use and information (Child and Lyman 2005). Participants at the 2003 Savannah Workshop “Turning Natural Resources into Assets,” which focused on CBNRM in Africa and North America, summarized the concerns of critics as follows (Child and Lyman 2005):

- “Things are fine—CBNRM is seeking to solve a problem that does not exist.
- It’s ineffective—It does not result in maximum conservation of biodiversity.
- It lacks rigor and will result in chaos.
- It disenfranchises national interest.
- Local communities aren’t competent.
- Commercial use of resources is bad.”

A recent workshop in 2006 on the Millennium Ecosystem Assessment, “Can Community Conservation Bring International Goals Down to Earth?” which was hosted by the Norwegian Ministry of Environment, described lessons, experiences, and critical conditions for CBNRM. This session of the workshop, lead by Brian Child (2007), discussed why the implementation of CBNRM often falls short of the concept. Specifically, he cited three necessary conditions that are not always met, including the recognition of social values, market values, and nonmarket values. Nonmarket value (also referred to as “externalities”) include the ability of local people to capture payments for environmental services received by others.

All of these concerns fall into the domains of economics, ecology, social capacity, and governance/management.

Through conducting an analysis and synthesis of 47 papers, this article lays out a comprehensive framework of organizational principles and key characteristics that will address these and other concerns of by documenting the characteristics of successful CBNRM organizations.

A better understanding of the underpinning characteristics of success will be useful to practitioners so they may operationalize key characteristics and increase the probability for future success of community-based approaches as they are applied throughout the world. This may also be useful to academic institutions as they conduct evaluations of their current environmental management and leadership curriculum. This article does not attempt to quantify which characteristics are the most critical for achieving success nor how each of the authors defines success; rather, it describes the characteristics most frequently associated with successful CBNRM initiatives.

### A Working Definition of CBNRM

CBNRM has numerous definitions. Similar to the definitions of sustainability, these definitions include both process and strategy. Core to all definitions is an approach to natural resource management that seeks to support long-term sustainability through broad participation of community members and resource users in decision making (Zanetell and Knuth 2004; Soeftestad 2006). CBNRM has evolved during the last two decades in response to the limitations of previous top-down resource management approaches, which were based primarily on a pure technical approach to natural resource management (CBNRM NET 2006; Armitage 2005). This community-based approach draws on the principles of building social capital, which includes building local social networks, norms, and trust (Barker 2005; Putnam and others 2003). According to Armitage, in his recent review of the literature, a working definition of CBNRM is a follows:

CBNRM is generally viewed as a mechanism to address both environmental and social-economic goals and to balance the exploitation and conservation of valued ecosystem components. It requires some degree of devolution of decision-making power and authority over natural resources to communities and community-based organizations.... [This approach] seeks to encourage better resource management outcomes with the full participation of communities and resource users in decision-making activities, and the incorporation of local institutions, customary practices, and knowledge systems in management, regulatory, and enforcement processes. (Armitage 2005)

For the purposes of this article, I will apply this definition of CBNRM.

### Approach and Methodology

A draft of characteristics of effective CBNRM was developed by collecting a multiplicity of perspectives from the publications of 23 research teams and then grouping these findings into overall broad organizational principles and associated key characteristics. These research papers were identified through an inductive process that included multi-database searches conducted using the key term “community-based” in combination with the terms “environmental,” “conservation,” “management,” or “natural resources.” References cited in these papers were also examined.

The research papers selected were those that contained a significant analysis of characteristics attributed to effective CBNRM and similar community-based social ecologic systems approaches, including community-based management, community-based conservation, community-based environmental protection, community-based environmental planning organizations, integrated conservation and development programs, incentive-based conservation, and ecosystem management. The papers themselves were based on numerous case studies around the world, including countries with developing and developed economies. The authors of these papers are listed in Table 2. Note that some of the research papers analyzed focused on only a few of the organizational principles. This does not imply that the researcher(s) did (or did not) consider the other principles important for effective CBNRM or similar types of programs or initiatives. These other organizational principles were simply not part of their scope of research.

Some of the most recent review papers (Armitage 2005; Bradshaw 2003; Campbell and Vainio-Mattila 2003; Leach and others 1999; Olsson and others 2004; Scheberle 2000) suggested numerous key characteristics attributed to or foundational for effective CBNRM. Research has also been focused on concerns as to why some community-based environmental management efforts have been more successful than others (Bradshaw 2003; Butler and Koontz 2005; Campbell and Vainio-Mattila 2003; Agrawal and Gibson 1999; Thompson and others 2003; Zanetell and Knuth 2004).

From these 23 research papers, a total of 222 characteristics were identified and coded that the authors indicated were associated with effective and/or successful community-based environmental initiatives. Each of these coded characteristics was then assigned to 1 of the 12 broad organizational principles I developed during the analysis using an iterative inductive process. This required

broadening some initial principles and subdividing others. The principles were also informed by recent research in broad areas. For example the principle of adaptive leadership and comanagement is based on research by Olsson and Allan (Olsson and others 2004; Allan and Curtis 2005), and the principle of participatory decision making arose from the work of Newsom and Chalk (2004), Scheberle (2000), and Webler and others (2001).

Following an approach used by Grumbine (1994) in developing dominant themes to help define ecosystem management, a matrix was constructed that assigned each of the identified 222 coded characteristics statements to 1 of the 12 principles. These were consolidated into 5 key characteristics for each of the 12 organizational principles.

This draft matrix was then vetted (or “field tested”) by reviewing CBNRM case studies from the World Bank International Workshop on CBNRM (1998). More than 400 case studies were submitted to this international workshop. Currently 240 of these case studies, representing 75 countries, have been published to the Sustainable Rural Development Information System Web site (<http://www.rdis.ciesin.org>). Each of these cases was submitted in a World Bank-prescribed format that included sections on change process and lessons learned. I selected a random sample of 45 case studies (19%) of this set with a limit of no more than 2 cases from any 1 country. Each of the cases of this subset was rated as 1, 2 or 3 based on the specificity of information provided under the sections of lessons learned and/or change process (“1” represented the lowest level, and “3” represented the highest level of specifics.) Twenty-four case studies were rated the highest category (i.e., 3). These 24 cases represented examples of robust CBNRM initiatives in 23 countries and are the cases used in this analysis (field test). A total of 238 text statements from these case studies, which involved the authors stating an effective and/or successful CBNRM initiative, were extracted and coded using the draft matrix of organizational principles and associated key characteristics. These text statements created a large “communication concourse” that represents a discourse of practitioners on CBNRM. A discourse is a “way of seeing and talking about” an issue (Addams and Proops 2000).

This vetting process resulted in a confirmation of the overall organizational principles and associated key characteristics. This second process also identified specific areas in which clarifications to organizational principles were needed and a few enhancements to associated key characteristics were in order. The primary differences between the findings from the 23 research teams and the 24 practitioners’ case studies were that practitioners gave a stronger focus or emphasis than the researchers on the following as characteristics associated with successful

CBNRM initiatives (note that the associated organizational principle is listed after each characteristic; see Table 1 for a full description of the principles):

- There is a designed link between the public participation process and mobilization of the public support and involvement (A).
- There is a central role of stakeholder trainings, workshops, and other learning opportunities in the raising of knowledge and awareness and the building of commitment (B).
- The financial factors that are critical to stability of the organization or initiative are adequately addressed (C).
- There is effective information dissemination using a wide range of multimedia approaches (D).
- There is a core focus on engaging and building commitment of local community members (F).
- The critical roles of leadership and management to engage and mobilize local community members in the work of the organization are recognized (I).
- There is availability of financial and other resources needed to support start-up and transitional costs (K).

## Results and Summary of Findings

The 12 organizational principles I identified based on this analysis are as follows: (A) public participation and mobilization, (B) social capital and collaborative partnerships, (C) resources and equity, (D) communication and information dissemination, (E) research and information development, (F) devolution and empowerment, (G) public trust and legitimacy, (H) monitoring, feedback, and accountability, (I) adaptive leadership and comanagement, (J) participatory decision making, (K) enabling environment: optimal preconditions or early conditions, and (L) conflict resolution and cooperation.

These 12 principles are not listed in any particular order. Certain principles are cited more frequently by research teams; other by practitioners. The principles should not be considered “predictors” of successful CBNRM initiatives but rather as organizational design principles and preconditions that have been frequently associated with successful initiatives. I do not imply that any one principle could be considered a necessary condition, yet following these principles will likely increase the probability of a successful CBNRM initiative. This has been explicitly or implicated stated by many of the cited authors. Table 1 describes these 12 organizational principles with the associated key characteristics.

Table 2 illustrates that each of the organizational principles have received significant interest by multiple researchers. In Table 1, the characteristics identified in my

review of 23 cited teams of researchers are consolidated, summarized, and framed as key characteristics of each of the organizational principles. These characteristics were then clarified using the communication concourse from the 24 practitioner World Bank case studies (see Table 3). Table 4 provides a comparison of researchers’ and practitioners’ matrices, including the frequency of citation of each of the organizational principles.

In the next section, each of the 12 organizational principles are discussed and critiqued based on the key characteristics summarized in Table 1. Citations of researchers and their papers, provided under each principle, provide sources on how to implement or operationalize these organizational principles.

### Principle A: Public Participation and Mobilization

The classic article by Arnstein on public participation (1969) describes an eight-rung ladder of citizen participation that moves from what is referred to as “manipulation” up to “partnerships,” “delegated power,” and finally to “citizen control.” The paradigm shift required is to move from “getting people on your side” or selling them on your ideas (the lowest rung) to including local people in a substantive and meaningful manner, such as sharing decision-making authority (the higher rungs). Effective CBNRM initiatives encourage working at the higher rungs of the ladder. Public participation needs to occur at all stages of CBNRM initiative development and implementation including information gathering, consultation, decision making, initiating action, and evaluation (Campbell and Vainio-Mattila 2003). This “true public participation” includes stakeholders with programmatic, operational, scientific, and legal expertise through involvement that is open, inclusive, and fair (Scheberle 2000; Gruber and Clark 2000). Effective public participation will empower citizens and involve all affected parties, including marginalized communities (Spiteri and Nepal 2006; World Bank 1996). It may also include local people in program or organization management (Hackel 1999). This principle is cited by many authors as one of the most essential for successful CBNRM programs.

### Principle B: Social Capital and Collaborative Partnerships

The importance of building social capital and of collaborative partnerships is frequently cited as an attribute of successful initiatives. The term “social capital,” also referred to as “community-based capacity” (Barker 2005; Eade 1997), is used to describe robust local social networks, strong community norms, and trust between community members (Putnam and others 2003). A few examples of

**Table 1** Organizational principles and key characteristics of effective community-based environmental initiatives<sup>a</sup>**Principle A: Public participation and mobilization**

Effective public participation is integral to all forms of CBNRM and other community-based environmental initiatives.

Public participation process should empower citizens and raise knowledge levels.

Public participation will directly impact public trust, confidence, and legitimization.

Seek diversity of stakeholders, including citizens, NGOs, local and regional governments, private sector, and those with programmatic, operational, scientific, and legal knowledge.

Provide for participation of stakeholders at all stages: information gathering, consultation, visioning and goal setting, decision making, initiating action, participating in projects, and evaluation.

**Principle B: Social capital and collaborative partnerships**

Networks and partnerships are integral to building social capital and serve as a catalyst to finding innovative strategies and solutions.

Collaborative partnerships are key to leveraging resources and supporting implementation.

Stakeholder trainings, workshops, and other collaborative learning opportunities can build social capital and commitment.

Seek agreement among key environmental NGOs, governments, and the private sector to work collaboratively and to share resource and responsibilities.

Ownership by community members and other stakeholders enhances design, implementation, and operation; support cohesion; and encourages long-term commitment.

**Principle C: Resources and equity**

Environmental justice is a social imperative that includes recognizing local values.

Seek to improve (or minimize negative effects on) the local economy.

Recognize need for linkages between conservation and local economy based on equity, local needs, and financial and environmental sustainability.

Seek equitable and fair distribution of local benefits, potentially including compensation for protecting natural resources.

Regulated access to natural resources and graduated sanctions can help ensure equity

**Principle D: Communication and information dissemination.**

Well-designed communication systems provide information sharing that support multiple social networks and raises levels of knowledge and awareness.

Linkages are provided between different information and knowledge systems to support learning, decision making, and change.

Effective communication supports openness and transparency.

Promote information sharing between experts and nonexperts through multiple approaches, including seminars and workshops; printed, electronic, and mass media; and projects.

Explicitly state expectations and limits.

**Principle E: Research and information development**

There is a common information base that is accessible and useful.

Decisions should be based on a broad but systematic body of information.

Integrated information includes technical, scientific, social, quality-of-life, economic, and other forms of local knowledge, including indigenous experiential knowledge.

Economic evaluation of environmental assets is a valuable information base.

Ongoing research is necessary to improve on existing solutions, including a role for community members in collection of scientific information.

**Principle F: Devolution and empowerment**

True sharing of power and responsibility (devolution of authority and responsibility) between government authorities, community groups, and the wider community with enhanced local decision making improves outcomes.

Most individuals affected by environmental rules and regulations, including those who are often marginalized, should be included or represented in the group who make or modify the rules.

There are nested, multiple layers of governments and enterprises related to role and activities of decision making, appropriation, monitoring, enforcement, conflict resolution, and governance.

Devolution of control and decision making significantly changes the relationship between central governments and rural and regional areas and, if done effectively, can engage and build commitment of local community members.

Establishing clear rules, procedures, and regulations can empower the local community.

**Principle G: Public trust and legitimacy**

Work must be viewed by community as legitimate to build community trust.

Local leaders are integral to efforts in establishing trust and credibility.

Support by local elected officials will build trust and legitimacy.

Table 1 continued

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Participatory approaches to problem solving and decision making are critical to building legitimacy.

Transparency in activities, including decision making, supports the building of trust.

**Principle H: Monitoring, feedback, and accountability**

Tight feedback loops are supported by openness, transparency, monitoring, mutual accountability, collaboration, and power sharing between the stakeholders and partners.

Effective feedback systems, including feedback from social networks, allow for opportunities to learn from mistakes, uncertainty, and crises.

Local appointed or elected representatives of communities must themselves be accountable to their constituents if community-based conservation is to be responsive to the community.

The performance of those who make decisions should be periodically reviewed by those that are affected by the decisions.

The social and technical capacity for monitoring, evaluating, responding, and enforcement is necessary for effective and dynamic systems.

**Principle I: Adaptive leadership and comanagement**

A robust social–ecologic organization is designed and supported to be a learning organization that supports adaptive capacity.

A learning organization and an optimum management system is resilient to perturbation, with an ability to cope with external shocks and rapid change.

Adaptive comanagement and adaptive leadership are dynamic and focused on processes rather than static structures.

Adaptive comanagement approaches include roles for local government, local community members, NGOs, and private institutions and decision making inclusive of people affected by and knowledgeable of the issues.

An effective comanagement approach engages, trains, and mobilizes community members in the work of the organization.

**Principle J: Participatory decision making**

Effective participatory problem solving and decision making is enabled by a well- structured and facilitated dialogue involving scientists, policy makers, resource users, practitioners, and community members.

Decision making is informed by analysis of key information about environmental and human–environmental systems, including life aspirations of local people.

It is vital to create a shared holistic vision/plan that anticipates probable environmental, social, and economic outcomes.

The policy creation process should include a wide range of key expert and nonexpert constituency and community groups “at the table.”

Participatory problem solving should provide opportunities for the sharing of knowledge and collaborative learning about social–ecologic systems.

**Principle K: Enabling environment: Optimal preconditions or early conditions**

Community has a homogenous social structure, common interests, and shared norms and a local social structure in which divisions are not too serious or disruptive of cooperation.

There are clearly defined boundaries of the resource system.

The public is unsatisfied with the status quo but is not feeling hopeless.

Citizens and stakeholders are willing to participate because they have a high sense of community and/or dependency on the local natural resource.

There is adequate support and investment of financial and other resources to support transitional costs.

**Principle L: Conflict resolution and cooperation**

Difficult realities and conflicts are inherent in community-based social–ecologic systems.

Plan for and develop capacity and strategies for conflict management and resolution at the time of initiation of a community-based social–ecologic initiative.

Recognize the central role of institutions outside of the community-based organization in mediation of environment–society conflicts.

Work to transcend organizational rivalry and competition between organizations or stakeholder groups.

Design participatory decision-making processes that promote dialogue and reduce factionalism.

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<sup>a</sup> Sources are noted in text under each principle

social capital building include providing opportunities for participatory visioning, planning, designing, problem solving, and decision making (Newsom and Chalk 2004; Olsson and others 2004; Dietz and others 2003). This type or similar types of local involvement and engagement can lead to building trust and local ownership (Campbell and Vainio-Mattila 2003). Joint learning opportunities with a range of stakeholders can also enhance community involvement that

is supportive of building social capital or community-based capacity (Newsom and Chalk 2004).

Researchers have found that the formation and support of new collaborative partnerships is critical for leveraging resources and implementation of priorities (Barker 2005; Butler and Koontz 2005; Thompson and others 2003). Partnerships can be formed and implemented through agreement among key governments, environmental, and

**Table 2** Matrix of research teams' references of organizational principles attributed to effective community-based environmental initiatives

Research team and date of publication <sup>a</sup>	Public participation and mobilization Principle A	Social capital and collaborative partnerships Principle B	Resources and equity Principle C	Communication and information dissemination Principle D	Research and information development Principle E	Devolution and empowerment Principle F	Public trust and legitimacy Principle G	Monitoring, feedback, and accountability Principle H	Adaptive leadership and comanagement Principle I	Participatory decision making Principle J	Optimal environment preconditions or early conditions Principle K	Conflict resolution and cooperation Principle L
Allan and Curtis 2005				X					X	X		
Agrawal and Gibson 1999						X		X		X	X	
Anderies and others 2004			X	X		X		X	X		X	
Armitage 2005				X	X			X	X			
Armstein 1969					X							
Barker 2005	X	X	X		X	X	X		X			
Berkes and others 2003					X	X		X	X			
Butler and Koontz 2005		X			X			X	X			
Campbell and Vaimio-Mattila 2003	X	X	X	X	X	X		X	X			
Dietz and others. 2003		X					X		X	X		X
Gruber and Clark 2000		X	X			X	X	X	X	X		
Grumbine 1994	X			X	X	X	X		X		X	
Hackett 1999	X	X	X	X		X		X	X			
Leach and others 1999		X	X			X		X	X	X		
Meinzen-Dick and Knox 1999		X	X		X	X		X	X		X	
Newsom and Chalk 2004	X	X		X	X			X	X	X		
Olsson and others 2004	X	X	X	X	X	X	X	X	X	X		
Poeteete and Welch 2004								X	X			
Scheberle 2000	X	X				X	X	X	X	X	X	X
Spiteri and Nepal 2006	X	X	X		X			X	X	X	X	X
Thompson and others 2003		X						X	X	X	X	X
Walker and others. 2002							X	X	X	X		
Zanetell and Knuth 2004							X	X	X		X	X

<sup>a</sup> Refer to Reference for list of publications

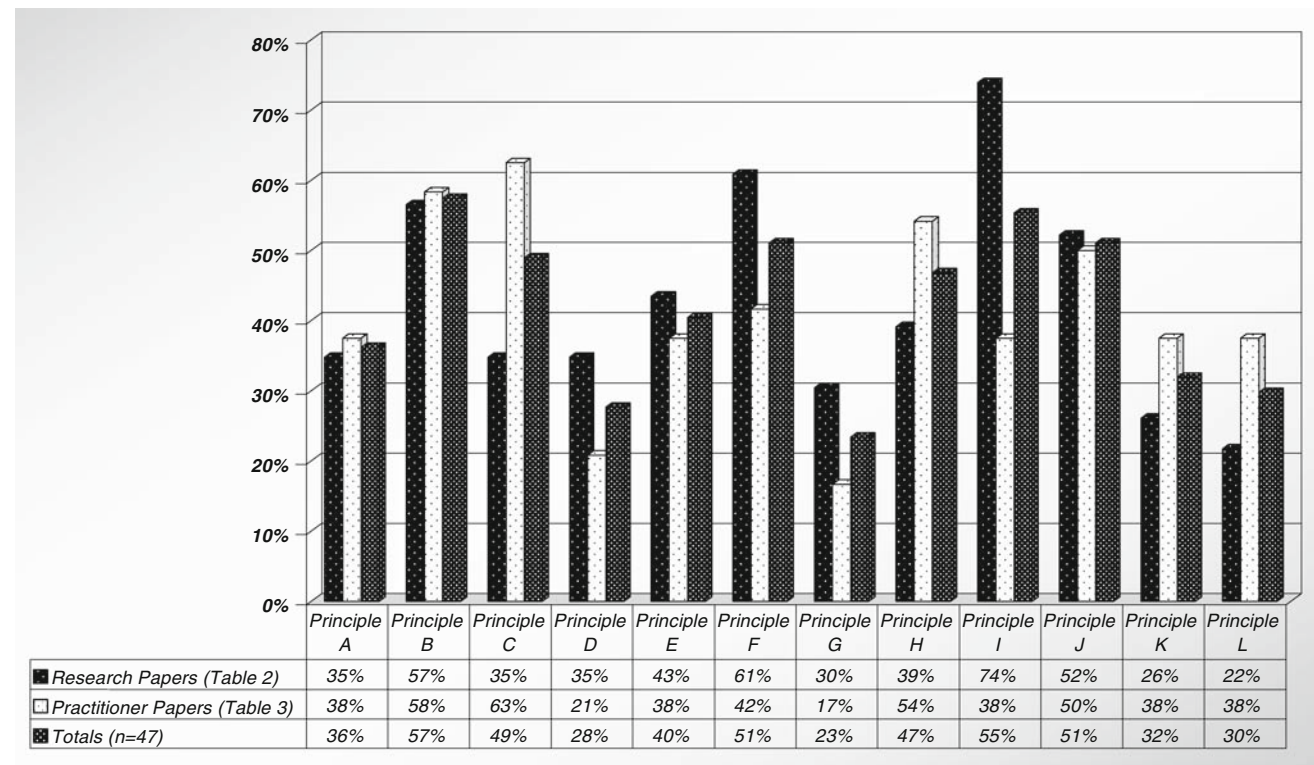
**Table 3** Matrix of practitioners' references of organizational principles attributed to effective community-based natural resource management initiatives

Country or region	World Bank-submitted case study (author) <sup>a</sup>	Public participation and mobilization Principle A	Social capital and collaborative partnerships Principle B	Resources and equity Principle C	Communication and information dissemination Principle D	Research and information development Principle E	Devolution and empowerment Principle F	Public trust and legitimacy Principle G	Monitoring, feedback, and accountability Principle H	Adaptive leadership and comanagement Principle I	Participatory decision making Principle J	Optimal environment preconditions or early conditions Principle K	Conflict resolution and cooperation Principle L
Cameroon	Ewusi, B.	X	X	X					X		X		X
Canada	Hawboldt, S.	X	X	X	X	X	X		X	X	X	X	X
Canada	Smith, W	X	X	X	X	X	X	X		X			
Columbia	Allred, T.	X	X						X		X		
Eastern Africa	Opole, M.								X	X	X		
Ghana	Olesu, I.	X	X	X		X	X						X
Guinea-Bissau	Tous, P.							X			X		
Guyana	Tambiah, C.											X	
Hawaii	Josayna, C.	X	X			X		X	X	X		X	X
Honduras	Seidl, A.	X	X	X	X								
Indonesia	Engkoeswara	X	X	X		X	X			X			
Jamaica	Tambiah, C.	X	X	X									
Kenya	Githitho, A.	X	X	X			X			X	X		
Mali	Yanggen, D.	X	X	X					X				
Mexico	Jimenez, V.	X	X	X		X						X	
Micronesia	Raynot, B.	X	X	X		X	X	X	X	X	X	X	X
Mozambique	Brito, L.	X	X	X		X	X	X	X	X	X		
Nepal	Dhakal, N.	X	X	X									
Nicaragua	Vernooy, R.	X	X	X		X	X	X	X		X	X	
Philippines	Vogt, H.	X	X	X			X		X		X		
Senegal	Diouf, A.	X	X	X		X			X	X	X		X
Thailand	Chong, K.										X		X
Trinidad	Tambiah, C.										X		X
Zimbabwe	Odero, K.	X	X	X	X		X	X	X	X	X	X	X

<sup>a</sup> Refer to web site: <http://srdis.ciesin.org> for information for all authors and full text of World Bank-submitted case studies



**Table 4** Comparison of Research and Practitioner Papers



private organization to work collaboratively and to share resources and responsibilities. These partnerships could also serve as a catalyst for finding innovative strategies (Scheberle 2000).

**Principle C: Resources and Equity**

For community-based environmental programs to be effective, there must be clear linkages between natural resource protection and conservation and the recognition of local social and economic needs and livelihoods of the community members (Meinzen-Dick and Knox 1999; Leach and others 1999; Brown and others 2005). This linkage should take into consideration equity, local needs, and sustainability (Spiteri and Nepal 2006; Hackel 1999; Barker 2005). To promote equity, CBNRM initiatives should seek the fair distribution of benefits as well as the sharing of hardships for those who may be subject to limited access to resources and sanctions (Spiteri and Nepal 2006; Anderies and others 2004).

**Principle D: Communication and Information Dissemination**

Authors cited effective communication as another crucial aspect of successful CBNRM initiatives. Effective

communication embraces transparency, fosters trust, and provides information that is translated into usable forms of knowledge (Olsson and others 2004; Newsom and Chalk 2004). This knowledge should be accessible not only to experts and scientist from a range of disciplines but also to the people whose lives are being affected by the natural resource decisions (Allan and Curtis 2005; Campbell and Vainio-Mattila 2003). This accessible knowledge can support learning and adaptation of the community (Armitage 2005; Hackel 1999). Open and readily understood communication in CBNRM initiatives—which typically have numerous partners, stakeholders, and community members—serves to keep channels open, is a critical dissemination tool, and may help serve as a social cohesive factor for this network (Grumbine 1994; Newsom and Chalk 2004).

**Principle E: Research and Information Development**

Effective research and information systems of community-based initiatives were recognized by nearly all practitioners as integral to their success. The need for a common information base that is accessible to all parties was raised by numerous researchers (Butler and Koontz 2005; Grumbine 1994; Olsson and others 2004). This information

base must have integrated information that includes technical and scientific as well as social, quality-of-life, and other forms of indigenous local knowledge (Barker 2005; Butler and Koontz 2005; Newsom and Chalk 2004).

Organizational decisions should be based on a comprehensive and systematic body of information that includes local knowledge, ecosystem understanding, and economic evaluations of environmental assets (Meinzen-Dick and Knox 1999; Berkes and others 2003; Butler and Koontz 2005; Newsom and Chalk 2004). Ongoing research that supports ongoing learning will be supportive of the sustainability of community-based initiatives (Allan and Curtis 2005; Newsom and Chalk 2004).

#### Principle F: Devolution and Empowerment

If properly achieved, devolution, i.e., the transferring of political authority and responsibility to a local region or community, will support a core value of CBNRM, which is empowering community members to take on greater role in environmental decision making (Armitage 2005; Grumbine 1994; Child 2007). This also supports a central tenet of adaptive leadership, i.e., supporting a society to take on the social adaptive work embedded in responsibly making challenging community environmental decisions, through an open participatory process (Heifetz 1994; Gruber and Clark 2000). Devolution can be considered a precondition to developing adaptive comanagement because it enables a community-based organization to create a decision making structure that “relies on the collaboration of a diverse set of stakeholders operating at different levels, often in networks, from local user, to municipalities, to regional and national organizations” (Olsson and others 2004).

This devolution of control and decision making, with less direction from regional and national authorities (Grumbine 1994), will significantly change the relationship between central governments and rural/regional areas (Hackel 1999; Zyl and others 1995). It is likely to entail enabling legislation (Olsson and others 2004); diverse institutions operating at different levels with dynamic institutional arrangements (Leach and others 1999); a new organizational system with nested, multiple layers of enterprises with clear roles and activities (Anderies and others 2004); and a “true sharing of power and responsibility” between governments authorities, community groups, and the wider community (Scheberle 2000). Several authors stated that marginalized parties and those that are resource-dependent must be empowered through representation in the postdevolution decision-making processes (Agrawal and Gibson 1999; Anderies and others 2004; Meinzen-Dick and Knox 1999).

#### Principle G: Public Trust and Legitimacy

To be effective and sustainable, the work of an organization must be viewed by the greater community as legitimate (Scheberle 2000). It is common knowledge that in the eyes of the public, legitimacy of an organization or an initiative is built on public trust. With legitimacy built on public trust, an effective CBNRM organization must consider trust building as an integral to all of its work and actions (Olsson and others 2004). According to recent studies, participatory approaches and support for transparency in activities, including decision making and actions of stakeholders and partners, are critical for the legitimacy of an organization (Walker and others 2002; Campbell and Vainio-Mattila 2003; Barker 2005). Local officials and local community leaders are also integral to efforts in establishing trust and credibility (Grumbine 1994).

#### Principle H: Monitoring, Feedback, and Accountability

Maintaining the health of a CBNRM organization requires dynamic systems of feedback and accountability. Primary forms of feedback recognized by numerous researchers include those from monitoring and evaluation (Anderies and others 2004; Hackel 1999; Newsom and Chalk 2004); from learning through mistakes, uncertainty, and crisis (Armitage 2005); and from social networks (Olsson and others 2004). Accountability is necessary at all levels of the organization and from all core partners that form a community-based initiative (Campbell and Vainio-Mattila 2003; Anderies and others 2004; Child 2007). Agrawal and Gibson (1999) clarified this by stating:

Local appointed or elected representatives of communities or those officials in federated structures of community groups must themselves be accountable to their constituents if community-based conservation is to be responsive to the community.

This implies that the performance of those who make policy as well as operational decisions is routinely reviewed by those who are affected by the decisions (Agrawal and Gibson 1999; Ostrom 1990). This requires that social and technical capacity (including commitment) for monitoring and responding to this feedback as well as methods of enforcement are integral to community-based initiatives (Olsson and others 2004; Meinzen-Dick and Knox 1999).

#### Principle I: Adaptive Leadership and Comanagement

There has recently been a shift from assessing/evaluating CBNRM organizations from a “static” structural view to that of a “dynamic” view, including issues of

organizational resilience for complexity and change. This shift can be illustrated by the 41 characteristics (identified in my review of 15 research papers) affiliated with this principle. Within the description of these characteristics, the terms “adaptive,” “resilience,” “leadership,” “comanagement,” and “learning organization” occurred frequently. Virtually all characteristics associated with this principle fall within the broad principles of adaptive leadership and adaptive co-management. Adaptive leadership (Heifetz and Linsky 2002) is described as a type of leadership work that can help community members face, rather than avoid, tough realities and conflicts. Tough realities and conflicts are inherent in the work of CBNRM organizations. Adaptive leadership focuses primarily on learning how to address social adaptive rather than purely technical problems (Heifetz 1994).

Comanagement (i.e., cooperative management) is based on broad levels of cooperation. It relies on “the collaboration of a diverse set of stakeholders operating at different levels, often in networks, from local users, to municipalities, to regional and national organizations” (Olsson and others 2004). An integrating term, “adaptive comanagement,” combines the dynamic learning characteristics of adaptive management with the collaborative networks inherent in comanagement.

Adaptive leadership and comanagement are consistent with the strategies and tools of “learning organizations” described by Peter Senge in the *Fifth Discipline* (Senge and others 1994; Kofman and others 1995) and discussed by others (Butler and Koontz 2005; Poteete and Welch 2004). Learning organizations are best able to cope with external shocks (Berkes and others 2003; Newsom and Chalk 2004; Olsson and others 2004; Walker and others 2002) because they encourage institutional and organizational diversity (Armitage 2005) as well as an entrepreneurial culture (Scheberle 2000). Adaptive comanagement or learning organizations are dynamic and supportive processes rather than those that try to define states or preplanned static structures (Leach and others 1999) and are often integral to successful CBNRM organizations.

#### Principle J: Participatory Decision Making

Integral to effective CBNRM organizations and initiatives is a well-structured participatory problem-solving and decision-making process that engages a broad and representative cross section of the community (Dietz and others 2003; Gruber and Clark 2000; Newsom and Chalk 2004; Scheberle 2000; Child 2007). The community may include scientists, resource users, multiple levels of governments, policy makers, nongovernmental organizations, private sector, and interested members of the public (Walker and others 2002; Dietz and others 2003). An effective

multistakeholder process must ensure that a wide range of key experts and community members are empowered and “at the table” (Campbell and Vainio-Mattila 2003; Spiteri and Nepal 2006; Ostrom 1990). This process is enabled through a well-structured and -facilitated dialogue that includes information about environmental and human–environmental systems, including quality-of-life aspirations of local people (Agrawal and Gibson 1999; Dietz and others 2003; Thompson and others 2003). It should be designed to function as a forum for knowledge sharing and collaborative learning about the social system–ecosystem and its relationship to the economic system (Olsson and others 2004; Spiteri and Nepal 2006). Many practitioners have found that it is useful, perhaps even vital, to create a shared holistic plan that provides a integrated vision for future sustainable conditions. This holistic plan ideally includes a conceptual model of systems and strategies that will integrate the environmental, economic, and social objectives of the community (Walker and others 2002).

#### Principle K: Optimal Environment: Preconditions or Early Conditions

Achieving optimal preconditions before establishing a new CBNRM initiative can decrease initial challenges and increase the likelihood of success. One precondition identified by the researchers focuses on the existing social capital that is linked to the local social structure. Ideally, the community does not have current divisions that are too serious or could lead to disruption of future cooperation. Communities that have a homogenous social structure (Thompson and others 2003), common interests, shared norms (Agrawal and Gibson 1999), and a history of cooperation (Meinzen-Dick and Knox 1999) are more likely to be able work together in a multistakeholder, consensus-building manner. There is enhanced willingness by individuals to participate in a CBNRM initiative and decision making if these individuals (1) value their community; (2) are dependent on the local natural resources (Zanetell and Knuth 2004); and (3) are currently unsatisfied with the status quo but do not feel hopeless (Scheberle 2000). Clearly defined boundaries of the resource system at issue are also an important precondition or early condition for enhancing the likelihood of success (Anderies and others 2004; Ostrom 1990).

#### Principle L: Conflict Resolution and Cooperation

Most practitioners recognize that tough realities and conflicts are inherent in CBNRM initiatives. Literature on participatory conservation indicates that there are historical roots of mistrust between local communities and conservation agencies (Spiteri and Nepal 2006). Others cite the

tenuousness of partnerships formed in the process of community-based initiatives (Scheberle 2000). Attempting to balance local social–economic needs at the same time as developing policies and program to sustain the ecologic systems is difficult and is likely to raise conflict (Homer-Dixon 1999). It is therefore critical at the time of initiation of a CBNRM to plan for and develop capacity and strategies for conflict-management and resolution (Dietz and others 2004; Meinzen-Dick and Knox 1999; Spiteri and Nepal 2006; Ostrom 1990). These include efforts to reduce factionalism between stakeholders (Hackel 1999).

I identified a few general approaches and strategies for anticipating and addressing conflict and supporting cooperation. One approach is recognizing the central role of institutions outside of the CBNRM organization in mediation of environment–society relationships (Leach and others 1999). One researcher stated that it would be a mistake to ignore the possibility of state involvement in community-based resource management (Bradshaw 2003). Other approaches include providing arenas or services for resolving conflict that are easily accessible and low in cost (Anderies and others 2004); designing participatory decision-making processes that promote dialogue techniques geared toward overcoming resource use conflict among stakeholders (Barker 2005); and proactively working toward minimizing organizational rivalry and competition (Scheberle 2000). It appears that more fieldwork and research in developing tools for working with conflict and approaches for resolution (Fisher and others 2000) could enhance the success of future CBNRM initiatives.

## Discussion

I identified 12 broad organizational principles and associated key characteristics of effective and successful CBNRM and other similar types of community-based environmental initiatives. For this discussion, I am applying a working description of effective and successful CBNRM organizations as those organizations that are making progress toward “increased efficiency and effectiveness of natural resource management” (Child and Lyman 2005) while sustainably supporting the local human population economically, socially, and culturally. This implies that the local ecologic system and its natural resources are either recovering and or are being sustainably managed.

Most of the key characteristics provide a framework on “what to do” with far less of a focus on “how” this can be accomplished or operationalized. It is recognized that “how” to achieve effective and sustainable CBNRM initiatives is a critical question that is not addressed in this article. One potential approach to help address this question

is discussed later in this article. However, it is hoped that this analysis provides a useful broad framework for researcher, practitioners, and academics to further study and develop CBNRM.

The matrix resulting from these principles and characteristics is based on studies and published reports by researchers (23 published studies) and practitioners (24 case studies). Findings from both sources (Tables 2 and 3) are similar, but some have a greater focus or emphasis on certain principles. Table 4 illustrates that practitioners focused more on resource and equity; monitoring, feedback, and accountability; optimal environmental preconditions or early conditions; and conflict resolution and cooperation (principles C, H, K, and L, respectively). Researchers focused more on communication and information dissemination; devolution and empowerment; and adaptive leadership and comanagement (principles D, F, and I respectively). Table 4 summarizes the similarities and differences. Two of these 12 principles—social capital and collaborative partnerships (principle B) and participatory decision making (principle J)—were identified by a majority of both research and practitioner papers as an important characteristic of effective CBNRM organizations.

This matrix is provided to broaden the discussion and to encourage additional longitudinal research. It is also hoped that this matrix will provide practitioners a framework for their work in developing CBNRM initiatives.

Specific characteristics listed under each principle provide a basis for developing specific indicators for monitoring progress toward stated organizational goals and objectives. This is a critical part of applying a logic model approach to strategic planning of new initiatives and monitoring their effectiveness in achieving their goals. For example, under principle E—research and information development—one characteristic is, “There is a common information base that is accessible and useful.” This implies a progress indicator such as, “The public has timely access to information on community forest management.”

It is also hoped that these principles and characteristics will serve as a potential resource for academic institutions during their evaluation of their practitioner-focused environmental management and leadership curriculum.

This matrix provides, in effect, a “view from 30,000 feet” of “what to do.” It does not attempt to provide specifics on “how” these principles can be achieved except through general review and citations of researchers. Although some of these principles and characteristics may seem somewhat obvious to more experienced researchers and practitioners, it is my observation that in practice many of these principles are frequently given a perfunctory effort at best. A frequently cited classic article by Arnstein on public participation (1969) illustrates this point.

Recent research of successful or effective CBNRM programs or similar initiatives is rich with lists of key characteristics based on only one or two case studies. There is also research into concerns of why some community-based environmental management efforts have been more successful than others (Bradshaw 2003; Butler and Koontz 2005; Campbell and Vainio-Mattila 2003; Agrawal and Gibson 1999; Thompson and others 2003; Zanetell and Knuth 2004). This review indicates that there appears to be a lack of longitudinal studies of CBNRM initiatives and case studies and that the specific organizational principles and key characteristics that are critical to long term sustainable success. There is also a lack of consensus on how to define long-term success because this may be linked in part to local value systems and priorities of different stakeholders.

One approach to develop criteria of success that recognizes the potential different value systems of different stakeholders is to draw on Q-sort methodology (Addams and Proop 2000). Q-sort methodology was developed by Stephenson (1935). This approach uses hundreds of extracted statements from stakeholders (such as was done for the World Bank case studies) to create a “subcourse” of statements. These statements are then drawn on to develop Q-sort statements that are used to prioritize views of different stakeholder groups. The quantitative analysis of the data is then achieved using multivariate-exploratory factor analysis process. This approach can illustrate underlying patterning between groups or individuals that have shared values. Q-methodology is becoming recognized as a valuable approach or tool in assessing environmental policy (Addams and Proop 2000) and may be applicable in assessing success of effective and sustainable CBNRM initiatives. An example of Q-methodology approach (regarding public participation in environmental decision making) is described in an article by Webler and others (2001).

## Conclusion

It is my hope the developed organizational principles and key characteristics presented here will be useful for analyzing the current state of CBNRM initiatives and for providing foci for future research. For example, further analysis to identify which of these key characteristics are most critical in achieving long-term effective and sustainable CBNRM in a variety of contexts would be valuable. It is also hoped that this framework will be useful to practitioners in their fieldwork.

This matrix could also serve as a resource for practitioner-focused academic institutions with interdisciplinary environmental studies and management programs that are

undertaking an evaluation of their curriculum. Specifically, if the academic program embraces the value of community-based environmental problem solving, the matrix will help define the types of skills and knowledge areas that should be embedded in the overall curriculum, including practicum and field studies.

It is necessary for the next generation of environmental leaders trained in our academic institutions to learn scientific rigor and to acquire a solid foundation in environmental ecology, but this is not sufficient. In addition, adaptive leadership skills are a necessity for those willing to serve in future leadership roles. These collaborative skills are defined by many of the key principles. They include communication and facilitation, conflict resolution, negotiation, managing and facilitating multiparty stakeholder processes, adaptive management, managing complexity, participatory decision making, and many other community leadership and management skills (Borrini-Feyerabend 2004; Heifetz 1994; Heifetz and Linsky 2002). For future practitioners to work effectively with CBNRM initiatives, they will need an academic training that teaches how to create shared visions that reflect diverse views and values, design construction processes, build trust, foster commitment of participants, and identify and bring together stakeholders at every level of environmental problem solving. Their academic programs must teach how to integrate and communicate information that includes technical, scientific, social, and economic, and local indigenous experiential knowledge. The development of these types of skills will require both classroom learning and application through field projects that focus on complex social-ecologic systems.

The results and summary of findings in this article indicate a potential need and value of a conference on state-of-the-art CBNRM. This future conference could provide an opportunity for international practitioners, academicians, and local community leaders to seek a better understanding of the principles and characteristics (both static and dynamic) of effective and sustainable CBNRM initiatives. There are also concerns that this community-based approach may be currently outpacing a critical analysis of its characteristics that are associated with levels of success. The initial CBNRM initiatives, which were documented at the World Bank workshop and in other publications, have close to a decade of additional history and experiences on which to draw. Some potential framing questions for this conference, if convened, might include the following:

- What organizational principles and characteristics are associated with effective and sustainable CBNRM initiatives, and why are these critical for success? Are certain characteristics mutually exclusive of other characteristics?

- Under what conditions are CBNRM approaches most effective compared with more centralized approaches?
- How can these characteristics be operationalized in different cultural, environmental, and economic situations?
- How do we define success for CBNRM initiatives?
- Why are some CBNRM initiatives more successful than others?
- How can interdisciplinary practitioners and scholars more effectively collaborate and support CBNRM initiatives?
- How has CBNRM been adopted, funded, and implemented by numerous governments and international agencies?
- What is the role of adaptive leadership in successful CBNRM initiatives?
- Does the current “environmental” curriculum of our universities provide the knowledge and skills to train the next generation of environmental practitioners to work effectively in CBNRM and other community-based environmental initiatives? What are these skills and knowledge areas?

CBNRM and related community-based environmental systems have taken on a central role in environmental management. Although they have demonstrated numerous successes, there are also concerns about their viability in certain settings or conditions. Because currently there is substantive support from international aid agencies and governments supporting this conservation approach, we must be diligent in our research to better understand the organizational principles and characteristics that are essential for achieving effective and sustainable CBNRM initiatives.

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## References

- Addams H, Proops J (2000) Social discourse and environmental policy: an application of Q methodology. Edward Elgar, Northampton, MA
- Allan C, Curtis A (2005) Nipped in the bud: why regional scale adaptive management is not blooming. *Environmental Management* 36:414–425
- Agrawal A, Gibson CC (1999) Enchantment and disenchantment: the role of the community in natural resource conservation. *World Development* 27:629–649
- Anderies JM, Janssen MA, Ostrom E (2004) A framework to analyze the robustness of social-ecological systems from an institutional perspective. *Ecology and Society* 9(1):18 (online). <http://www.ecologyandsociety.org/vol9/iss1/art18/>
- Armitage D (2005) Adaptive capacity and community-based natural resource management. *Environmental Management* 35:703–715
- Arnstein SR (1969) A ladder of citizen participation. *Journal of the American Institute of Planners* 35:216–224
- Barker A (2005) Capacity building for sustainability: towards community development in coastal Scotland. *Journal of Environmental Management* 75:11–19
- Berkes F, Colding J, Folke C (eds) (2003) *Navigating social-ecological systems: building resilience for complexity and change*. Cambridge University Press, Cambridge, UK
- Borrini-Feyerabend G, Pimbert M, Farvar MT, Kothari A, Renard Y (2004) *Sharing power. Learning-by-doing in co-management of natural resources throughout the world*. IIED AND IUCN.-CEESP/CMWG, Cenesta, Tehran
- Bradshaw B (2003) Questioning the credibility and capacity of community-based resource management. *The Canadian Geographer* 47:137–150
- Brosius JP, Tsing AL, Zerner C (1998) Presenting communities: histories and politics of community-based natural resource management. *Society and Natural Resources* 11(2):157–169
- Brown J, Mitchell N, Beresford M (eds) (2005) *The protected landscape approach: linking nature, culture, and community*. IUCN–The World Conservation Union, Gland, Switzerland, and Cambridge, UK
- Butler KF, Koontz TM (2005) Theory into practice: implementing ecosystem management objectives in the USDA Forest Service. *Environmental Management* 35:138–150
- Campbell LM, Vainio-Mattila A (2003) Participatory development and community-based conservation: opportunities missed for lessons learned? *Human Ecology* 31:417–437
- CBNRM Net (2006) *The Community-Based Natural Resource Management Network*. Available at <http://www.cbnrm.net>. Accessed: 13 August 2006
- Child B (2007) Lessons, experiences, and critical conditions for CBNRM. Can communities conservation bring international goals down to earth? Chairman’s report from a workshop on the Millennium Ecosystem Assessment. Nordic Council of Ministers, Copenhagen, Denmark, From 29 Oct 2007 to 2 Nov 2007
- Child B, Lyman M (eds) (2005) *Natural resources as community assets*. Sand County Foundation and The Aspen Institute, Madison, WI
- Dietz T, Ostrom E, Stern PC (2003) The struggle to govern the commons. *Science* 302:5652
- Eade D (1997) *Capacity-building: an approach to people-centered development*. Oxfam, UK
- Fisher S, Abdi DI, Ludin J, Smith R, Williams S, Williams S (2000) *Working with conflict: skills and strategies for action*. Zed Books, London, UK
- Gruber JS, Clark D (2000) Building sustainable communities through new partnerships of central and local governments: lessons learned from Eastern Europe and New England: 2000 international conference on sustainable development, environmental conditions, and public management. Published 2002 in *sustainable development, environmental conditions, and public management*, National Academy of Public Administration (US) and National Institute for Research Advancement (Japan), Tokyo, Japan, pp 264–286
- Grumbine RE (1994) What is ecosystem management? *Conservation Biology* 8:27–38
- Hackel JD (1999) Community conservation and the future of Africa’s wildlife. *Conservation Biology* 13:726–734
- Heifetz RA (1994) *Leadership without easy answers*. The Belknap Press of Harvard University Press, Cambridge, MA

- Heifetz RA, Linsky M (2002) *Leadership on the line: staying alive through the dangers of leading*. Harvard Business School Press, Boston, MA
- Homer-Dixon TF (1999) *Environment, scarcity, and violence*. Princeton University Press, Princeton, NJ
- Kofman F, Senge P, Kanter RM, Handy C, Chawla S, Renesch J (eds) (1995) *Learning organizations: developing cultures for tomorrow's workplace*. Productivity Press, Portland, OR
- Leach M, Mearns R, Scoones I (1999) Environmental entitlements: dynamics and institutions in community-based natural resource management. *World Development* 27:225–247
- Meinzen-Dick R, Knox A (1999) Collective action, property rights, and devolution of natural resource management: a conceptual framework. Workshop: 2020 Vision Initiative. International Food Policy and Research Institute
- Newsom M, Chalk L (2004) Environmental capital: an information core to public participation in strategic and operational decisions—the example of River “Best Practice” Project. *Journal of Environmental Planning and Management* 47:899–920
- Olsson P, Folke C, Berkes F (2004) Adaptive comanagement for building resilience in social-ecological systems. *Environmental Management* 34:75–90
- Ostrom E (1990) *Governing the commons*. Cambridge University Press, New York, NY
- Poteete AR, Welch D (2004) Institutional development in the face of complexity: developing rules for managing forest resources. *Human Ecology* 32:279–311
- Putnam RD, Feldstein LM, Cohen D (2003) *Better together: restoring the American community*. Simon and Schuster, New York, NY
- Senge PM, Kleiner A, Roberts C, Ross RB, Smith BJ (1994) *The fifth discipline fieldbook: strategies and tools for building a learning organization*. Doubleday, New York, NY
- Scheberle D (2000) Moving toward community-based environmental management. *American Behavioral Scientist* 44:564–578
- Soefftestad LT (ed) (2006) *The Community-Based Natural Resource Management Network, newsletter. Issues 1–25* (online). Available at <http://www.cbnrm.net/index.html>. Accessed 22 Nov 2008
- Spiteri A, Nepal SK (2006) Incentive-based conservation programs in developing countries: a review of some key issues and suggestions for improvements. *Environmental Management* 37:1–14
- Stephenson W (1935) Correlating persons instead of tests. *Character and Personality* 4:17–24
- Thompson PM, Sultana P, Islam N (2003) Lessons from community based management of floodplain fisheries in Bangladesh. *Journal of Environmental Management* 69:307–321
- Walker B, Carpenter S, Anderies J, Abel N, Cumming GS, Janssen M, Lebel L, Norberg J, Peterson GD, Pritchard R (2002) Resilience management in social-ecological systems: a working hypothesis for a participatory approach. *Conservation Ecology* 6(1):14 (online). Available at <http://www.consecol.org/vol6/iss1/art14/>
- Webler T, Tuler S, Krueger R (2001) What is a good public participation process? Five perspectives from the public. *Environmental Management* 27:435–450
- World Bank (1998) *Conference Proceedings, International Workshop on Community-Based Natural Resource Management*. World Bank, Washington, DC, 5–14 May 1998
- World Bank (1996) *The World Bank participation sourcebook*. World Bank, Washington, DC
- Zanetell BA, Knuth BA (2004) Participation rhetoric or community-based management reality? Influences on willingness to participate in a Venezuelan freshwater fishery. *World Development* 32:793–807
- Zyl JV, Barbosa T, Parker AN, Sonn L (1995) Decentralized rural development and enhance community participation: a case study for northern Brazil. *The World Bank Working Paper* 1498