

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 multi-stakeholder 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.” This matrix was then given an initial vetting (or “field test”) by applying numerous case studies that were previously submitted to the World Bank International Workshop on Community-Based Natural Resource Management. 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, to further focus research to understand core characteristics of effective and sustainable CBNRM, to provide practitioners a framework for developing new CBNRM initiatives for managing the commons, and to provide a potential resource for academic institutions during their evaluation of their practitioner focused environmental management and leadership curriculum.

KEY WORDS: *Community-based natural resource management, Community-based environmental initiatives, The Commons, Social–ecological systems, Interdisciplinary Process, Environmental Curriculum*

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 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 1999). These centrally planned natural resource management systems frequently had faulty designs, inefficiencies, and sometimes corruption (Agrawal 1999). Indigenous communities were sometimes viewed as the

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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 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 non-experts and members of other constituency groups, has been instrumental to developing effective CBNRM initiatives (Child and Lyman 2005 and Borrini-Feyerabend and others 2004).

Due to early successes and a more democratic approach to change, community-based resource management 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. There are currently an estimated 500,000 new local environmental management organizations that have been established (Armitage 2005). While 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 which 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, philosophies of use and information (Child and Lyman 2005). Participants at the 2003 Savannah Workshop “Turning Natural Resources into Assets” that 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?” that 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 community based natural resource management (CBNRM) often is failing the concept. Specifically, he cites three necessary conditions that are not always met that include the recognition of social values, market values, and non-market values. Non-market value (also referred to as externalities) include the

ability of local people to capture the payments for environmental services received by others.

All of these concerns fall into the domains of economics, ecology, social capacity, and governance/management. This article, through conducting an analysis and synthesis of 47 papers, 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 paper does not attempt to quantify which characteristics are the most critical for achieving success, nor how each of the authors defines success, but which characteristics are the most frequently associated with successful CBNRM initiatives.

A Working Definition of CBNRM

Community-based natural resource management 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, and Soeftestad 2006). CBNRM has evolved over the last two decades in response to the limitations of previous top-down resource management approaches that were based primarily on a pure technical approach to natural resource management (CBNRM NET 2006, Armitage 2005). This community-based approach draws upon the principles of building social capital that 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 as 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 paper, I will apply the above definition of CBNRM.

Approach and Methodology

A draft of characteristics of effective Community-Based Natural Resource Management (CBNRM) was developed by collecting a multiplicity of perspectives from the publications of 23 research teams and then by 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 terms “community-based” in combination

with 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 ecological systems approaches. These included: Community-Based Management (CBM), Community-Based Conservation (CBC), Community-Based Environmental Protection (CBEP), Community-Based Environmental Planning Organizations (CBEPO), Integrated Conservation and Development Programs (ICDP), Incentive-Based Conservation (ICB), and Ecosystem Management (EM). The papers themselves were based upon numerous case studies around the world that included countries with developing and developed economies. The authors of these papers are listed in Table 2. Note that some of the research papers that were analyzed only focused on 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) suggest 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 one of 12 broad Organizational Principles that 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: "Adaptive Leadership and Co-Management" is based on Olsson and Allan research (Olsson and others 2004, Allan and Curtis 2005) and the principle "Participatory Decision Making" arose from the work of Newsom and Chalk (2004), Scheberle (2000), 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 coded 222 coded characteristics statements to one of the 12 Principles. These were consolidated into five 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 Community-Based Natural Resource Management (1998). Over 400 case studies were submitted to this International Workshop. There are currently 240 of these case studies, representing 75 countries, published to the Sustainable Rural Development Information System (SRDIS) web site (<http://srdiis.ciesin.org>). Each of these cases was submitted in a World Bank prescribed format that included "change process" and "lessons learned" sections. I selected a random sample of 45 case studies (19%) of this set with a limit of no more than two cases from any one country. Each of the cases of this sub-set was rated as 1, 2 or 3 based upon the specificity of information provided under "lessons learned" and/or

“change process” sections. (“1” represented the lowest level with “3” representing the highest level of specifics.) There were 24 case studies which rated the highest category, “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, that the authors stated were associated with an effective and/or successful CBNRM initiative, were extracted and coded utilizing 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 where 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. See Table 1 for a full description of 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 multi-media 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 are availability of financial and other resources that are 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:

- 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 Co-Management,

- J) Participatory Decision Making,
- K) Enabling Environment: Optimal Pre 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 while other by practitioners. The Principles should not be considered “predictors” of successful CBNRM initiatives but rather as organizational design principles and pre-conditions 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, Organizational Principles and Key Characteristics of Effective Community-Based Environmental Initiatives, 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 discourse from the 24 practitioner World Bank case studies (see Table 3). Table 4 provides a comparison of the researchers and practitioners matrices including the frequency of citation of each of the Organizational Principles.

Discussion

I identified 12 broad Organizational Principles and associated Key Characteristics of effective and successful community-based natural resource management (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” (Childs and Lyman, 2005) and at the same time are sustainably supporting the local human population economically, socially, and culturally. This implies that the local ecological 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 paper. One potential approach to help address this question is discussed later in this paper. 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 upon studies and published reports by researchers (23 published studies) and practitioners (24 case studies). Findings from both sources (Tables 2 and 3) are very similar but with 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 Pre or Early Conditions” and “Conflict Resolution and Cooperation”, Principles C, H, K, and L respectively. The researchers focused more on

“Communication and Information Dissemination”, “Devolution and Empowerment”, and “Adaptive Leadership and Co-Management”, 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 in both the 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 towards 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 a 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 that were based upon 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/case studies and 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 since 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 upon the Q-sort methodology (Addams and Proop, 2000). The Q-sort methodology was developed by Stephenson (1935). This approach utilizes hundreds of extracted statements from stakeholders (such as was done for the World Bank case studies) to create a “sub-concourse” of statements. These statements are then drawn upon to develop Q-sort statements that are used to prioritize views of different stakeholder groups. The quantitative analysis of the data is then achieved utilizing multivariate – exploratory factor analysis process. This approach can illustrate underlying patterning between groups or individuals that have shared values. This Q-methodology approach 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 this Q-methodology approach (regarding public participation in environmental decision making) is described in a paper by Webler (Webler and others 2001).

Conclusions

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 field work.

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, this matrix will help define the types of skills and knowledge areas that should be embedded in the overall curriculum including practicums and field studies.

It is necessary for the next generation of environmental leaders trained in our academic institutions to learn scientific rigor and 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 a future leadership role. These collaborative skills are defined by many of the Key Principles. They include communication and facilitation, conflict resolution, negotiation, managing and facilitating multi-party 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 constructive processes, build trust, foster commitment of participants, and identify and bring together stakeholders at every state of environmental problem solving. Their academic programs need to 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-ecological systems.

The results and summary of findings in this paper indicate a potential need and value of a conference on the state-of-the art of 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 to draw upon. Some potential framing questions for this conference, if convened, might include:

- What are the organizational principles and characteristics that 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 as compared to 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 that can work effectively in CBNRM and other community-based environmental initiatives? What are these skills and knowledge areas?

Community-based natural resource management 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. Since 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

Acknowledgements

I would like to acknowledge S. Margles, and M. Cadot, Antioch New England Institute of Antioch University New England, T. Webler and B. Kaplin, Antioch University New England, T. Legovic, Boskovic Institute, Croatia and P. Stoddard for their helpful comments and editorial assistance. Support for this work was provided by Antioch New England Institute and the N. Howes Fund.

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Table 1. Organizational Principles and Key Characteristics of Effective Community-Based Environmental Initiatives

(Note: Sources are noted in text and in literature cited)

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 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 upon) the local economy.
- Recognize need for linkages between conservation and local economy based upon equity, local needs, 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 level 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 non-experts 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 upon 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.
- On-going research is necessary to improve upon 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/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/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.
- 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 Co-Management

- A robust social-ecological organization is designed and supported to be a learning organization that supports adaptive capacity.
- A learning organization and an optimum management system are resilient to perturbation, with an ability to cope with external shocks and rapid change.
- Adaptive Co-Management and Adaptive Leadership are dynamic and focused on processes rather than static structures.
- Adaptive Co-Management 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 Co-Management approach engages, trains, and mobilizes community member 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 non-expert constituency/community groups at the table.
- Participatory problem solving should provide opportunities for the sharing of knowledge and collaborative learning about social-ecological systems.

Principle K: Enabling Environment: Optimal Pre 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/stakeholders are willing to participate due to 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-ecological systems.
- Plan for and develop capacity and strategies for conflict management and resolution at the time of initiation of a community-based social-ecological 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.

Table 2. Matrix of Research Teams References of Organizational Principles Attributed to Effective Community-Based Environmental Initiatives

Research Team and Date of Publication*	Public Participation and Mobilization Principle A	Social Capital & Collaborative Partnerships Principle B	Resources and Equity Principle C	Communication and Information Dissemination Principle D	Research & Information Development Principle E	Devolution and Empowerment Principle F	Public Trust & Legitimacy Principle G	Monitoring, Feedback, and Accountability Principle H	Adaptive Leadership & Co-Management Principle I	Participatory Decision Making Principle J	Optimal Environment Pre 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, Janssen, and Ostrom 2004			X	X		X		X	X		X	
Armitage 2005				X	X	X		X	X			
Arnstein 1969						X						
Barker 2005	X	X	X		X	X	X		X			
Berkes, Colding, and Folke 2003					X	X			X			
Butler and Koontz 2005		X			X				X			
Campbell and Vainio-Mattila 2003	X	X		X	X	X		X				
Dietz, Ostrom, and Stern 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		
Hacket 1999	X	X	X	X		X		X	X			
Leach, Mearns, and Scoones 1999		X	X			X			X	X		
Meinzen -Dick and Knox 1999		X	X		X	X		X	X		X	X
Newsom and Chalk 2004	X	X		X	X			X	X	X		
Olsson, Folke, and Berkes 2004	X	X	X	X	X	X	X	X	X	X		
Poteete and Welch 2004									X			
Scheberle 2000	X	X				X	X		X	X	X	X
Spiteri and Nepal 2006	X	X	X		X					X		X
Thompson, Sultana, and Islam 2003		X							X	X	X	X
Walker, Carpenter, Anderies, Abel, Cumming, Janssen, Lebel, Norberg, Peterson, and Pritchard 2002							X		X	X		
Zanetell and Knuth 2004											X	

*Refer to Literature Cited 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*	Public Participation and Mobilization Principle A	Social Capital & Collaborative Partnerships Principle B	Resources and Equity Principle C	Communication and Information Dissemination Principle D	Research & Information Development Principle E	Devolution and Empowerment Principle F	Public Trust & Legitimacy Principle G	Monitoring, Feedback, and Accountability Principle H	Adaptive Leadership & Co-Management Principle I	Participatory Decision Making Principle J	Optimal Environment Pre or Early Conditions Principle K	Conflict Resolution and Cooperation Principle L
Cameroon	Ewusi, B.		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			
Columbia	Allred, T.		X	X					X		X		
Eastern Africa	Opole, M.								X		X	X	
Ghana	Olesu, I.	X		X		X	X						X
Guinea-Bissau	Tous, P.								X		X		
Guyana	Tambiah, C.											X	
Hawaii	Josayma, C.	X	X			X		X	X	X		X	X
Honduras	Seidl, A.		X	X	X								
Indonesia	Engkoeswara		X	X		X	X			X			
Jamaica	Tambiah, C.			X									
Kenya	Githitho, A.			X			X			X	X		
Mali	Yanggen, D.		X	X					X				
Mexico	Jimenez, V.	X	X	X		X						X	
Micronesia	Raynot, B.		X			X	X	X	X	X	X	X	X
Mozambique	Brito, L.	X	X	X			X		X	X	X		
Nepal	Dhakal, N.		X	X									
Nicaragua	Vernooy, R.		X	X		X	X	X	X		X	X	
Philippines	Vogt, H.	X					X		X			X	
Senegal	Diouf, A.	X	X	X	X	X			X	X	X		X
Thailand	Chong, K.										X		X
Trinidad	Tambiah, C.												X
Zimbabwe	Odero, K.	X		X	X		X		X	X	X	X	X

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

Table 4. Comparison of Research and Practitioner Papers

