Strengthening natural resource institutions in Africa - applying social learning to reconciling poverty reduction and environmental management

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SUMMARY

In the past two decades social and political changes in Africa have unmasked the underlying complexity and pluralism of natural resource management landscapes and exposed the untenable nature of linear, centralized technocratic approaches. Institutional pluralism as both reality and approach has arisen to address complexity in natural resource management by attempting to negotiate and accommodate contradictory interests and knowledge. Management increases in complexity as the geographic scale and the scope of problem situations expand and competing and conflicting stakeholder interests intensify in response to threats of appropriation, scarcity or deterioration. New institutional arrangements face a critical challenge in balancing poverty reduction, environmental sustainability and equity decision criteria in the face of uncertain and changing relationships within complex adaptive social and ecological systems. An initiative to assess lessons learned from more than 20 years of development in rural Africa reveals that social learning is vital in pluralistic settings, enabling joint institutional capacity to adapt and innovate. Drawing from the cases and from literature on social learning a practical typology is proposed for tailoring the choice and design of social learning methods to situations that are framed by varying levels of complexity and different governance regimes. The paper describes characteristics and applications of social learning in institutional strengthening, and examines implications for reconciling poverty reduction and environmental management in Africa.

Keywords: social learning, pluralism, complex systems, adaptive management, Africa, natural resource institutions

1. INTRODUCTION

In the past two decades initiatives to improve the conservation and sustainable use of natural resources in Africa have illuminated the problem of weak institutions and inadequate institutional arrangements. Weak communities, governments and markets are characteristic particularly of the low income, tropical countries that comprise much of sub-Saharan Africa (Barrett *et al.*, 2001). In many cases centralized, government controlled and technically oriented institutional approaches have tended to mask the underlying plurality of interests, needs and values in natural resource management. Efforts to strengthen the capacity and performance of institutions and institutional arrangements to govern and manage the land, mineral, forest, wildlife and water resources that are central to the livelihoods of a large majority of the population reveal the need for pluralism in institutional design. Since neither governments, nor communities nor markets alone are in themselves suitable foundations for ensuring the stewardship and optimal, equitable use of natural resources, effective natural resource governance systems must accommodate a range of actors, interests and functions. Linking the required roles and responsibilities to proven and potential capacities, and coordinating activities across numerous organizations becomes an imposing "design" or learning challenge, one that is commonly met by little empirical evidence relating effects of institutions to management outcomes. The necessity and complexity of pluralistic institutional development, coordination and evaluation increases as the geographic scale and scope of management situations expand and as competing stakeholder interests intensify in response to threats of scarcity, degradation or appropriation of natural resources.

In this paper we explore the potential of social learning to help meet the central institutional development and performance requirements of innovation and adaptation in pluralistic settings. We begin by examining some fundamental characteristics of the social and ecological systems that require improved institutional capacity for management. We then examine concepts of social learning that have emerged during the past decade to offer another means of improving natural resource management; a "third way of getting things done" in addition to technical innovation and market mechanisms (Leeuwis and Pyburn, 2002). By elaborating applications of social learning across a spectrum of natural resource management situations, from less to more complex, we reveal characteristics of various techniques and their potential contribution to institutional strengthening. We follow by examining lessons learned from an initiative to assess more than 20 years of natural resource based development in rural Africa that was recently spearheaded by USAID and a group of partner organizations. We draw from case studies that formed the base of this assessment to reveal empirical evidence of the roles and effectiveness of social learning in the achievements and outcomes of the cases. These combine to suggest a practical typology for tailoring the choice and design of social learning methods to situations that are framed by varying levels of complexity and different institutional governance regimes. Finally we examine implications for reconciling poverty reduction and environmental management in Africa.

2. THEORETICAL FOUNDATIONS
(a) Complex systems

Economies and ecosystems are both examples of complex adaptive systems (CAS). As CAS they share several characteristics – many levels of organization, constant rearranging and revising of building blocks, no optimum or steady state and rich webs of interactions among multiple agents. Control of CAS' tends to be dispersed – while influence is possible, central control is not. Patterns emerge from the competitive and co-operative interactions of agents. Adaptation is the processing of feedback and is directly related to learning (Anderson, 2001). In dynamic and pluralistic settings (i.e. the real world) learning is necessary.

Almost by definition natural resource management situations integrate social systems and ecosystems rendering the situation even more complex and the need for adaptation all the greater. Grasslands, forests, savannahs, agricultural lands, rivers and lakes in Africa are ecosystems that serve diverse needs of numerous communities while influencing the biological diversity of the region. Natural resource systems of importance to society vary in scale, ranging from small agricultural systems that are critical for household livelihoods to expansive lakes and contiguous forests that are habitats for endemic species and meet multiple users' interests. The coupling of natural resource systems with human systems underscores the importance of institutional arrangements that recognize their dynamic and complex characteristics.

Ecosystems are assumed to respond to gradual change in a predictable manner. In reality, disturbance to a natural system can have dramatic impacts. Regime shifts for many ecosystems can be difficult, expensive, or sometimes impossible to reverse (Folke, et al., 2002). Ecological regime shifts are often understood retrospectively, but are difficult to forecast. Existing efforts to measure or predict thresholds typically have low precision, and seldom capture how ecological thresholds change over time (*ibid*). Large scale ecosystems accentuate the challenge of designing assessment programs that learn as fast as the thresholds change (*ibid*.).

Human systems are multifaceted and further augment the unpredictability and complexity of coupled systems. Human activities (e.g. collaborative management of forests or collective learning) can be conceived of as soft-systems (Checkland 1981; Checkland and Scholes, 1990). Soft systems are deliberate social constructs that exist to the extent that people agree on goals, boundaries, membership and the usefulness of the system construct. The crucial assumption is that system goals are not given, but contested and that system boundaries are negotiated. A soft system, or human activity system, is comprised of linked activities which together exhibit emergent properties of purposefulness (*ibid., 1999*). In sum, while human activity commonly involves situations in which individual agents attempt to act purposefully in ways that are personally meaningful, occasionally, though coordination, activity forms a system that involves pursuing a negotiated objective or goal (*ibid.*).

Tenure institutions capture part of the complexity associated with human activity systems. In rural areas of sub-Saharan Africa, traditional access to agricultural land depended on a household's membership and status in the group that controlled land (Reenburg and Lund, 1998). Kinship, ethnicity, status, gender and seniority determined land use and access rights. Changes in

state policy and social transformations often overlaid a different property regime upon the same resource, resulting in a dual legal structure and creating competition over rules and institutions (*ibid.*). In addition to overlapping property regimes, each tenure institution can include nested rights of use and access to land and/or specific resources (Rocheleau and Edmunds, 1997). Such property institutions often internalize social relations and natural resource availability. Accordingly, imposed changes in tenure can have unintended consequences. Moreover, as the geographic scale of the resource and diversity of social relations increases, multiple complex property institutions come into play.

Natural resource management initiatives must internalize the interconnections between human and ecological systems. Unpredictability, dynamics and imperfect information on complex coupled systems accentuates the need to learn about evolving relationships between communities and resources, and engender natural resource management institutions that are adaptive. Consideration of actual and potential impact of human activities on the environment and social relations should guide resource management decisions. Most importantly, understanding a complex coupled system requires an iterative process of appreciating the diverse relationships between humans and natural resources and the myriad of approaches to sustaining and/or modifying these relationships. Management of complex coupled systems must build on a foundation of pluralism and cyclical (adaptive) processes.

(b) The plural reality

Pluralism denotes any metaphysical theory that frames reality as a multiplicity of distinct and fundamental entities (Wollenberg *et al.*, 2001). Pluralism is also a description of reality and a practical approach for moving forward in such contexts. It captures the diversity and often conflicting and contradictory perspectives and positions regarding natural resource management (FAO, 1999). Pluralism embraces and attempts to accommodate the differences between and within groups and individuals (Daniels and Walker, 1999). Pluralistic approaches capitalize on the variety of groups within a community or society that have different, autonomous, and sometimes conflicting interests and experiences (Anderson, 2001). A pluralistic perspective overcomes the constraint of realist positivism, which emphasizes that reality exists independent of the human observer and can be objectively known by using scientific methods (Röling and Maarleveld, 1999). Pluralism reinforces the need to internalize various dimensions of complex coupled systems – social, natural, economic, political, knowledge and legal.

Pluralistic orientations build institutional arrangements that foster dialogue and learning amongst stakeholders. Adoption of a pluralistic perspective in managing complex coupled systems (at all scales) exposes conflicts between orientations (Ramirez, 2001). The accommodation of natural resource users' diverse (and often disparate) interests could enable synergistic collaboration especially if the management of the systems is continuously evolving with new information and technology.

Accommodation of multiple positions, values and interests while recognizing natural constraints involves three key stages: (i) identifying the various interests, (ii) communicating the various interests; (iii) coordinating the interests, actions and knowledge including negotiating and managing conflicts and recognizing and doing something about losers (Wollenberg *et al.*, 2001).

Successful coordination requires social capital, information exchange and learning, agreement between the actors regarding their roles, entitlements and responsibilities, and acceptance of the technical principles of resources management (*ibid*.). Of these elements for successful coordination, learning amongst stakeholders regarding others' approaches to natural resource management and diverse interests is pivotal.

(c) Communicative rationality and collaboration

The traditional economic paradigm fails to explain incentives for participating in collective learning or pluralistic approaches to managing complex coupled systems. Neoclassical economics assumes that individuals are selfish, rational, calculating beings who anticipate others' moves in order to pursue their own objectives in conditions of scarcity (Röling and Maarleveld, 1999). However, people are not objects and they react (sometimes unpredictably) and shape the context in which they exist. They impact the system by forming larger social units which have emergent properties unpredicted by a view of them as individual agents. The occurrence of collective action is substantiated by empirically grounded research (see Wollenberg *et al*., 2001).

Social psychologists explain the expression of collective action through differences in value orientation – altruism, co-operation, individualism and competition. Empirical evidence confirms this theory, suggesting that humans are neither altruistic nor selfish but have the capability to be both, in varying degrees (Röling and Maarleveld, 1999). Political scientists have also identified conditions under which cooperation and collective decision-making occur that are distinct from neoclassical economic incentives (Ostrom, 1999).

Habermas (as cited in Röling and Maarleveld, 1999) provides a theoretical underpinning for social learning. He distinguishes between instrumental, strategic, and communicative rationality as three ways of explaining human behavior. Of these, communicative rationality recognizes that people can solve problems through negotiation, deliberation, cooperation, and agreement about a shared definition of the situation, leading to consensus. Communicative rationality helps explain the reproduction of society and provides a strong foundation for understanding collective action and individuals as socialized beings rather than solely economic persons who pursue their own advantage[1]. Communicative rationality hinges on providing forums for sincere and reflective deliberation and discourse[2] (Röling and Maarleveld, 1999). This theoretical perspective provides a place for social learning and, more broadly, collective action as an alternative to technology and competition, conditioned on the creation of institutions that support human capacity to cooperate and collaborate in resolving ecological problems.

(d) Social learning

Social learning involves the interaction of social units (organizations, households, communities), in the transformation of group behavior (Dunn, 1984). Social learning underlies people centered development theory, which emphasizes the need to use the creative abilities of all participants to foster innovation and adaptive action (Korten and Klauss, 1984). Social learning builds on pluralism - the recognition of others' positions, perspectives, and knowledge.

In applying the concept to the environmental realm Lee (1993) defines social learning as a combination of adaptive management and political change. Adaptive management is an approach to natural resource policy that involves treating economic use of nature as experiments so that we may learn efficiently from experience and identify improved practices. Adaptive management is a mode of learning that searches for a durable relationship between humans and the natural world (Lee, 2001). Therefore, while experimentation using adaptive management is one part of social learning, the other part is politics, that is, keeping within bounds the conflicts that are inevitable over natural resources while learning from them (Lee, 1993).

In arguing the need for balance between the biophysical and human dimensions of environmental management, Woodhill and Roling (1998) make a case for using a social learning approach to address the complexity of environmental crises. They define social learning as an approach and a philosophy which focuses on participatory processes of social change. Groups, communities or organizations collectively learn on the basis of shared perceptions of problems, their causes and solutions, and agreement on goals to take concerted action (Jiggins and Roling, 2000).

Social learning captures the dialogue and discourse between stakeholders that is fundamental for adaptive management of complex coupled systems. Maarleveld and Dangbégnon (1999) characterize social learning in natural resource management as continuous dialogue and deliberation among scientists, planners, managers and users to explore problems and their solutions. Schusler *et al*., (2003) extend the interpretation of social learning to "[occur] when people engage one another, sharing diverse perspectives and experiences to develop a common framework of understanding and basis for joint action".

Social learning enhances the quality and foundations of decisions taken when actors are faced with complexity, uncertainty, conflict and paradox (Röling and Wagemakers, 1998). Social learning is an ongoing process. It acknowledges that interest groups bring different knowledge to natural resource management, including knowledge in the form of values, capacities, perspectives, methods, and stores of historical experience (Buck *et al*., 2001a). Social learning builds on the premise that removal of barriers to communication will enable constructive interaction amongst interest groups. Moreover, social learning engenders joint problem solving by fostering perceptions of interdependence, trust, and mutual appreciation (Buck *et al.*, 2001a).

In social learning, the participants are critical and not solely 'tools' or 'instruments'. Herein lies a paradigm shift towards recognizing the importance of information resulting from new relationships and equally valuing information, negotiation-based problem solving (rather than instrumental reasoning) and appreciating peers as experts and sources of relevant knowledge (Jiggins and Röling, 1997 as cited in Ramirez, 1998). "Learning sees knowledge as a quality of perception or a way of making sense of phenomena. It emphasizes processes of forming and re-forming ideas and creating knowledge through the transformation of experiences" (Kolb, 1984 as cited in Steele *et al*., 1999).

(e) The practical challenge

Power differentials among stakeholders in many African countries makes pluralism challenging from an equity point of view. High economic stakes and weak legal institutions further aggravate

this situation (Wollenberg *et al.*, 2001). Institutionalizing a pluralistic approach requires reducing power disparities and facilitating dialogue regarding complex coupled systems. To this effect enabling governance[3] arrangements that enhance the legitimacy of marginalized groups is critical (Brechin, *et al.*, 2002). Fiorino (2001) emphasizes that patterns of governance and the quality of dialogue in a regime determine the capacity for innovation far more than the specific policy instruments used. In addition, arrangements that institutionalize reflection and self-correction are important (Brechin *et al.*, 2002).

A systems approach enables understanding complex interconnections between society and nature. However, the unpredictability of complex coupled human and natural systems necessitates management approaches that build on diverse bodies of knowledge and are continuously updated with new findings and information. Such approaches hinge on facilitating a common understanding and overlapping perspective on principal issues via social learning. Enabling social learning requires collective initiatives that accommodate different viewpoints, strengthen coordination and further collaboration. Institutionalizing an adaptive process for accommodating diverse positions and developing a unified approach to addressing natural resource issues is the main challenge.

FACILITATING SOCIAL LEARNING

(a) Weak institutions

In Africa, as elsewhere, a growing number of studies show that different groups (such as the forest service and local communities) have radically different, and sometimes conflicting perceptions, values, objectives and knowledge systems in natural resource management (FAO, 1999). There is also mounting evidence that exclusive management by a single entity (such as a private concern, the forest service or local communities) has not assured sustainable management. Furthermore differences between groups seem to defy conventional attempts at consensus building and agreement. Sulieman (1996), in looking at the situation in Sudan, refers to this as the resource "battlefield". Political changes over the past decade have made these situations more obvious and the need to deal with them more pressing. Almost everywhere one looks in Africa, forest departments, only a decade before almost fully "in charge", are now wondering how they can "manage" the numerous new and conflicting voices that are raised demanding a role in natural resource decision-making and management.

Natural resource management often requires levels of collective action. An increasingly complex organizational environment with agents often acting independently is evolving and requires developing ways to accommodate it in order that different groups collaborate and build dynamic institutional frameworks. Platforms, mediators and facilitators are often needed to provide the conditions needed for negotiation and cooperation. Conflicts are inevitable but can have a positive impact if managed correctly. A number of tools have been developed or applied to these situations in order to maximize the benefits of diversity, creative confrontation and checks and balances while keeping the situation within certain bounds. These tools share several characteristics such as an emphasis on communication and dialogue, a historical as well as future focus and an orientation towards learning (FAO, 1999).

Box 1. Techniques for facilitating social learning include participatory mapping, conflict management, stakeholder analysis, rapid appraisal of agricultural knowledge systems (RAAKS), collaborative management, back-casting, soft systems methodologies, platforms for resource use negotiation, search conferences, future scenarios analysis, linked local learning, collaborative learning, adaptive management, participatory technology development, rapid rural appraisal and participatory rural appraisal.

Pluralism, or complex institutional arrangements, cannot totally compensate for weak institutions and organizations. However these arrangements, because they can encourage learning, and checks and balances, have mechanisms that can promote adaptation and improved management.

(b) Conceptual framework

There are various techniques for facilitating social learning. See Box 1. These approaches recognize the diverse groups who impact and are impacted by natural resource use. The techniques also build on stakeholders' knowledge, perspective and capacity in order to facilitate a collaborative approach to resolving problems associated with a complex coupled system.

In this section, we present a conceptual framework that provides guidelines for applying and designing social learning[4]. The different methods for catalyzing social learning overlap on various dimensions. Nevertheless, each has key characteristics and contributions to enhancing social learning. Accordingly, the suitability of a technique to strengthen institutions that are not effectively enabling adaptive collaboration will depend on the actors, the scale of the system and the scope of resource use. The scale and scope of a system determine the diversity of actors, power disparity and variety of governance regimes involved.

To operationalize problem solving in institutions that manage complex coupled systems, the context must dictate the selection of technique. Nevertheless, literature on collective and participatory natural resource management provides guidance regarding which approach to use for different scales and scopes of natural resource management. In Table 1 we attempt to summarize some of the general trends in application of various techniques that facilitate collective action and social learning.

The table indicates how the methods used vary with the scale and scope of natural resource management. It also illustrates how the scale and scope influence the diversity in governance regimes and the number of stakeholder groups. Table 1 does not identify how power disparity changes with the scale and objective of natural resource management. This is because power disparities can be high at both ends of the spectrum. For example, in small-scale contexts with a simple management scope, hierarchical social structures can create significant power disparities. However, it is possible to generalize that where the scope of resource management is complex and the scale is large, the power disparity between groups is likely to be high.

The various objectives of natural resource management selected for Table 1 capture the spectrum of challenges faced by practitioners and policy-makers. For example, the scope of sustainable agro-ecosystems reflects situations in which it is instrumental to identify techniques that complement local needs. The main actors in this activity often include a government agency,

local farmers, and a non-governmental agency. Development of sustainable agro-ecosystems needs to be undertaken in a coordinated manner throughout a cluster of households or perhaps at a village level in order to ensure environmental benefits from strategies such as integrated pest management.

Similarly, soil erosion control captures issues faced by most upstream-downstream or upland-lowland resource use situations. Accordingly, to control soil erosion, it is instrumental to coordinate amongst resource users who may seldom interact and provide incentives for these groups to work together. Community forest management, in contrast, presents a natural resource management objective that prioritizes local interests and needs in contexts where there are multiple interests for the same scarce resource base and communities do not own the resource. In these situations, government, private, non-governmental, donor agencies, and several communities are instrumental actors.

Watersheds can span an extensive geographic area. Within this space there often are multiple land uses and interest groups. Accordingly achieving integrative watershed management requires bringing together numerous actors and identifying areas of common interest and potential collaboration and engendering social learning amongst these groups. Wildlife management, or management of landscapes for migratory species, faces similar challenges to integrative watershed management though the scale may be even more extensive. An additional dimension associated with wildlife management is international interest in the natural resource from a tourism and conservation standpoint.

As the complexity related to scope and scale increase several of the techniques specified under simpler objectives and smaller scales remain relevant for facilitating social learning. Addressing management issues for complex large-scale systems often requires a stage-wise approach. Initially, a few components of the system are dealt with independently. These efforts then feed into a larger process to promote social learning that brings together various components of the system. The nested processes ensure that problems requiring immediate attention are addressed while still tackling the root causes with a long-term orientation.

To highlight what makes the approaches listed in Table 1 effective, Table 2 presents distinguishing characteristics that explain each technique's contribution to social learning[5]. Together the tables are intended to provide a framework for examining how social learning activities may best be tailored to different natural resource management situations to optimize the benefits for institutional strengthening.

(c) Facilitation

An essential ingredient in social learning is facilitation. Effective facilitation involves helping people to reconstruct their realities through observation, experimentation and meaningful experience. The facilitation process is said to be the key to the success of collective learning particularly when there is considerable potential for conflict among the stakeholders (Daniels and Walker, 2001; Finger and Verlaan (1995); Kruger, 2001). Facilitators catalyze joint learning by bringing stakeholders together in various configurations to plan, coordinate, demarcate, monitor, reflect, learn and to act together in other ways (Buck *et al.*, 2001a). In some ways process

facilitation may be viewed as a scientific equivalent to the rituals and traditions that socialize complex resource management processes in all human societies (Sayer and Campbell, 2001).

Those who aspire to a facilitation role gain power through their respect for all of the stakeholders who move a process of collaborative management forward (Borrini-Feyerabend *et al.*, 2000). Engel *et al.* (2001) emphasize how facilitation strategies must be defined according to the situation the stakeholders are in. Therefore facilitators must be skilled and sensitive to the stakeholders and their relationships. They should be circumspect in their dealings with all people so that, as much as possible, neutrality is maintained. However, it is difficult for a facilitator to be neutral as they often have a stake in the process (Hagmann, 1999). In addition, although facilitation catalyzes a process and helps in achieving immediate results, it does not necessarily guarantee long term positive outcomes. This requires persistence and the consistent application of financial and human resources to the effort.

We suggest that a good facilitator or facilitation team must be sensitive also to the choice of social learning technique(s) for particular natural resource management situations and skilled at adapting them to local cultural contexts. While external facilitators may be able to perform this and other roles effectively, it does not always work well. Thus it is important to develop the facilitation skills of organizations and individuals who are familiar with the local context (Nemarundwe, 2001).

4. AFRICAN CONTEXT

(a) Toward Institutional Pluralism

Most rural Africans face three major and related challenges: environmental degradation, increasing poverty and continued disenfranchisement. Natural capital is the major source of wealth and power in most African countries. Control and access over natural resources is the major governance and economic issue for rural Africans. Natural resource management in Africa, at least until the early 1990s, was dominated by centralized, technocratic approaches. These approaches seemed to assume linear and predictable patterns in ecosystems and the need for informed, central decision-making. Learning about natural resources was assumed to be technical and best accomplished in educational institutions. Science dictated natural resource management objectives. These approaches had mixed results at best. Centralized government agencies using command and control techniques based upon their monopoly on technical knowledge continually ran up against a litany of problems from lack of resources, to lack of skills, to 'recalcitrant' local groups.

The use of market principles to guide natural resource decisions has perhaps given somewhat better results for local people. Liberalized economies have allowed local groups to create enterprises, manage their affairs in a more business-like manner and enter the market place. However some of these gains have been inadequate and short-lived as fundamental issues of rights, ownership, access and control have not been resolved or continue to be unfavorable. Technologies or practices with a long lag time between investment and returns or with

predominately public benefit are unlikely to be adopted unless farmers have secure rights to resources (Meinzen-Dick *et al.*, 2002).

The fall of the Berlin Wall and the opening of society unveiled the underlying plurality of interests and values and approaches to natural resource management. Some 40 of 47 sub-Saharan countries have undertaken significant political reforms since the early 1990s (Bratton and van de Walle, 1997). In many cases there has been an explosion in the numbers of civil society organizations, private enterprises and outspoken grassroots groups. In addition, elected officials in some countries are becoming increasingly independent and political parties more numerous. Many African nations have made moves towards increased decentralization and greater roles for the private sector and civil society. However, the democratic transition has in many cases been incomplete or suffered reversals. The various intensities of political reform pose challenges for traditional natural resource management by throwing into question conventional organizational paradigms of technocrats and markets.

While many natural resource management decisions and choices are made by individuals, the need for collective action in NRM, especially at a landscape level, are clear (Meinzen-Dick, 2002). Many if not most of Africa's environmental "problems" will require some level of collective effort. As pointed out in the introduction, Africa's formal political institutions - including laws, organizations and offices are "notoriously weak" (Bratton and van de Walle, 1997). In addition, institutional arrangements and organization networks are also weak - making collective action difficult.

Since natural resource use and abuse is socially mediated, strengthening organizations and institutional arrangements is a key project for natural resource management in Africa. Much needs to be done at the level of an individual organization such as a community group, NGO, government department and local legislatures. However, resource management by a single organization or organizational type whether it be a village, a private company or a government department has proven problematic in Africa. Single organizations often lack the qualities of adaptation, resilience, flexibility need to respond to dynamic situations. Frameworks and arrangements that promote checks and balances have proven to be somewhat more responsive if transactions costs are significantly lower than benefits. For rapid and flexible progress to be made on environmental problems continuous learning between and among stakeholders is a key.

(b) Strengthening Weak Institutions

In 2002 USAID and a range of partners formed a community of practice to carry out a review and bring together the lessons learned from community based natural resource management programs in Africa (USAID, 2002). Perfect examples of success as well as failure are difficult to define and identify. The review, however, did reveal that certain programs were more successful than others in simultaneously improving environmental, economic and governance status. These programs appear to be moving beyond technocratic and market oriented methods to approaches that emphasize adaptive management and improved governance in addition to technical and economic interventions. Social learning is a key to the success of these new institutional approaches.

Due to the pluralistic and dynamic socio-economic and bio-physical settings in Africa the application of technical prescriptions and blueprints has proven inadequate for solving natural resource management programs. While programs relying solely on market-oriented approaches have demonstrated somewhat better results, they have had difficulties integrating governance concerns. They also have experienced constraints in adapting to new settings – especially with respect to changes in governance.

Three main case studies are presented below to illustrate the ways in which social learning processes strengthen natural resource management institutions at a range of levels and help integrate technical, economic and governance issues. Social learning is applicable at the level of a single community within one forest ecosystem to a group of forest-dependent communities, to national level programs, and finally to ecosystems that span multiple domestic political boundaries. The first case described below is an example of social learning at the forest level. This case, from Senegal, illustrates how social learning activities facilitate solutions to a violent conflict over forest resources. New institutions were formed with corresponding rules and organizations. Additional information is provided from Mali at the forest level where several villages have used strong local organizations to interact with outsiders to increased control and access over forests to prevent "open access" exploitation of the resource.

The second case is from Namibia. The case demonstrates how development programs provide means for local communities to delimit boundaries, build capacity and gain legal recognition, and obtain particular rights over wildlife resources. Social learning has been particularly important in processing feedback on the status of the resource base including better monitoring of the wildlife through collaborative learning. Learning has lead to better management and positive economic, technical and governance outcomes. At the national level a dynamic, broad based, multi-organization platform has been created. This platform has allowed for dialogue and knowledge management that has enhanced national planning and support to CBNRM. Supplemental information is provided on a similar case in Botswana.

Lastly a transboundary example, involving Mozambique, Zimbabwe and South Africa, is provided which shows institutional development and learning at an international level in response to large ecosystem concerns. Concrete outcomes include more participatory planning and an international treaty on cross border management. New institutions have been created and existing ones strengthened.

(i) Senegal: A forest-level case

For some, natural resource management is a form of conflict management.

> Traditions, customs, rules, laws and policies dealing with access to, and use and management of, natural resources all aim to bring order and predictability to situations where competition and conflicting interests – even in the smallest communities – are present. Such institutions and practices can be termed "proactive" responses seeking to manage the potential for tension and conflict." (Castro and Nielsen, 2003).

The Pata Forest in southeastern Senegal has been the site of a struggle between migrant farmers from the north and local people vying for access to and control over land and a protected forest. During the rainy season of August-September 1999 the conflict escalated and two people were killed and several others injured. It was an example of what Sulieman (1996) calls the "forest battlefield".

At the heart of the violence was competition for land and natural resources between the local, agro-pastoral people and migrant farmers from the north. Drought and agricultural land pressure in northern Senegal provided incentives for northerners to migrate to the less settled and better watered southern portion of the country. This included the Pata Forest. More than 15,000 people migrated to Pata area and created 40 settlements. One viewpoint considers the migration "an organized invasion" that was perhaps informally encouraged by the state and had political undertones. The government has a policy of encouraging peanut farming and this was interpreted as granting the migrants privileged access to land for peanut farming, a traditional export crop and income source.

Over the years, migrant farmers cleared large tracts of protected forest for farming. This had negative repercussions for the local agro-pastoral livelihood system – in many places grazing and farming are incompatible and increases in one livelihood strategy were at the expense of the other. Local government authorities were unable to use legal means to prevent the migrants from conve rting the forests to agricultural land partly because they had limited legal jurisdiction - the forest reserves are under the authority of the national level Forestry Department. Conflicts between herders and farmers over access to resources such as grazing and water became more frequent. Over time they became increasingly violent.

After the deaths and injuries brought the situation to a tragic head other actors became involved. As part of a conflict management and learning process, USAID helped spearheaded a participatory assessment of the conflict dynamics bringing together the main stakeholders. About 5,000 local people, development partners, and businesses active in the area participated in the discussions and diagnosis. The assessment laid out a range of possible agreements for addressing the conflict. In September 2000, the agreements and understandings worked on by the group were restituted to local government and influential leaders. Partners in the assessment then presented the study to the wider community for validation and confirmation and to provoke much-needed dialogue, search for solutions, and to define elements of a conflict and natural resource management approach.

The participatory assessment and conflict management resulted in social learning and led to the following institutional outcomes:
- A dialogue on the crisis to demonstrate to local residents that government officials, local elected leaders, and development actors would make efforts to prevent the situation from degenerating into chaos.
- A draft action plan that the monitoring committee would refine to define clear zones and to limit future settlements in the Pata forest. The plan would clarify the principal uses of the forest, establishing procedures for enforcing the zoning scheme and developing a collaborative forest management system among the forestry service, villages surrounding the forest and local governments[6] .

- A committee representing the main interest groups to monitor completion and implementation of an action plan.
- A commitment from participants to work with the government of Senegal and other partners to develop simple management plans that local forest users can master themselves (as opposed to the complex plans developed by the Forestry Department) and alternative crops and production techniques that are both profitable and protective of the environment.

The institutional arrangements and dialogue continue to have positive impacts. The process has strengthened capacities and organizations of local community members and authorities. Community members are participating in decisions through the local councils, which aim to reduce natural resource management conflicts. The surveillance committee also continues to function and the community has taken the initiative to hire its own forest guards to enforce decisions made by this committee[7]. With this institutional support, the communities are discouraging encroachment on the forest and uncontrolled cutting by people within the community or by new migrants. According to a recent evaluation conducted in April 2002 by *Démocratie et Gouvernance Locale* (DGL-Felo) and personal communication from USAID Senegal (2003), there have been no new conflicts since January 2001.

The DGL-Felo evaluation concludes that the Pata experience has increased the local populations' awareness. These communities, with their own resources, can reverse a tendency towards conflict that could have had disastrous consequences. The improved understanding among partners and better management of the resource base is a vibrant example of feedback between coupled systems. In addition, the process and institutional arrangements have attracted the attention of three other local communities each of which has expressed the desire to establish their own forest surveillance and management system such as the one in Pata Forest.

A similar process has occurred across numerous villages in the Upper Niger Valley of Mali. Efforts over the past 20 years by the parastatal development organization supported by USAID and with technical assistance from CLUSA to develop strong local organizations, predominately with economic objectives have led to better institutional arrangements and mutual learning amongst different actors. The organizations are now legally recognized, have access to credit and because of economies of scale defend the welfare of farmers better than individual farmers. These cooperatives have enhanced villagers' ability to negotiate and exchange information not only with private sector entities including input suppliers and output purchasers, but also the government.

In the Upper Niger Valley, there was persistent tension between local villages and the forest service. This stemmed from the forest service's policy of issuing of permits to urban-based wood-cutters for resources found on village lands without first consulting the villagers. Local communities had little control over forest resource exploitation on village lands. The government also had difficulty assessing the impact of cutting on village lands. The cooperatives were able to speak for the village and negotiate an end to government issuance of permits on their lands in exchange for the development of management plans and limited commercial forest exploitation by the villagers.

(ii) Namibia: Social learning at the national and sub-national level

Over the past 10 years Namibia has developed a community-based natural resource management (CBNRM) program that helps local communities delimit areas, build capacity and become legally recognized and obtain some rights over local wildlife resources. At the community level obtaining a game hunting quota is key not only to wildlife conservation but to revenue generation. Quotas for trophy hunting represent 12% of conservancy revenues and game meat distribution led to 1% of conservancy revenues, which totaled nearly 3.5 million Namibia dollars in 2000.

Wildlife censuses are key to establishing the possible sustainable off-take from populations and therefore the establishment of quotas. In the past, government services conducted annual aerial wildlife censuses in conservancies such as Salambala Conservancy.. Due to funding cuts and a loss of capacity, these surveys have not been repeated for many years. Therefore, quotas were being set based on outdated population figures that did not reflect the dramatic recovery in wildlife populations. Realizing this constraint NGOs, in partnership with communities and government officials, developed an alternative process for information generation involving different knowledge forms and actors. They initiated road counts in an attempt to find a more cost effective and technologically appropriate method that could revive annual game census in the area.

The new census process generated figures that differed significantly from 'conventional wisdom'. This necessitated a paradigm shift not only among government officials, but also many NGO workers. A new data set that had broad based ownership was developed in contrast to the previous government data. Although aerial census is considered superior to road counts, some deficiencies in aerial census methodologies were exposed.   This program is building partnerships, consensus and integrating different methodologies to arrive at better information for decision-making.

A similar problem existed the Nyae Nyae Conservany. Old pre-game introduction data was being used to set quotas. With game introduction information and communities and NGO's becoming involved in data collection the NGO became aware that the quotas were no longer appropriate. Current and reliable data was generated using community game guards and a simple "event book" system design. This information informed local management decisions. The communities with vested interests, used the updated wildlife population census data to question the government's process of renewing quotas based on outdated information. The government promptly and willingly improved the quota and was appreciative of the new data.

This case illustrates the impact of social learning, including:

- Costly and "high tech" surveys that are the exclusive domain of government should not be the sole source of data. Triangulation is critical and should involve collaboration amongst several stakeholders. The different mechanisms for information generation should function in a synergistic manner.

- Regular monitoring of the human and natural system is critical. Monitoring allows for processing of feedback between the bio-physical status of the resource and the management

system that is impacting it. Monitoring engenders learning and responses that are sensitive to the ecological and socioeconomic context. All too often monitoring systems have collapsed often because of lack or multiple buy-in, especially from users, and lack of relevance.

As a result of the monitoring, the Nyae Nyae and Salambala conservancies, for example, acquired significantly higher quotas from the government based upon monitoring data and anecdotal information provided by the conservancies. In both cases, the income rose sharply after the quotas were increased: In the Salambala Conservancy income rose from N$165,000 to N$340,000. In the Nyae Nyae Conservancy income rose fromN$320,000 to N$920,000. Monitoring, as an element of social learning in these cases, has lead to positive environmental outcomes, increased economic performance and improved governance (especially through participation in decision-making).

- Involving all stakeholders in monitoring can generate better data and importantly, create transparency and allow consensus to be reached with less conflict and more efficiency.

Conservancies collect data not only to impact higher-level government decision-making but also for local use. In fact, the data on wildlife populations collected by conservancies has been so valuable that local communities are now expanding their data collection activities to incorporate forestry and fishery resources into their monitoring systems. In Salambala, community game guards have identified key indicators for monitoring fisheries including the number of nets and the sizes of nets.

At the national level institutional arrangements and social learning have also led to concrete benefits in terms of both the economy and governance. Since the establishment of the CBNRM program in the early 1990s a range of national level organizations have become involved including several parts of government, a diversity of NGOs, private sector organizations, as well as various associations and donors. This institutional complexity and the lack of a coordinated and informed approach lead to the establishment of the Namibian Organization of CBNRM Support Organizations (NACSO) in 1999 for the purpose of ensuring CBNRM program coordination. It was also created to facilitate the continuation of the CBNRM program upon completion of donor support.

NASCO has become a collaborative and extremely productive partnership of 11 NGOs. The organizations activities have created a national platform presenting opportunities for collaborators to come together and influence the sector. NASCO coordinates Namibia's CBNRM programs. A small secretariat plans activities of organizations whose members meet quarterly. Individuals from member organizations work on cross cutting issues through thematic working groups on national resource management, business and enterprise, institutional development, training, as well as monitoring and evaluation. Through these working groups the participants have advanced the analysis of various aspects of the program and disseminated information. NACSO has proven to be an effective advocate for CBNRM and was key in promoting the recently established government CBNRM unit.

A case from Botswana presents similar evidence of the positive impact of platforms for social learning through dialogue and deliberation. In Botswana, the national level platform represents community based organizations involved in natural resource management. Since the late 1980s USAID-supported-facilitators assisted local communities in forming "trusts" – a type of legally recognized community-based organization (CBO). More recently, in the late 90s these groups formed a federation of CBOs called the Botswana Community Based Organization Network (BOCOBONET). The mission of BOCOBONET is "to promote the interests of individual members involved in CBNRM by playing a mediating and advocating role between communities and service providers including the government of Botswana, the private sector, NGOs and training institutes". BOCOBONET has created a platform for expressing rural views, and a channel for communication among communities. One of the concrete outcomes of this platform was to successfully mobilize members and lobby against a government initiative to re-centralize the financial management of CBOs, Although the government has legitimate concerns about financial management, this re-centralization would have been tantamount to rescinding community control and decision-making over community funds. BOCOBONET's activities and its ability to amplify rural voices and dialogue with the government avoided centralization of financial management, effectively putting local government in control of funds generated by the CBOs.

(iii) At the ecosystem level - the Great Limpopo Case

The Great Limpopo Transboundary Natural Resource Management Area (TBNRMA) initiative recognizes the need for southern African nations and communities to collaborate to manage their shared and unique biodiversity. This biodiversity underpins the economic and social development prospects of the region.

The TBNRMA encompasses almost 100,000 km^2 in southwestern Mozambique, northeastern South Africa, and southeastern Zimbabwe and includes several parks (including Kruger, Gonarezhou and the Limpopo parks) and surrounding community areas. Ecologically, the TBNRMA is mostly flat savanna, bisected by the Lebombo Mountains running north to south. Four ecosystem types make up the landscape: lowland plains in the eastern areas, a granitic plateau in the west, the Lebombo mountains, and the riverine plains crossing the savanna. The mixed bushveld is best for game viewing, being home to large herds of zebra, wildebeest, buffalo, giraffe, impala, and associated species, plus rhino and elephant. The sandveld areas have high conservation value for their diversity of plant species.

The Great Limpopo TBNRMA Initiative seeks to reduce the restrictions that political boundaries place on the ecological requirements of wildlife, which requires unimpeded movement throughout its natural ecosystem. It also hopes to enhance economic and social returns through better management, marketing, and lessening transaction costs. A Ministerial Committee oversees establishment, development, and management, with day-to-day operations handled by the Joint Management Board (JMB).

A tri-national technical committee was established to create a platform for dialogue and coordination amongst communities and the government. The Republic of Mozambique, the Republic of South Africa, and the Republic of Zimbabwe signed an international agreement to

establish the Transfrontier Park and Transfrontier Conservation Area in November 2000. The Presidents of the three nations subsequently signed a Treaty in December 2002 formally establishing the Area.

Current land uses in the Great Limpopo vary by country. In South Africa, almost all areas are covered by formal conservation status, or are private reserves. Tourism to the renowned Kruger National Park and surrounding areas helps to support high standards of park maintenance and conservation practices. The situation in Zimbabwe is similar, having benefited both from official National Park status (Gonarezhou) and from community conservation efforts such as CAMPFIRE. Park maintenance standards may not be as high as those in South Africa, but are noteworthy. Isolation limits community economic opportunities in the Sengwe Communal Lands and tourism in public or private reserves.

Mozambique continues to recover from civil war, so parks incorporated into the TBNRMA are starting from a lower baseline. Much of the interstitial areas are sparsely populated with communities practicing subsistence agriculture and livestock rearing. Some extractive resource uses – timber and firewood, for example – occur, as do fishing, hunting, and charcoal making. The TBNRM Initiative is focusing its field efforts in the under-developed parks in Mozambique, and especially the interstitial areas between parks because these areas contain activities that conflict with wildlife.

The desired outcomes of the Great Limpopo TBNRM Initiative includes:
- community groups interacting effectively with public and private sector entities;
- increased economic and social benefits from resource use and management;
- a strong policy foundation for collaborative natural resources management and business development; and
- robust institutions capable of implementing program activities.

Several important steps have been taken to support the broader Great Limpopo initiative led by the three governments, including::

- A Joint Management Plan, drafted in consultation with key stakeholder entities, for the Great Limpopo Transfrontier Park (approved by the Ministerial Committee in July 2002);
- A policy review for harmonization strategies with Southern Africa Development Committee natural resource protocols;
- Community socioeconomic profiles in Mozambique and South Africa;
- Five community structures with joint venture opportunities for community-private partnerships related to tourism and other natural resource enterprises;
- Multi-sectoral development of CBNRM guidelines in South Africa;
- Assisting Mozambique to delimit communal lands, develop investment opportunities, draft a national policy for People in Protected Areas, and plan Banhine & Zinave parks;
- Increasing involvement of other stakeholders in decision-making processes; and
- Support to Department of Conservation Areas (DNAC) and Ministry of Tourism in Mozambique for strategic planning and to fulfill role as Coordinating Party under the tri-national agreement.

Although relatively recent, this case provides an example of concrete collaboration at the international level. Despite differences in each country's priorities and economic situation, the initiative created a platform for coordination and collaboration initially at the working level and then at a higher political level. Dialogue and discussion included local communities who often had different and sometimes conflicting views. Institutions were strengthened or created and mechanisms for creating and enforcing rules were put in place through these platforms. It is too early to measure the bio-physical changes resulting from the social learning. However, efforts to improve distribution of game and game introduction in the area provide some indication of the ecological impact. Economic benefits are also difficult to measure but baselines exist and several communities are better integrated in the market and its benefits through collaborations with the private sector made possible by this framework. Governance benefits at several levels are also likely to consolidate over time.

(d) Social learning in natural resource management

It has become increasingly clear that social learning is a necessary, though not the sole, part of the process of adjusting or improving natural resource management (Pretty and Buck, 2002).
Our sampling of case studies suggests the types of impacts that can be anticipated when effort is made to build the capacity of people who depend on natural resources for their livelihood, and their communities, to learn about the complexities of these systems and then to act in different ways. The cases are consistent with claims that the process of learning, if it is socially embedded and jointly engaged upon, provokes changes in behavior and can bring forth a new world (Maturana and Verela, 1982). They give rise to optimism.

Social learning processes, ably facilitated, can bring together stakeholders who previously did not interact, or who were locked in a state of polarized conflict. As learning progresses, new patterns of interaction are stimulated, which can lead to new or renewed institutional arrangements for management. Important catalytic learning processes for institutional strengthening include facilitating perceptions of interdependence, generating common objectives among stakeholders, strengthening community confidence in their monitoring and planning capacities, and jointly analyzing institutional performance. We have seen that these and related learning activities, if facilitated using transparent methods, can engender trust among participants and thus lead to new options for improving economic returns as well as social and environmental benefits to management.

5. CONCLUSIONS AND IMPLICATIONS

(a) Social learning and institutional strengthening

There is a critical need in Africa to strengthen institutions that support natural resources management in order to tackle losses of soil fertility and forested watersheds, replenish wildlife, and create the conditions for more secure livelihoods. New thinking and practice are needed for developing and spreading forms of social organization that are structurally suited for natural resource management and protection at the local level, and to articulate these with higher levels of governance. This usually means more than just reviving old institutions and traditions; it

commonly means new forms of organization, association and platforms for common actions (Pretty and Buck, 2002).

Social learning is an important, though not the sole, pathway to institutional strengthening for natural resource management. Social learning is a deliberate process to foster joint institutional capacity for problem solving, conflict negotiation, convergence of goals, and concerted action among interdependent stakeholders. It is a continuous process that respects and integrates the experience and needs of social actors. Social learning forms the foundation for adaptive, collaborative approaches to natural resource management that aim to balance competing needs for socioeconomic development and environmental conservation (Schelhas *et al*., 2001). It can illuminate the complexities of coupled human and ecological systems, and the importance of institutional arrangements that are responsive to their dynamic characteristics. Social learning can help to reduce complexity into manageable proportions, and to stimulate innovative solutions to problem situations. But it is also difficult to promote, support and sustain (Pretty and Buck, 2001).

Social learning processes need to be tailored to the social and ecological context in which they are applied. There is a growing collection of techniques for facilitating social learning and new methods are continuously being invented. In selecting which techniques to use and adapt for particular situations it is instructive to take into account the scope, scale and complexity of the natural resource management challenge. As the scale of activity moves from household to community to multiple communities to watershed to eco-region for example, the number of stakeholders increases, the scope of the problem situation expands and governance units concerned become more complex. The choice of method accordingly will range from relatively simple techniques for securing local input into the design of agroecological practices, to creating platforms for conflict management and resource use negotiation that may involve numerous actors in various configurations over an extended period of time.

In tailoring the method to the learning situation it is important also to consider the characteristics of the particular techniques so facilitators can anticipate what is involved and expected of them. It is essential also to consider the contributions to social learning and ultimately to institutional strengthening that respective techniques may offer. In this way the organization(s) supporting the social learning effort can anticipate the desired and likely outcomes.

There is more to social learning however, than getting the method right. To gain the ultimate benefits of social learning requires vision and up front investment in a long term process whose outcome is uncertain and contingent. Stakeholders must perceive institutional and individual facilitators of social learning processes as reasonably fair and impartial, trustworthy and broadly knowledgeable in order to gain legitimacy. Commonly however, organizations with an interest in facilitating social learning processes also have a stake in the outcome, and/or they are used to investing in programs that demonstrate quick results. These issues need to be sorted out and addressed. While social learning activities can catalyze dramatic, positive change in a short time, the process can also lumber and labor until all the ingredients are right. This implies that if social learning is to support institutional strengthening in natural resource management, the approach itself needs to be institutionalized together with technical and economic policy programs for development and change.

(b) Reconciling Poverty Reduction and Environmental Management

Poverty and degradation are both to a large extent structural. Poverty can be viewed as a distributional problem and degradation of resources as a function of structural elements that promote overexploitation in specific areas rather than competition in areas of absolute scarcity. Access and control over resources is central to both poverty reduction and positive environmental outcomes. Without control and access to resources local communities are unable to convert resources into wealth. Without control and access to resources local communities have little incentive to invest in resource productivity and sustainability – environmental stewardship becomes extremely difficult. Reconciling poverty reduction and environmental management therefore depends on mechanism and processes for dynamic and flexible adjustments to control and access. These mechanisms must be sensitive to feedback from both bio-physical systems and socio-economic systems. In many cases these mechanisms and processes cannot be predicted in advance – they must be the result of a negotiation – where a diversity of interests, values and experience comes into play. Social learning is key to this continual negotiation. As applied in some cases (and in a broad sense) it has lead to structural changes and better management helping to reconcile poverty alleviation and environment.

This paper has attempted to provide a theoretical backdrop in complex systems, pluralism and communicative rationality and to provide a description of social learning as a concrete way to improve institutional and governance performance. The paper has provided a sampling of cases where social learning has contributed to changes in institutional relationships and capacity. These changes have in turn lead to situations where management and better environmental governance have contributed to both economic growth and to environmental recovery.

As Uphoff (Buck et al, 2001b) notes, we live in open systems, knowledge needs to be continuously validated and revalidated, reality is pluralistic and the world contains many surprises. Social learning is a key method for adapting management to a dynamic and unpredictable world.

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ENDNOTES

[1] Rölings and Maarleveld (1999) state that social theory (which we assume refers to theories explaining social action) based on instrumental or strategic action cannot explain the reproduction of society. They feel that social theory has to be based on communicative rationality, and it is this that is inspiring their work and that of their colleagues.

[2] Rölings and Maarleveld (1999) state that Habermas provides a condition for communicative rationality - an "ideal speech situation." Their interpretation of this condition is that "people choose for communicative action on the basis of reasoned agreement and that each stakeholder in the agreement has the right to participate in the deliberation. In ideal speech situations, solutions to intractable problems emerge from interaction among reasonable people".

[3] The term governance broadly refers to arrangements for decision making and power sharing.

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[4] This is an extension of existing literature that has appraised the participatory techniques according to other criteria (see Daniels and Walker, 1999; Blumenthal and Jannink, 2000; Ramirez, 2001).

[5] For more information on the other facets of each approach we refer the readers to articles specifically on each method.

[6] In essence this natural resource management plan is a central part of conflict management

[7] Recent work by Gibson, Williams, and Ostrom (this volume) indicates that this type of regular monitoring and sanctioning dominates other factors with regard to the probability that a forest is in good condition. This is independent of levels of social capital, forest dependence, or formal organization. Regular monitoring and sanctioning of de facto rules is related to better forest conditions.