

Adaptive Co-management of Natural Resources: A Solution or Problem?

Tendayi Gondo

*Department of Urban and Regional Planning, School of Environmental Sciences,
University of Venda, Private Bag X5050, Thohoyandou 0950, Limpopo Province, South Africa
Telephone: +2715 962 8576 OR +27826611558; Fax: +2715 962 8597;
E-mail: tendayi.gondo@univen.ac.za, gondotee@gmail.com*

KEYWORDS Adaptive. Co-management. Natural Resource Management. Experiences

ABSTRACT Natural resource management issues are increasingly viewed from the complex systems theory. There is general consensus among scientist that complex systems are not amenable to conventional resource management approaches that stresses on command-and-control. This has triggered a search for novel governance approaches that are more suited to complexity and uncertainty. Adaptive co-management (ACM) has emerged as a recent interdisciplinary response to this need. However, concepts associated with ACM are relatively new and quickly expanding from multiple perspectives. Consequently the successes and failures of such a methodology has varied from one study to the next. The analysis critiques the utility of such an approach and eventually argues that ACM of natural resources is not necessarily a solution but part of the problem itself. A Delphi method was applied to gather the knowledge of experts in adaptive management. The panel of experts was drawn from East and Southern African researchers whose experiences with the tool had been documented in a series of publications. Such analysis was complemented by evidence drawn from a sample of case studies in the same field. The difficulties faced by the (ACM) practitioners during the implementation phase as well as the evaluation of the associated benefits suggest there is an urgent need to fix the leaking buckets, before sharing optimism that currently characterize the orthodox and ideals of this methodology. Failure to do so (it seems) will see the approach running the risk of being a hollow marketing tool rather than a viable tool.

INTRODUCTION

There is general consensus among Natural Resource Management (NRM) practitioners that the emergency or rather the advent of complexity and uncertainty in NRM requires the adoption of response options that are interdisciplinary and adaptive in nature. Such an approach (it would seem) can best be explained from the complex systems theory. According to Plummer and Armitage (2007), complex systems understanding imply a world characterized by dynamic, non-linear interactions, discontinuities, and surprises. A continued drum beat of failure in numerous NRM efforts that has characterized many countries over the past two or so decades has raised insurmountable euphoria among NRM practitioners about the incorporation of adaptive principles in dealing with complexity and uncertainty. It is, therefore, not surprising how the new concept of adaptive co-management (ACM) of natural resources has taken centre stage in NRM discourse (Plummer and Armitage 2007; Bruns 2008). Central to the concept is the recognition that natural eco-systems are complex adaptive systems that require approaches that go beyond command and control strategies to encompass flexible governance solutions that have ability to respond to envi-

ronmental feedbacks (Gadgil et al. 2003; Olsson 2004; Plummer and Armitage 2007). Such flexible governance systems are touted for providing an ideal platform where institutional arrangements are tested and revised in a dynamic and self organized process of experimentation (Folke and Environmental 2002). Conventional approaches are often said to be devoid of such a *trial and error* component and subsequently are lacking the much needed dynamism (Moberg and Galaz 2005).

Beyond the orthodox and ideals of ACM is, however, a group of critics sharing skepticism on the utility of the tool (Walters 1997; Dukes et al. 2001; Few 2001; Stankey et al. 2003; Walker and Hurley 2004; Bormann et al. 2007). Perhaps at a more theoretical level one can argue that concepts associated with adaptive co-management are relatively new and quickly expanding from multiple perspectives (Plummer and Armitage 2007). To this end they are therefore liable to misinterpretation by NRM. Perhaps what is appealing about the controversies surrounding the concept, is the paucity of tangible, compelling evidence to underpin the utility of the concept (Walters 1997; Stankey et al. 2003). Unless scientists and policy makers come up with a convincing result based evaluation methodology to objectively take stock of the

envisaged benefits, people will start to question whether ACM is a viable tool or a simply a hollow marketing tool in natural resource management. The paper discusses the extent to which adaptive ACM of natural resources has been a solution to problems characterizing NRM in a sample of Eastern and Southern African experiences. Following this introduction, I present the analytical framework adopted followed by an overview of the materials and research instruments employed. I then proceed to present and discuss the results, before I finally give some concluding thoughts.

Analytical Framework

In order to have an informed critique of adaptive co-management of natural resources, it is important to have an analytical framework on which to base any arguments. This analysis reviews a number of experiences within the context of the commonly stated assumptions of the tool. Hijweeg (2008: 2) summarizes the key assumptions as follows:

- Complex adaptive systems are assumed to be inherently unknowable
- Uncertainty and surprise are inevitable
- Structural learning is the way uncertainty is winnowed.
- Adaptive management must meet both social and learning objectives
- Policies must be viewed as tests of hypothesis.

Perhaps it is imperative at this stage to have an operational definition of what is meant by the ACM. The analysis adopts the definition by Moberg and Galaz (2005) who defines it as an approach based on collaboration among agencies, researchers and local stewards. In this perspective, the management of natural resources is regarded as controlled experiments, with the consequent need for monitoring, evaluation and constant improvement. It requires horizontal (local) as well as vertical (regional to global) collaboration. Hence, adaptive management (AM) allows managers to take action in the face of global change, to enhance and complement scientific knowledge in order to reduce uncertainties, and to craft policies that respond to, and even take advantage of unanticipated outcomes. The testing of the various assumptions was achieved through the follow-

ing analytical perspectives as proposed by Hijweege (2008:2).

- **Managing for Impact:** This perspective questions the contribution and ultimately the impact of AM in achieving sustainable management practices. In other words, what is the added value of the AM principles, compared with earlier practices?
- **Dealing with Conflict:** How have AM tools and methods been applied to deal with conflict among the involved stakeholders? This dimension requires interpreting experiences from the 'conflict management perspective' and documenting lessons learnt.
- **Managing Scales:** Under this dimension, AM is seen as an approach to NRM at the landscape or regional level. It questions the major institutional and governance issues to be addressed at the district / regional level as one move away from the community level.
- **Cross Sectoral Integration:** An analysis of the pros and cons of a conscious choice to work across sectoral boundaries and integrate the various lines of thinking into a common approach.
- **Organisational Consequences:** Adopting an AM approach must have organizational implications. This could be in terms of team composition, decision making, tools and methods applied and the way reporting is organized among other issues.

MATERIALS AND METHODS

Empirical evidence presented here draws from an array of experiences shared NRM experts on the implementation of AM in their respective localities. The panel of experts was drawn from East and Southern African researchers who recently published a book on their personal experiences in the application of the approach (published by Wageninigen International¹). Such analysis was complemented by evidence drawn from a sample of case study experiences in the same field shared by a group of AM practitioners from CIFOR² sponsored AM initiatives in Zimbabwe. Such experiences were ultimately published in a series of Adaptive Collaborative Management News magazines. The Wageninigen initiative organized a 'writeshop' held in June, 2008, in Bloemfontein, South Africa where a serious brainstorming of

experiences, followed by a peer review of drafts culminated into the production of a reader of eight experiences in NRM. A number of ACM practitioners reflected on their experiences on AM during the period 1999 to 2005 through a series of workshops organized by CIFOR in Zimbabwe. The reflections were ultimately published in the ACM news magazines through its editorial board. Figure 1 gives a snippet of the two processes involved in the write-shop and in the editorial process. The author was privileged enough to have received CIFOR sponsored training on AM in 2002. Since then the author ran a number of training programmes on the tool, applied it in research and has been part and parcel of the write shop and the numerous ACM workshops and field visits organized by CIFOR. These platforms offered the author an invaluable opportunity to take stock of experiences of ACM practitioners. The Delphi method employed relied heavily on a conscious, serious brainstorming exercises in which the author solicited empirical data through a series of open ended questions. Key questions that ran through the bulk of CIFOR workshops and to some extent through the write shop compared well with those used by Plummer and Armitage (2007: 63-72) and included;

- What have been the key success areas of AM in your ACM projects?
- What has been the lessons learnt?
- What have been the key challenges or constraints in successful implementation of AM?
- What needs to be done (by WHOM?) to ensure effective implementation?

A key component of the adopted Delphi

method was the ability of the author to interact directly with 5 ACM practitioners drawn from Eastern Africa and more than 25 practitioners drawn from Southern Africa.

The study has however been complemented by an anthropological perspective. Ethnography is applicable in this study because it enabled eliciting information from ACM practitioners in their own cultural context and thus gave invaluable opportunity to understand processes and outcomes from the stakeholder's point of view. This was achieved through a number of visits to some of the rural communities such as in Mafungautsi forest where a group of ACM practitioners, communities and other stakeholders were interacting through the ACM process. The largely qualitative data generated was subjected to content analysis. Table 1 and Table 2 give a descriptive summary of the rich diversity of experiences drawn from Eastern and some Southern African countries respectively.

RESULTS AND DISCUSSION

A review of case experiences on ACM as a tool in NRM reveals that the approach has been an invaluable solution to some of the vexing problems confronting the sector. At the same time the application and / testing of the associated principles and assumptions (respectively) has not been automatic or spontaneous. This has been met with a myriad of both practical and theoretical challenges associated with ACM as both a tool and a concept. An anecdotal analysis of such achievements and challenges in some selected cases in Eastern and Southern Africa respectively is portrayed in Table 3 and Table 4.

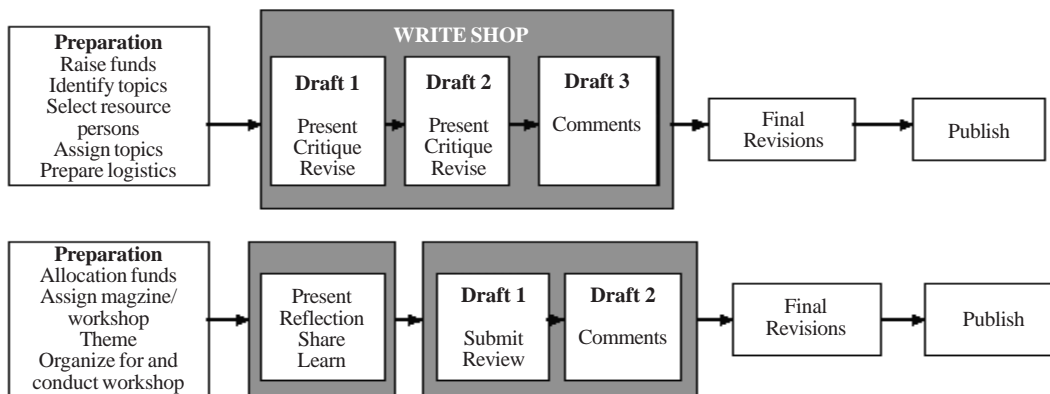


Fig. 1. A snippet of the processes involved

Table 1: Summary of Adaptive Co-Management project initiatives in East Africa.

Country	Biography of ACM practitioner	Project scope / focus	Project background
Uganda	<p>-Team leader: Community Action to Conserve Rwoho Forest Reserve; Support for Women in Agriculture and Environment (SWAGEN).</p> <p>- Responded to call for articles in applying ACM principles.- Has been exposed to the ACM approach.</p>	<p>- Application of ACM principles – experiences and challenges of moving from local to regional: A case study of Rwoho Forest Reserve in Uganda.</p>	<p>- SWAGEN is an Indigenous community based organization (CBO) working with the Forest Edge Community (FECO) in Rwoho forest reserve area to promote sustainable use and management of forest resources.</p> <p>- The organization has been commissioned to review the experiences and challenges of employing various methods of forest conservation in Rwoho Forest Reserve in South – Western Uganda.</p>
Tanzania	<p>-Programme co-ordinator, Udzungwa Mountains Conservation Programme, WWF, Tanzania programme office.</p> <p>- Responded to call for articles in applying ACM principles.</p> <p>- Has been exposed to the ACM approach.</p>	<p>- Resource use conflict management: A case from the Eastern side of UMNP</p> <p>- Responded to call for articles in applying ACM principles.</p> <p>- Has been exposed to the ACM approach.</p>	<p>- The Udzungwa Mountains Ecosystem is part of the Eastern Arc Mountains Range, a global biodiversity hot spot that harbours endemic species of plants and animals. The mountains also contain catchment forests that are a major source of water for hydropower generation, agricultural activities, fisheries and domestic use.</p> <p>- Parts of forest (approx 1190 km²) were amalgamated to form UMNP in 1992 and this created conflict over resource use with about 29 surrounding villages depending heavily on the Parks natural resources. 110 000 people were affected.</p>
Kenya	<p>- Program analyst with United Nations Development Programme (UNDP), managing specific projects under the Energy and Environment Programme and the current focal point for UNDP – Global Environment Fund (GEF) in Kenya.</p> <p>- Responded to call for articles in applying ACM principles.</p> <p>- Has been exposed to the ACM approach</p>	<p>Adaptive Collaborative Management Principles for effective forest management. A case study of Community Forest Associations in Kenya.</p>	<p>- In 1994, Kenyan Master Plan was drawn to address the serious decline in forest cover that had taken place during the 1980s. This saw the Forest sector department pursue a reform agenda that culminated in the new Forest Act of 2005 and a forest policy which established the Kenya Forest Service (KFS) during the period 1994 to 2007.</p> <p>- The policy calls for forest ecosystem management and for devolved decision-making and management of forests on the basis of participatory forest management plans.</p> <p>- It also calls for the establishment of a new consultative mechanism, which brings together the communities, civil society and government officers for community policing and enforcement of the Act.</p> <p>- The case study documents the application of adaptive collaborative management principles in effecting this transformation and pilot structures and norms for the joint management of forests in Kenya.</p>
Tanzania	<p>- A retired wild life officer, now head of Development Alternatives Programme – a Non-Governmental Organization (NGO) based in Kibabale District of Uganda.</p> <p>- The NGO works with communities to promote sustainable agriculture, conservation of wildlife especially of chimpanzees outside protected areas and promotion of eco-tourism and alternative energy sources.</p>	<p>- Trans-boundary collaborative natural resources management initiatives. A case study of Uganda Wildlife Authority.</p>	<p>- The project examines experiences gained in launching of and implementation of two cross border initiatives within Central Albertine Rift (CAR).</p> <p>- Taking in an action learning perspective, it sees the emergence of transboundary collaboration in the region as an antidote to ecosystem fragmentation, cross border illegal trade in wildlife and related products.</p> <p>- It presents opportunities for promoting regional ecological stability, sustainable socio-economic and cultural development and overall peace building.</p>

Table 1: Contd.....

Country	Biography of ACM practitioner	Project scope / focus	Project background
Kenya	<ul style="list-style-type: none"> - Works for African Wild Life Foundation (AWF). - Responded to call for articles in applying ACM principles. - Has been exposed to the ACM approach 	<ul style="list-style-type: none"> - Stakeholder dynamics: a challenge for Adaptive Collaborative Management (ACM) - Experiences from Kenya. 	<ul style="list-style-type: none"> - AWF initiatives engage communities in the development and implementation of NRM plans for areas under their jurisdiction in order to rationalize multiple land uses and lay the foundation for effective NRM. - The AWF participatory approach adheres to the main principles of ACM in that it is people oriented and is characterized by social learning, systems thinking and adaptability.

NB: Detailed insights into project experiences are published in a reader on 'Emergent practice in adaptive Collaborative Management in natural resource management in Southern and Eastern Africa, by Wageningen International, in 2008

Table 2: Summary of 5 of the 25 Adaptive Co-Management project initiatives in Southern Africa

Country	Biography of ACM practitioner	Project scope / focus	Project background
Zimbabwe*	<ul style="list-style-type: none"> -CIFOR has been instrumental in providing ACM training to government, civil society organizations and academia in Southern and East Africa during the period 2000 – 2005. -As a pilot project to test the application of ACM concepts, CIFOR initiated a pilot project. In Matungautsi forest of Gokwe District in Zimbabwe. 	<ul style="list-style-type: none"> -CIFOR's ACM project sought to add value to the initiatives created by Forest Commission (RMC) and by enhancing the participation of local communities in effectively managing conflict laden resources in Matungautsi State Forest in Gokwe District. 	<ul style="list-style-type: none"> - Matungautsi Forest was converted into a state forest in 1954. The forest boasts of four major rivers that drain into the Zambezi river and is a source to hydro-electricity in Zimbabwe. - The government forest department, Forest Commission (FC) was mandated to ensure that the forest was managed in a sustainable manner. - The exclusion of communities in the forest management process resulted in conflicts between the FC and local communities. - In response the FC attempted to involve the communities by creating RMCs to spear head a Resource Sharing Project in 1994. Despite this, conditions between the two major stakeholders continued with obvious implications on resource management in the state forest. - This then marked the intervention by CIFOR in 1999 through its ACM project.
Zimbabwe**	<ul style="list-style-type: none"> - Attended 4 training ACM sessions offered by CIFOR. - Had previous training in PRA under Germany Agency for Technical Corporation (GTZ) and in community based planning funded by the Intermediate Technology Group (ITDG) - Practitioner also attended a number of Southern Dry Areas Resource Management Project (SDARMP). 	<ul style="list-style-type: none"> - The ACM project aimed at addressing high levels of wood poaching and overgrazing in a resettlement area Gwanda district in Zimbabwe. 	<ul style="list-style-type: none"> - The project study unit is Eryandeni Village 6, in ward 5 in Gwanda north district of Matebeleland South Province of Zimbabwe. This constitutes a resettlement area in which people were resettled in 1994 and 1995. The project area is home to 17 households whose total population is 168. The major problem affecting the project site is increased wood poaching activities and overgrazing. Such challenges were the entry point of the ACM project.
South Africa***	<ul style="list-style-type: none"> - Project leader: Communal Range Management Project, department of Livestock and Pasture Science, University of FortHare. 	<ul style="list-style-type: none"> - Interaction between resource users, science and policy in communal rangelands of Eastern Cape Province of South Africa. 	<ul style="list-style-type: none"> - Project experiences are based on an Action Research , Communal rangeland management Project funded by W.K Kellogg Foundation from

Table 2: Contd.....

Country	Biography of ACM practitioner	Project scope / focus	Project background
	<ul style="list-style-type: none"> - Responded to call for articles in applying ACM principles. - Has been exposed to the ACM approach 		<p>2006 to 2008 and implemented by the University of FortHare in partnership with the Eastern Cape Department of Agriculture.</p> <ul style="list-style-type: none"> - The project examined the role of different stakeholders in the development of strategies for the management of rangelands and the need to enhance capacity of resource users through formal training and farmer to farmer learning.
Zimbabwe***	<ul style="list-style-type: none"> - Regional Natural Resource Management officer, Southern Alliance for Indigenous Resources (SAFIRE). - Has worked with CIFOR on the initial ACM pilot project, and has also been instrumental in facilitating a number of CIFOR financed ACM training courses. - Has been on CIFOR sponsored editorial board of the Zimbabwe ACM news. 	<ul style="list-style-type: none"> - Examines the successes and challenges of using ACM in taming wicked problems in Zimbabwe's rural landscapes. 	<ul style="list-style-type: none"> - SAFIRE a regional NGO, headquartered in Zimbabwe, uses an eco-systems approach to NRM. The approach aims at the full participation of stakeholders in the management and use of natural resources. It employs elements of ACM, notably collaboration and social learning among stakeholders. - Experiences presented here relate to how to deal with issues of collaboration and social learning among stakeholders in the commercialization of Non Timber Forest Products (NTFPs) as a way to improve livelihoods.
Zimbabwe****	<ul style="list-style-type: none"> - Two forest extension officers who had earlier on received training through CIFOR's ACM training programme. 	<ul style="list-style-type: none"> - Examines the challenges associated with fostering collaborative platforms in a multi-stakeholder contested dam project in Bindura district of Zimbabwe. 	<ul style="list-style-type: none"> - The Arcadia dam in Bindura was used to test the transferability of the ACM approach to contexts outside state forests. - The dam was under threat from stream-bank cultivation, indiscriminate tree cutting, brick moulding, sand abstraction, and gold panning. - Collaboration was deemed necessary as there were so many interested parties in the project. These included the Rural District Council (RDC), The Zimbabwe National Water Authority (ZINWA), the rural communities, the Center for international Forest Research (CIFOR), the Forest Commission (FC), the Department of Natural Resources (DNR), the department of Agricultural Research and Extension (AREX), the Zimbabwe Republic Police (ZRP), a NGO – Developmental Aid from People to People (DAPP) and traditional leaders.

*Project experiences were initially published in (1) Zimbabwe ACM news, February, 2004 Vol. 1, No. 1 and (2) in Zimbabwe ACM news, August 2005, Vol. 2, No. 2

** Project experiences are also documented in ACM News Zimbabwe – February, 2006, Vol 3, No. 1.

*** Detailed project experiences were later published in a reader on 'Emergent practice in adaptive Collaborative Management in natural resource management in Southern and Eastern Africa, by Wageningen International, in 2008.

**** Project experiences are also document (1) Zimbabwe ACM news, December, 2006 Vol. 3, No. 2 and (2) in Zimbabwe ACM news, August 2005, Vol. 2, No. 2

NB: The total number of experiences solicited in Southern Africa is 25 and 24 of them from Zimbabwe, while 1 is from South Africa

Table 3: An anecdote of emerging ACM achievements and challenges from a sample of cases from Eastern Africa

<i>Country</i>	<i>Derived project goal (s)</i>	<i>Achievements</i>	<i>Challenges</i>
Uganda	- To determine whether ACM is an illusion or realistic approach in managing transboundary natural resources conflicts between Uganda, DR Congo and Rwanda.	-Collaboration at the community, departmental, national and international level led to creation of working structures and modalities in the region. This resulted in less chances of transboundary resource management conflicts.	- A multi-stakeholder venture of this magnitude, requires the commitment of parties concerned, time, financial resources, and political will which are not always available at all times. - The roles and perspectives of international NGOs over national and local ones are increasingly influencing and facilitating the direction and pace of transboundary collaborative resource management and governance.
Tanzania	- To resolve major conflicts and address the critical problems of forest resource conservation and livelihood security of forest dependent people in the Udzungwa mountains of Tanzania through social learning and collaborative decision making.	- Enhanced collaboration drew on untapped resource management capacity among local level resource users as various platforms were created for them to share experiences, reflect and learn together. - consequently the created platforms provided opportunities for resolving major conflicts and addressing the critical problems of forest resource conservation and livelihood security. - Mainstreaming of conservation education in project activities and the establishment of locally based ecological research and monitoring have created a good learning atmosphere. - ACM resulted in the transformation of the joint forest management forest institutions resulting in flexible institutions and structures ready to deal with complexity characterizing the joint forest management project. - ACM transformed some forest managers and policy makers into stakeholders that are more willing to try alternative ways of doing 'business' and more will to take risks.	- Despite their usefulness to Udzungwa's ACM process, awareness, education and capacity building are expensive in terms of time and money, and where resources have been limited results have accordingly not been impressing. - While facilitation processes are known to encourage the involvement of marginalized people, they have in many ways created a dependency syndrome
Kenya	- To document the application of ACM principles in facilitating a reform process in the forest sector, and piloting structures and norms for the joint management of forests in Kenya.		- Power issues are at the heart of challenges in practicing ACM principles by both local and national level institutions.

Table 4. An anecdote of emerging ACM achievements and challenges from a sample of cases from southern Africa

Country	Derived project goal (s)	Major achievements	Major challenges
Zimbabwe	- To employ ACM principles to restore environmental sanity in fast degrading woodlands of Chatoranombe, in Masvingo district.	- Increased collaboration among communities occupying the project site, led to better woodland resource management. - ACM managed to help resolve ensuing conflict over resource use between communities outside the project site and those part of it.	- Lack of rewarding (both financial and kind) incentives for project facilitators threatened to derail the whole exercise. - Human resource shortages exacerbated by illness saw some scheduled activities being either abandoned or postponed. - Officers wanting to pursue their own personal agendas through the project were met with contempt and resistance by communities. - Mismatch between Forest Commission priorities and those of the communities almost derailed the whole programme. - It is difficult for the ACM process to adapt to staff losses especially where facilitators have been transferred to other centers. - ACM requires huge financial resources and where these are inadequate, will not work. Shortage of fuel resources crippled some of the scheduled social learning meetings. - ???
Zimbabwe	- To extend the concept of Communal Areas Management Programme For Indigenous Resources (CAMPFIRE) based wildlife management and ACM principles in the management of the ailing Nyatana woodland resources in the north of Mudzi district.	- Effective collaboration saw a shift of attitudes and the evaporation of a number of misconceptions among stakeholders about a variety of issues relating to woodland resource use. One notable transformation was a reduced hostility stance by the Rural District Council towards local resource users.	
South Africa	- (Within the context of the ACM mapping environment), to determine the amount of interaction that exists between resource users, science and policy in the communal rangelands of Eastern Cape.	- The application ACM concepts and principles worked well in exposing the nurture and extent of collaboration between resource users, science and policy	
Zimbabwe	- To determine whether ACM can be employed a viable strategy in taming wicked problems in Zimbabwe's rural landscapes.	- The creation of social learning platforms worked well in solving some of the problems relating to low resource productivity, and unbalanced access to the resource base. - Collaboration in experiential learning generated useful knowledge that was used as an entry point for addressing a number problems relating to the commercialization of NTFPs.	- High turnover of key actors can slow down the progress of ACM facilitated processes. - Creating social learning platforms for a multiplicity of stakeholders proved to be a mammoth task especially in case where different interests could be discerned and where the stakeholders were geographically separated. - Intra household conflicts are likely to derail ACM activities especially where conflicting members are part of the natural resources management committees.

¹ Eight experiences in Natural Resources Management were published in a reader on "Emergent practices of adaptive collaborative management (ACM) in southern and eastern Africa

² The Centre For International Forest Resources (CIFOR) has since 2000 conducted extensive action research to link the concept of AM to community approaches in NRM in what has become known as 'Adaptive Collaborative Management' (ACM).

Adaptive Co-management: A Solution or Part of the Problem?

An analysis of a number of cases from eastern and southern Africa reveals that ACM has worked well in a number of areas including but not limited to;

- *In Managing Conflicts over Resource Use at Different Scales.* Conflicts over resource use have been resolved in ACM generated social learning platforms in projects such as Mafungautsi both at the institutional and community levels. Other success stories include Chatoramombe woodland, in Zimbabwe and Udzungwa mountains in Uganda. At a more regional scale the adoption of ACM principles resulted in reduced conflict over transboundary resources pitting three countries, including Uganda, DR Congo and Rwanda. It is imperative however to note that conflict over the utilization of natural resources is sometimes difficult to resolve especially when the conflicting parties are not at equal footing (in terms of resources and decision making authority) and vertical collaboration is called for. The Nyatanga woodland management project in Zimbabwe bears testimony to this.
- *In Taming the Otherwise Complex and Uncertain Problems Characterizing NRM.* The SAFIRE initiative has revealed that ACM can be a viable strategy of dealing with complexity – and more specifically in taming what are increasingly known as *wicked* problems in NRM (Conklin 2000; Mandondo 2006; Kozanayi 2008). The SAFIRE experience also warns us that taming *wicked* problems require sober as opposed to *wicked / constrained* approaches. Unfortunately, the application of ACM concepts and related assumptions has always been tainted by a multitude of challenges as identified in the SAFIRE case (refer to Table 4) with obvious implications on finding solutions to *wicked* problems. The SAFIRE case reveals that continuity of the ACM process is likely to be futile where there is a high turnover of key actors. Despite its assumed ability to deal with uncertainty and other related shocks, the SAFIRE ACM process succumbed to intra household conflicts. Key stakeholders in the process found it very difficult to create social learning platforms for a multiplicity of stakeholders who were geographically spaced.
- *Explaining the Dynamic Interaction that Exists Between Resource Users, Science and Policy.* The South African Eastern Cape rangeland experiences offer ample evidence of how the adoption of ACM concepts and principles can assist to expose intricate relationships that exist between resource users, science and policy. Knowledge generated is indispensable in mapping out related projects in other parts of South Africa. However, the *trial and error* characterizing ACM together with the dynamic nurture of the environments in which various projects are located makes it extremely difficult to determine the appropriate mix between local knowledge, science and policy that can be up-scaled to other environments. A challenge associated with replication is part of the theme runs out through the Rwoho Forest Reserve project in Uganda.
- *In Fostering Working Social Networks that are Beneficial to NRM Initiative.* The Ugandan initiative offers graphic evidence of a case where collaboration at the community, departmental, national and international level led to the creation of working structures and modalities in the region that resulted in reduced transboundary resource management conflicts between Rwanda, DR Congo and Uganda. Collaboration was consolidated through a number of initiated programme activities including through:
 - The formulation of the Tourism Revenue Sharing Memorandum of understanding between Uganda, Rwanda and DR Congo.
 - The joint nomination of the Volcanoes and Mgahinga as a Transboundary World Heritage Site (WHS).
 - The Goma Ministerial Declaration in 2005 supporting and broadening the mandate and scope of the initiatives.
- *Producing NRM outcomes that would have not been Realized by Laissez Affair and Various Forms of Confrontational Strategies.* The case experiences referred to in this analysis reveal three possible response options (1) avoid (2) compete/

confront and (3) engagement to dealing with challenges of NRM (Figure 2). Certainly not taking action (a business as usual strategy) strategy has compounded NRM problems in all the cases and is the initial reason why ACM practitioners resorted to intervention. Conventional approaches, which in most cases have been through government initiated top-down approaches, have not produced acceptable results either.

The cases have revealed that one of the symptoms of such failure has been conflict between communities and government officials. The ultimate outcome has been isolation and resistance which has not benefited the NRM sector. Only ACM induced engagement strategies seem to have generated acceptable levels of results. What is emerging in the majority of cases is that only the path that creates co-operation, partnerships and mutual problem solving is ideal (Carlsson and Berkes 2005; Natcher et al. 2005). Confrontation and disregard would breed antagonism and resistance from affected parties. Some identified practical symptoms of this include threats, destructive criticism of issues, manipulation and development of regressive climates in collaborative meetings and non action by some stakeholders. Negotiated outcomes on the other hand have promoted joint outcomes and have often assisted ACM practitioners to create more options for mutual gain.

Need for Fixing the Leaking Buckets

Failure of ACM to deal amicably with some complex challenges and to produce some desired results has attracted some skepticism on the viability of the tool. The argument is that if ACM is to remain a credible natural resource governance instrument (Which at least it is in theory), then it has to start by fixing some of the theoretical and practical challenges facing its application and / or implementation. In addition to challenges discussed in the previous section the following are other challenges that confront the ACM concept.

Adaptive Co-management of Natural Resources' Concepts and Principles are not Clearly Defined and Therefore are Subject to Different Interpretations and Abuse. A number of case studies from Zimbabwe offer graphic evidence of how some government initiatives have taken advantage of collaboration to use it when it suits them. Such findings are, however not new. Some scholars have always argued that "collaboration" has always remained a contested and confused concept (Dukes et al 2001; Few 2001; Walker and Hurley 2004). Experiences from elsewhere have often revealed that implied collaboration and partnerships can be a means by which government of other groups with vested interests can abdicate responsibility or

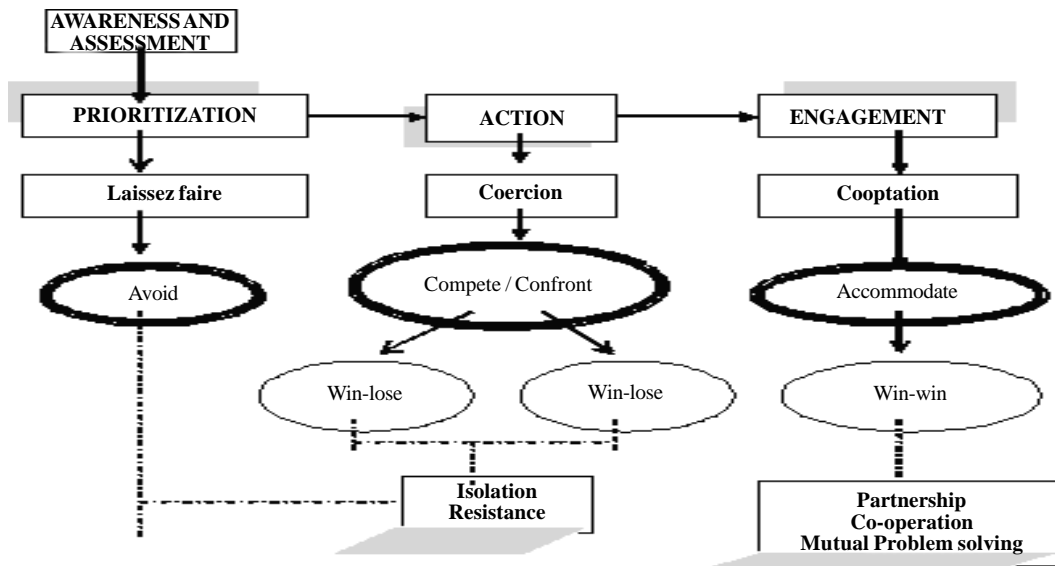


Fig. 2. Response options to dealing with NRM problems in eastern and southern Africa

prelude citizens rights under law (Coggins 1996, 2001; McCloskey 2001). In Chatoramombe ACM project of Masvingo province in Zimbabwe, it is alleged that some Forestry Commission field officers usurped the concept of adaptive management and used it as a tool to advance their own egocentric agendas. This, however, led to resistance by some community members.

Responses to the Question “are the NRM Outcomes of the Relationship Better than Would have Otherwise Been Achieved?” are Far From Appealing. All the case experiences presented offer ample evidence of adaptive management practitioners failing to evaluate the effectiveness of adaptive co-management interventions. Effectiveness has remained an anecdotal anatomy of perceived outcomes. Put in simple terms, “effectiveness” has often been misconstrued for success. It is not surprising see how quickly Natural Resource Managers are easily losing track of their mandate - that of serving to effect purpose given euphemism surrounding this new tool (Wondollock and Yaffee 2000). Successes and / or failures are now often measures about how well the concept has been applied than how well the concept is serving the intended objective of offering solutions to complex and uncertain situations characterizing NRM. One of the greatest challenges characterizing the evaluation of these case studies and other more inclusive forms of decision-making, especially in terms of assessing substantive outcomes, is the lack of *ex ante* evidence about the issues that emerged during the preliminary stages of the development of management regimes, which may well prove critical in terms of subsequent events (Jones and Burgess 2005). Only CIFOR’s pilot studies in Mafungautsi Forest in Gokwe district of Zimbabwe seem to provide valuable insights into the beginnings of co-management schemes. Despite some attempts at benchmarking, the study has also been plagued by lack of an objective way of evaluating the achievements. Perhaps the only hope lies with the Rwoho Reserve Forest project in Uganda, where an attempt was made by the SWAGEN team to test the hypothesis;

“Adaptive Collaborative Management (ACM) addresses complex multistakeholder resource management issues equitably. However, it faces the challenge of replication at the regional scale level as observed in its application in Rwoho forest in Uganda.”

Beyond the Orthodox and Ideals of an all Inclusive Decision Making Approach Lies Top – Down Imposition. Empirical evidence has revealed that collaborative and / or co-management approaches have the ability to undermine local governance latent energy through their top – down imposition. Jones and Burgess (2005) refer to this as the ‘The risk of imposition.’ Evidence of goals and institutions being imposed on people, the undermining of legitimate decision making process, and the reinforcement of the interests of the already powerful (Rydin and Pennington 2000; Yandle 2003; Plummer and FitzGibbon 2004b; Jentoft 2004; Carlsson and Berkes 2005) can be traced in a number of case experiences in Zimbabwe. In the Enyandeni Gwanda North district case such symptoms include but are not limited to;

- Power struggles among traditional leadership
- Limited support from key district level stakeholders.

In Mudzi and Bindura, a clash of priorities between Forest Commission (FC) and those of the community almost threatened the viability of the whole project. Political interference during election times was noted in the Kariba project. Throughout the whole project, fostering collaboration was viewed as ‘the FC initiative’ owing to the magnitude of its involvement.

Despite the existence of platforms for negotiating to resolve ensuing conflict between National Park authorities with mandate to oversee operations in Udzungwa Mountains National Park (UMNP) of Tanzania and the community, powerful park authorities always emerged victorious and this in most cases left the communities bruised, unsatisfied and resentful. The park authorities have been powerful in the sense that they are more organized and have access to the much needed leadership skills and intellectual resources - factors that give them an edge in negotiations. In the management of conflict over the management and utilization of transboundary resources between Uganda, DR Congo, and Rwanda, the roles and perspectives of international NGOs over national and local ones are increasingly influencing and facilitating the direction and pace of transboundary collaborative resource management and governance.

Clearly reconciling rhetoric and reality in what adaptive co-management purports to do

and what it actually does is difficult given the conflicting evidence. Contrary to some of its underlying assumptions is the fact that adaptive co-management has not been a dynamic and a problem solving process (Pinkerton 2003; Carlsson and Berkes 2005). Neither has it yielded one of its core objective – that of strengthening the capacities of co-management institutions and organizations (De Urioste-Stone et al 2006). These overwhelming positive promises associated with co-management are being called into question as critical reflection from multiple perspectives on the experience is being urged (Nadasdy 2003; Natcher et al. 2005; Plummer and Armitage 2007).

CONCLUSION

The analysis has revealed that the ACM of natural resources in Eastern and Southern Africa has been instrumental in solving some of the vexing problems confronting the NRM sector. The application and / or implementation of its relatively newer principles has not been smooth. A wide range of conceptual and practical challenges have been discussed. The analysis has argued that unless some of these challenges are fixed, ACM in NRM will be as part of the problem as much as it is a solution in NRM.

ACKNOWLEDGEMENTS

The author would like to acknowledge participants at the Nuffic funded ACM writeshop held in June, 2008 in Bloemfontein, South Africa and supported by Wageningen University and Research Centre in the Netherlands for sharing their ACM experiences. Specific complements go to Wouter Leen Hijweege who facilitated the write shop and managed to pool together ACM experiences from Eastern and Southern Africa into a reader. I also express gratitude to my interaction with Zimbabwean ACM practitioners, through workshop platforms created by CIFOR. My sincere gratitude to Witness Kozanayi and Tendayi Maravanyika who have contributed a lot to the Zimbabwean insights shared here in their capacity as editors of the Zimbabwe ACM news magazine. I am also greatly indebted to the institutional and financial support rendered by the University of Venda in South Africa. The views expressed are how-

ever strictly those of the author and not necessarily those of the supporting institutions.

REFERENCES

- Bormann BT, Haney RW, Martin JR 2007. Adaptive management of forest ecosystems: Did some rubber hit the road? *BioScience*, 57: 186 – 191.
- Bruns B R 2008. Aiding Adaptive Co-management in Irrigation: Governing Shared Resources: Connecting Local experience to Global Challenges. *Panel on Adapting Irrigation Waterscapes: 12th Biennial Global Conference of the International Association for the Study of the Commons*. Cheltenham, England, July 14 to 18, 2008.
- Carlsson L, Berkes F 2005. Co-management: Concepts and methodological implications. *Journal of Environmental Management*, 75: 65-76.
- Coggins GC 1996. Devolution in federal land law: Abdication by any other name. *Hastings North-West Journal of Environmental Law Policy*, 3(2): 211-218.
- Coggins GC 2001. Some perils of devolved collaboration. In: P Brick, D Snow, S Van de Wetering (Eds.): *Across the Great Divide: Explorations in Collaborative Conservation and the American West*. Washington, DC: Island Press, pp. 163-171.
- Conklin J 2006. *Wicked Problems and Social Complexity in Dialogue Mapping: Building Shared Understanding of Wicked Problems*. Cognexus Institute.
- De Urioste-Stone S, McLaughlin W J, Sanyal N 2006. Using the Delphi technique to identify topics for a protected area co-management capacity building program. *International Journal of Rural Management*, 2(2):191-211.
- Dukes EF, Firehock K, Leahy M 2001. *Collaboration: A Guide for Environmental Advocates*, Virginia: University of Virginia.
- Few R 2001. Containment and counter-containment: planner/community relations in conservation planning. *Geography Journal*, 167(2): 111-124.
- Folke C, Environmental Advisory Council to the Swedish Government 2002. Resilience and Sustainable Development: Building Adaptive Capacity in a world of transformations. *Working paper*. Stockholm: Environmental Advisory Council.
- Gadgil M, Olsson P, Berkes F, Folke C 2003. Exploring the role of local ecological knowledge in ecosystems management: Three case studies. In: F Berkes, J Colding, C Folke (Eds.): *Navigating Social Ecological Systems*. Cambridge, UK: Cambridge University Press, pp. 1307-1317.
- Hijweege W L 2008. *Emergent Practice of Adaptive Collaborative Management in Natural Resource Management in Southern and Eastern Africa*. The Netherlands: Wageningen University and Research Centre.
- Kozanayi W 2008. Can wicked problems be tamed? An examination of successes and challenges in using ACM approach in Rural Zimbabwe. In: WL Hijweege (Ed.): *Emergent Practice of Adaptive Collaborative Management in Natural Resource Management in Southern and Eastern Africa*. The Netherlands: Wageningen University and Research Centre.
- Jentoft S 2004. Institutions in fisheries: What they are, what they do, and how they change. *Marine Policy*, 28(2): 137-149.
- Jones PJS, Burgess J 2005. Building partnership capacity

- for the collaborative management of marine protected areas in the UK: A preliminary analysis. *Journal of Environmental Management*, 77(3): 227-243.
- Mandondo A 2006. Dialogue of theory and empirical evidence: A weighted decision and tenural niche approach to reviewing the operation of natural resource policy in rural southern Africa. *Southern Africa Commons Occasional Paper Series*.
- Moberg F, Galaz V 2005. Resilience: Going from conventional to adaptive freshwater management for human and ecosystem compatibility. *Swed Water House Policy Brief No. 3*, Stockholm, Sweden: SIWI.
- Nadasdy P 2003. *Hunters and Bureaucrats: Power, Knowledge, and Aboriginal-State Relations in the Southwest Yukon*. Vancouver, British Columbia, Canada: University of British Columbia Press.
- Natcher DC, Davis S, Hickey CG 2005. Co-management: Managing relationships, not resources. *Human Organization*, 64(3): 240-250.
- Olsson P, Folke C, Berkes F 2004. Adaptive co-management for building resilience in social-ecological systems. *Environmental Management*, 34(1): 75-90.
- Pinkerton E 2003. Toward specificity in complexity: Understanding co-management from a social science perspective. In: DC Wilson, J R Nielson, P Degnbol, (Eds.): *The Fisheries Co-Management Experience: Accomplishments, Challenges and Prospects*. The Netherlands: Kluwer Academic, Dordrecht, pp. 61-77.
- Plummer R, FitzGibbon J 2004. Some observations on the terminology in co-operative environmental management. *Journal of Environmental Management*, 70(1): 63-72.
- Rydin Y, Pennington M 2000. Public participation and local environmental planning: the collective action problem and the potential of social capital. *Local Environment*, 5(2): 153-169.
- Stankey GH, Bormann BT, Ryan C, Shindler B, Sturtevant V, Clark RN, Philpot C 2003. Adaptive management and the northwest forest plan: Rhetoric and reality. *Journal of Forestry*, 101(1): 40-46.
- Walker PA, Hurley PA 2004. Collaboration derailed: The politics of community-based resource management in Nevada County. *Society and Natural Resources*, 17: 735-751.
- Walters CJ 1997. Challenges in adaptive management of riparian and coastal ecosystems. *Conservation Ecology*, 1(2): 1.
- Wondolleck JM, Yaffee SL 2000. *Making Collaboration Work: Lessons from Innovation in Natural Resource Management*. Washington DC.: Island Press.
- Yandle T 2003. The challenge of building successful stakeholder organizations: New Zealand's experience in developing a fisheries co-management regime. *Marine Policy*, 27: 179-192.