

# Collective Action in the Management of Water Sources in the Highlands of Eastern Africa<sup>1</sup>

J.G. Mowo<sup>2</sup>, L.A. German<sup>3</sup>, J. M. Wickama<sup>4</sup>, A. Zenebe<sup>5</sup> and Waga Mazengia<sup>6</sup>

## Abstract:

Participatory constraints and opportunities analysis conducted in three watersheds in Tanzania and Ethiopia established that water quantity and quality were the major constraints to adopting integrated natural resource management (INRM) practices. The African Highlands Initiative (AHI) working with communities in the three watersheds considered management of water sources as an important entry point for enhanced INRM. Focus group discussion, key informants interviews and historical trend analysis were used to obtain information on the status of water sources in the target watersheds, reasons why most of them have deteriorated, the impact of this on NRM and available opportunities for reversing this trend. The study established that rehabilitation of water sources was possible through collective action, which in this paper refers to direct actions carried out by groups of people working toward common goals. Further, appropriate policies and realistic by-laws, planting of water friendly tree species and putting in place an effective management structure were necessary for the long term survival of the water sources. Through AHI interventions, 32 water sources have been rehabilitated in Baga Watershed in Tanzania where target communities indicated a reduction on the time spent in collecting water from 5 hours to 5 minutes. A health centre in one village in this watershed reported a 55 % reduction in the incidences of waterborne diseases. In Ginchi (Ethiopia) three springs have been rehabilitated and are being used to protect the catchments around through enacting of local rules and regulations for their management. In Areka (Ethiopia) a total of 300 households have benefitted from rehabilitated water sources while reduction in the time for collecting water has increased the time available to attending to other developmental activities. It is concluded that collective action in managing water sources is an effective way of addressing issues that are beyond the capability of individual households, and through this, save time that can be directed to other activities including NRM, apart from having a healthier community.

**Key words:** *Collective action, Entry point, Water sources, Natural resource management, Highlands, Eastern Africa*

---

<sup>1</sup> Paper presented at the IASC 2008 Global Conference in Cheltenham U.K., 14 – 18 July 2008.

<sup>2</sup> African Highlands Initiative (AHI), World Agroforestry Centre, Box 26416 Kampala, Uganda

<sup>3</sup> Centre for International Forestry Research (CIFOR), Box 6596, JKPWB, Jakarta 10065 Indonesia

<sup>4</sup> Directorate of research and training, Ministry of Agriculture, Box 22 Lushoto, Tanzania

<sup>5</sup> Holetta Agricultural Research Centre, Box 2003, Addis Ababa, Ethiopia

<sup>6</sup> Areka Agricultural Research Centre, Box 79, Areka, Ethiopia

## Introduction

Sustainable natural resource management (NRM) by smallholder farmers is limited by the fact that most NRM practices are labour intensive and that they operate in spatial scales transcending beyond the boundaries of individual plots (Meinzen-Dick and Di Gregorio, 2004). Individual farmers and households with low active population cannot undertake such tasks as soil conservation on their own. Moreover, patchy or scattered conservation efforts are bound to fail because of uncontrolled run-off from neighbouring non conserved fields. In most rural areas in the highlands of eastern Africa water is not piped and is considered a common pool resource available in springs or rivers. Water flows transcend individual plots and therefore management of water sources can work effectively if handled through communal efforts. An important resource available to most rural communities in the highlands of eastern Africa is therefore, their social capital through which several farmers or households come together to work on a developmental issue in pursuance of a common goal. This is commonly referred to as collective action, and in the past, rural communities in eastern Africa were well advanced in exploiting such social capital in addressing issues like management of water sources, soil conservation and management of grazing lands and community woodlots (Mowo et al. 2006). The advent of market economy, socio-political interference and break down of traditional values have promoted individualism at the expense of co-existence leading to failure by rural communities to fully exploit their collective potential in addressing important NRM issues. Coupled with this is the limited recognition in recent agricultural and rural development of the importance of local groups and institutions in harnessing social capital for NRM although the management of natural resources has always involved collective action (Pretty, 2003). Working in Cambodia Weingert (2006) observed that local institutions were bound to succeed in the management of natural resources than external institutions.

Collective action can be defined as the pursuit of a goal or set of goals by more than one person. This pursuit of common goals may go well beyond formal social structures (farmers' groups) or direct activities carried out by such groups. In the highlands of Eastern Africa where AHI has experimented with different approaches a number of different forms and functions of collective action have been identified (Lubell et al. 2002; Swallow et al. 2001; Tanner 1995). The most widely used, refers to direct actions carried out by groups of people working towards common goals and may range from two neighbouring resource users managing a common boundary to a widespread social movement. This is what German et al. (2006) have called the social movement dimension of collective action. On the other hand, the collective regulation of individual actions is considered another function of collective action (Meinzen-Dick et al. 2002; Pender and Scherr 2002; Gebremedhin et al. 2002; Scott and Silva-Ochoa 2001). This form of collective action refers to collectively agreed upon rules to govern individual behaviour and helps to minimize the negative impacts of an individuals' behaviour on another or on an environmental service of public concern such as water sources. Sultana et al (2002) considers the mechanisms for political equality as another function of collective action which involves acknowledgement of diverse political interests around any given resource or management decision, and their effective integration into more equitable decision-making processes. Collective action in NRM is becoming increasingly important given the importance of natural resources to rural communities who rely on them to meet their daily needs. Increasing

degradation of the natural resource base is having a negative impact on efforts to reduce rural poverty mainly due to failure by local communities to adopt NRM practices. This is in turn caused by technologies that are either too costly or labour intensive for individual poor smallholder farmers to adopt (Metcalf, 2003).

Throughout the highlands of Eastern Africa water availability in terms of quantity and quality was identified a top priority constraint by local communities (Mowo et al. 2006). Water quantity is a major problem during the dry season which is attributed to degradation of most water sources and the high population increase which stretches available water during dry seasons to extreme limits. Meliyo et al. (2006) reported a decrease in the number of springs and streams and in the water levels for the few remaining water sources due to degradation of the environment in the Baga watershed in Lushoto Tanzania. Water quality is also an important constraint in the highlands of eastern Africa and this is mostly attributed to abuse and cultivation close to water sources leading to high incidences of waterborne diseases (Petekwa et al. 2007). Limited water availability and quality hinders community members from effectively utilizing their labour in productive enterprises including agricultural production. Research teams working with communities in the highlands of eastern Africa soon realized that without addressing these priority constraints efforts at NRM cannot bear much fruits. In this paper, efforts at promoting collective action for effective management of water sources were studied at three sites in Tanzania and Ethiopian highlands to improve water quantity and quality as an entry point to NRM for improved agricultural production.

### Location of the study area

The African Highlands Initiative (AHI) is an eco-regional program of the CGIAR under the World Agroforestry Centre (ICRAF). It operates in 10 east and central

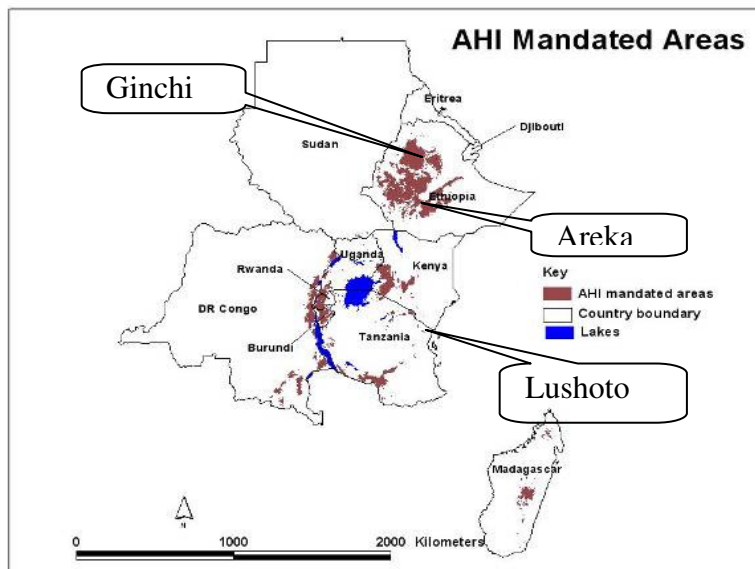


Figure 1. AHI Mandated areas and location of study sites

African countries in areas 1,400 metres above sea level, characterized by high population density ( $> 100 \text{ people km}^{-2}$ ), adequate rainfall ( $> 1,000 \text{mm year}^{-1}$ ), shows signs of stress such as decreasing crops and livestock production, fragmentation of land holdings to small size, increasing numbers of rural poor, limited cash opportunities, poor access to markets and limited opportunity to practice traditional ways of maintaining land productivity

measures. Figure 1 shows the mandated areas of AHI in East and central Africa. The major role of AHI is to develop methodologies for integrated natural resource management (INRM) and institutionalising them in partner organisations in the

region. The current study is confined to the Baga watershed in Lushoto Tanzania, Galessa Watershed in Ginchi Ethiopia and Gununo Watershed in Areka Ethiopia.

## Methodology

Work on rehabilitation of water sources began in 2006. This was preceded by a participatory action research with farmers playing a major role to identify and prioritize watershed issues including water sources. Farmers were disaggregated based on wealth, gender (sex and age) and location on the landscape to ensure that interests of the different social groups were taken into consideration. Focus group discussions (FGD), key informants interviews and historical trend analysis were used to obtain information on the status of water sources in the target watersheds, reasons why most of them have deteriorated, the impact of this on NRM and available opportunities for reversing this trend. Focus group discussion provided the opportunity to probe further into the reasons for deteriorating of water sources and what each social group consider to be the most appropriate strategies to address them. Key informants were used to triangulate the information from the FGD since these are a more enlightened group in the communities. Key informants included elders with a long experience on the situation in the watersheds, retired government officials and government and religious leaders. Historical trends analysis was implemented to establish how the status water sources including amount of water discharge and quality of water have changed over time using simple indicators such as the time it takes to collect water, physical appearance and presence of pollutants in water. In Lushoto the research team collected data from health centres to monitors incidences of water borne diseases before and after rehabilitation of water sources.

The three watersheds followed more or less the same steps in arriving at a strategy for rehabilitation and management of the water sources. These were: (i) awareness creation on the situation of water sources in the target watersheds and the need for collective action to reverse the trend, (ii) formation of water committees to oversee the implementation of agreed plans, (iii) identification and consultation with different stakeholder groups, (iv) identification of the roles of different stakeholders (v) participatory bylaws development to ensure sustainable management of the water sources, (v) validation of bylaws by target communities (vi) Authentication of the bylaws by Ward Development Committees, (vi) capacity building of water committees and local leaders on the management of water sources, (vii) implementation of agreed tasks and (vii) participatory monitoring and evaluation of agreed targets. As much as possible local materials and local artisans were used in the rehabilitation of water sources. The local communities through collective action contributed their labour for collecting stones and sand while other stakeholders such as the AHI project supplied materials that could not be obtained from the watersheds such as cement. Collective action was also extended to management of the land around water sources to minimize the effect of contamination from soil erosion. Such activities included re-vegetation of the areas surrounding springs. In Lushoto and Ginchi district leadership was involved in different stages including inauguration of rehabilitated water sources (Areka) and campaigns for increased community interest in water sources management (Lushoto). In the case of Lushoto farmers were prompted to plant locally available water friendly trees around the water sources such as *Ficus-Vallis chaudae*, *Albizia schiniperiana*.

## Results

### *Priority Watershed Issues*

In all the watersheds studied water availability in terms of amounts and quality ranked highest. Table 1 shows the four most highly ranked watershed issues in Lushoto and Ginchi, and the farmer groups prioritizing them. The three top ranked issues in Lushoto rotate around water either for domestic use or for irrigation. Valley bottom off-season high value crop production is a major enterprise in Lushoto and this rely mainly on irrigation. Water quality is a major concern for upslope farmers, men and the youth. Upslope farmers rely on streams while downslope farmers on springs the later offering relatively better quality water as long as the spring is protected. In Ginchi water quality (Figure 1) was ranked second most important watershed issue by all farmer groups. In all sites poor water quality was attributed to abuse of water sources such as washing directly in the spring or stream (Figure 1), animals using the same water source as for domestic supply, cultivation close to water sources and solid waste contaminants given that most water sources are either not protected or failure to enforce available bylaws on water source management. The later is mainly attributed to improperly formulated bylaws which do not involve full participation of local communities, low fines given to abusers of water sources and out-dated bylaws.

Table 1. Top 4 ranked watershed issues in Lushoto and Ginchi

Watershed issue	Group ranking	Rank
<i>Baga Watershed, Lushoto</i>		
Poor water quality	upslope farmers, high income, youth	1
Declining water quantity	All	2
Declining irrigation water	High income, men, youth	3
Negative effects of boundary trees	High income	4
<i>Galessa Watershed, Ginchi</i>		
Loss of indigenous tree species	All	1
Poor water quality	All	2
Land shortage	Youth, women	3
Declining soil fertility	All	4



Figure 1. Poor quality water sources in Areka (left) and washing in a spring in Lushoto (right)

### ***Achievements of collective action in management of water sources***

#### *Galessa Watershed, Ginchi, Ethiopia*

There is increasing awareness of the importance of spring management by watershed communities due to awareness creation efforts. In Ginchi a total of 3 springs were rehabilitated in 2007 and are managed well without external support. This shows that the bylaws enacted with full participation of watershed communities are working compared to earlier bylaws which were difficult to enforce. Community participation was high and there was increased confidence and trust among community members as they interact to address a common problem. As a result they have been motivated to take part in other watershed related activities such as construction of soil conservation structures and niche compatible a forestation. From time to time users of the springs concerned about the quality of water (another result of awareness creation) are asking district authorities to check the quality of their water. Relying on their Collective strength all farmers are actively participating soil and water conservation above the spring that can increase the discharge of the springs. Water user groups have been established around water sources and they are effective in mobilizing the community for meetings and negotiations. From farmers testimonies there has been continuous supply of water throughout the year since the rehabilitation of the spring including the dry months of April and May. Researchers are however not clear whether this can solely be attributed recharging of springs due to soil bunds around water sources or from the accumulation of water in the collecting chambers which would have otherwise been lost.

#### *Gununo Watershed, Areka, Ethiopia*

In Areka, one spring, one cattle trough and one washing basin were constructed and are now serving more than 300 hundred beneficiaries of the watershed community. The water discharge of the spring has increased and larger amount of water can now be obtained. Labour and time to fetch water are now saved which otherwise could be wasted before the spring development. Water quality has also improved and it is now clean, pure, and odourless. Further analysis including laboratory quality determination and a study on the incidences of water borne diseases are required to

further ascertain the purity of the water. The time taken to fetch water has gone down from 10 hours to 15 minutes. The spring rehabilitation has also resolved certain social issues. For instance, workload on women has decreased and this has reduced conflicts between women against their spouses. The participation of men in fetching water has decreased in most households. Conflicts between wild animals and human beings associated to fetching water at night have been minimized.

The improved washing basin, on the other hand, has simplified washing of clothes saving both water and soap while keeping the water source clean because dirty water does not go back to the water source. Water pollution through cattle has also been minimized because of the improved cattle trough (Figure 2).

The community is currently using and managing the spring following the formulated by-laws. The community contributes money for the maintenance of the pump and payment of a guard to protect the water source. A water committee made of 7 people has been established for the management of the spring so there are some good indications on the sustainability of the spring. Capacity building was conducted by training the water committee members and two community leaders. The training focused on water supply and sanitation, water scheme management and operation and maintenance of water plant. Other stakeholders are also playing a key role in the management of the spring and these includes Zone and District Water Offices who provided the training experts as well as technical and material support to develop the spring.



Figure 2. Washing of clothes before rehabilitation of the spring (left) and after (right) in Areka.

### *Baga Watershed, Lushoto, Tanzania*

In Lushoto collective action has led to the rehabilitation of several degraded water sources by watershed communities and enacting of bylaws to manage them. A total of 30 water sources were earmarked for rehabilitation and by 2007 twenty six (26) were completed representing a 95 % achievement. The communities have planted a total of 400 water friendly trees around the water sources. Women have reported a significant decrease in the time spent to collect water. For example, in two villages (Dule and Kwekitui) the time for collecting water has gone down from 30 minutes to 5 minutes. In some villages farmers had earlier reported spending up to 5 hours in search of water during the dry seasons (Meliyo et al 2006). Figure 3 shows the time spent in collecting water before and after AHI intervention in the watershed.

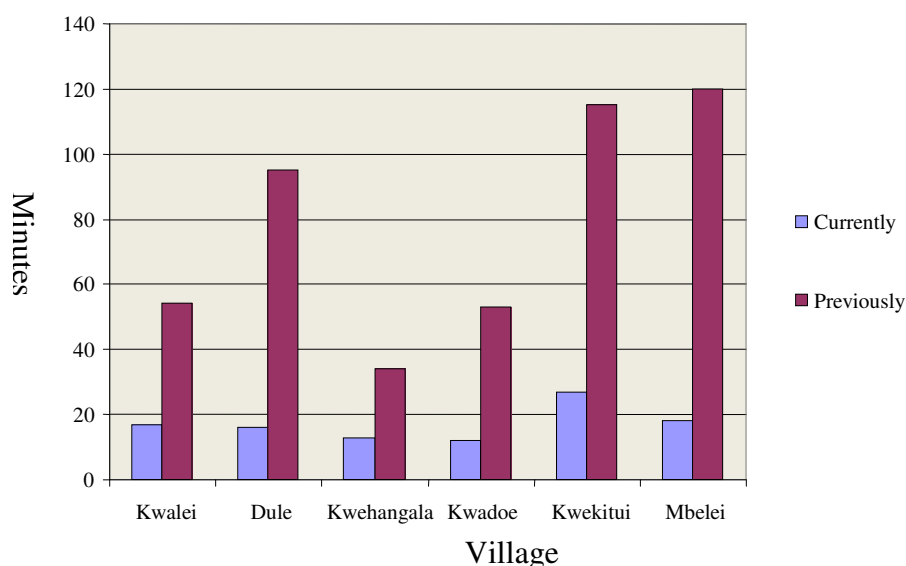


Figure 3. Time (minutes) spent in collecting water before and after AHI intervention in the Baga Watershed, Lushoto.

In all the watershed villages, there is a growing interest in the participation of farmers in other watershed activities and this is partly related to improved availability of water. More in-depth studies are required to find out how farmers are using the time saved from collecting water.

Results also show that the number of water borne diseases in the watershed has decreased. In one health centre in Mbelei Village the number of patients treated for ailments related to unclean water (Diarrhea) declined from 77 in 2006 to 22 in 2007 during the long rain periods (Figure 4).

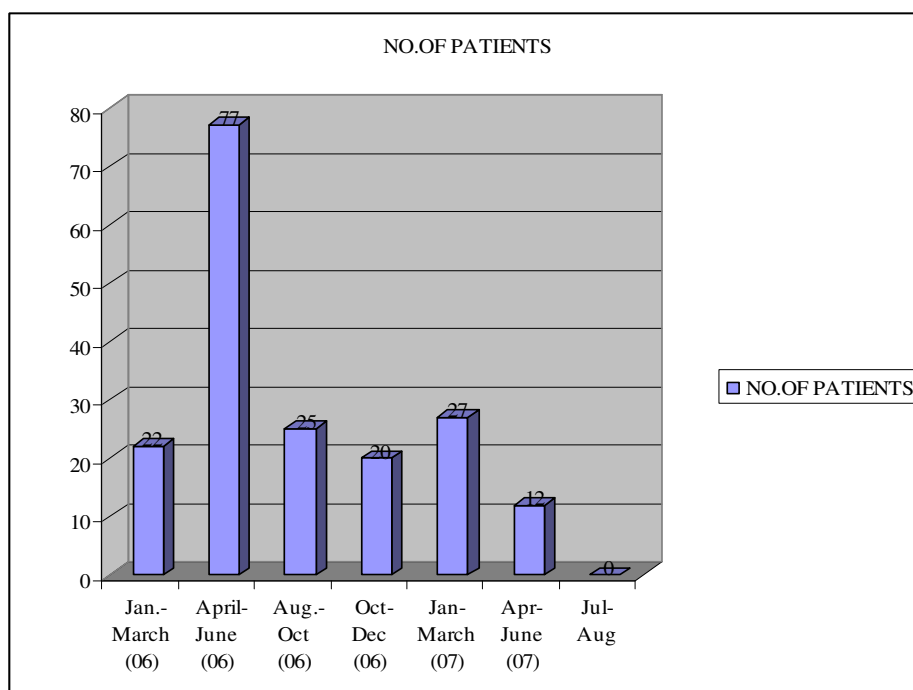




Figure 4. Number of patients received at one of the local dispensaries in the Baga Watershed, Lushoto in 2006 and 2007

### **Lessons learnt**

The highlands in Eastern Africa might be receiving relatively high rainfall but this does not always translate to high availability of water throughout the year and in desirable qualities. On the other hand, the majority of the smallholder farming households cannot afford the costs related to harvesting and storing rain water for use during the dry period. Water quality is also poor due to relaxation of the traditional rules and regulations that guided societal norms in then past. Abuse of water source comes in different ways including washing clothes and bathing right in the spring or stream, pollution from agricultural pesticides especially given that production of high value crops is common in the highlands and these uses lots of pesticides, and solid pollutants including plastic wastes. The lack of cheap energy sources prohibits boiling as a measure to address water quality resulting in increased frequencies of water borne diseases. A frequently sick farming community can not invest effectively in NRM. Given the above scenario, highland communities in eastern Africa are left with the option of rehabilitation and effective management of available water sources for their survival. Experiences from the three watersheds studied shows that water sources that had disappeared could be revived through concerted efforts directed at their rehabilitation and establishing an effective governance structure through use of their collective (social) capital.

Although water is not under the agricultural research portfolio per se, addressing it as an entry point to agricultural NRM was found a strategic because of its importance. Failure to address this priority issue would lead to lack of interest in the research process by target communities. It will also mean failure by the research and development team to adopt an integrated approach in order to address the always interlinked NRM constraints facing smallholder farmers in the eastern Africa Highlands. Natural resource management agendas demand a high level of farmer participation and control of the research and development process and therefore watershed management should strategically be linked to local incentives for improved NRM (German, 2003). Once this is attained the interest of local communities in introduced interventions is high and sustainability is ensured. A good example is offered by Areka where although the incomes of the majority of the farmers are low they were ready to contribute cash for the maintenance of the water pump and paying the guard.

Farmers usually show full cooperation to research and development teams after seeing the benefits of different technologies and practices. Because the target communities have seen the benefits of collective action in spring management the likelihood that they will fully cooperative in addressing other watershed issues that demand collaboration is high. Similar observations were made by Amede (2003) who noted that watershed agendas can be sustainably implemented only if supported by interventions that give immediate benefits to farmer. .At landscape scale issues of importance to diverse groups (gender, resource endowment and location on the landscape are important entry points to participatory watershed management.

In most communities common pool resources are not very much respected and their exploitation does not consider sustainability issues, rather individuals are more concerned with their immediate problems. Through collective action and full participation of community members in enacting appropriate rules and regulations agreeable to all there is a greater likelihood that such common pool resources like water sources will be sustainably managed ( Meinzen-Dick et al. 2002; Pender and Scherr 2002; Gebremedhin et al. 2002). Enforcement of such bylaws becomes more effective than for those that are imposed from outside no matter how good they might be. Finally, the establishment of water committees and building the capacity of members in running such committees was vital in the success of the water source management intervention. The participation of community leaders is vital in influencing the active participation of the rest of the community members. Leaders must show the way for the rest of the community members to have trust and confidence in them.

## **Conclusion**

Collective action is a powerful tool in addressing priority watershed issues such as management of water sources which cannot be handled by individual farmers or households. Through this tool water sources which had dried due to mismanagement of the landscape have been brought back to life greatly contributing to improved livelihoods of rural communities in the highlands of eastern Africa. Collective action is also vital in enacting appropriate and enforceable rules and regulations to govern water sources as well as other common pool resources. Improved supply of water greatly reduced the time it takes to collect water from as high as 5 - 10 hours to 5 – 15 minutes greatly releasing time for other activities including other NRM issues. Good quality water reduced the incidences of water borne diseases hence ensuring a healthy community strong enough to attend to the labour intensive watershed issues such as soil conservation. Establishment of strong water committees and building the capacity of committee members and community leaders are important undertakings that will ensure sustainability of rehabilitated water sources. Community leaders must be in the front line in participating in collective action not only to lead by example but also for the community to have trust and confidence in them.

## References

- Ayele, S., Ghizaw, A., Admassu, Z., Tsegaye, M., Alemu, G., Tolera, T. and German, L. (2007) Enhancing Collective Action in Spring “Development” and Management through Negotiation Support and By-Law Reforms. AHI Briefs No. E5 (African Highlands Initiative), Kampala, Uganda
- Gebremedhin, B., Pender, J. and Tesfay, G. (2002). Collective action for grazing land management in mixed crop-livestock systems in the highlands of northern Ethiopia. Socio-Economics and Policy Research Working Paper No. 42. Nairobi, Kenya: International Livestock Research Institute.
- German, L., Hailemichael T., Charamila, S., Tolera, T and Tanui, J. (2006). The Many Meanings of Collective Action: Lessons on Enhancing Gender Inclusion and Equity in Watershed Management. CAPRI Working Paper No. 52 • July 2006
- Lubell, M., Schneider, M., Scholz, J.T. and Mete, M. (2002). Watershed partnerships and the emergence of collective action institutions. *American Journal of Political Science* 46(1):148-163.
- Metcalfe, J. (2004). Landcare in the Phillipines: Stories of people and Places. Australian centre for International Agricultural Research (ACIAR) Monograph 112, 170p
- Meinzen-Dick, R. and Di Gregorio, M. (2004). Collective action and property rights for sustainable development: An overview. International Food Policy Research Institute (IFPRI).
- Meinzen-Dick, R., Knox, A. Swallow, B. and Place, F. (2002). Introduction. In *Innovation in natural resource management: The role of property rights and collective action in developing countries*, ed. Meinzen-Dick, R., A. Knox, F. Place, and B. Swallow. Baltimore, MD: Johns Hopkins University Press.
- Meliyo, J.L., Mansoor, H.A., Masuki, K. and Mowo J.G. (2006). The Baga Watershed Characterization: A step for sacling out technologies In: Amede, T., German, L., Opondo, C., Rao, S. and Stroud, A. (Eds.), *Proceedings of a conference held at ICRAF HQs, Nairobi, Kenya on October 12 – 15, 2004*. Kampala, Uganda: African Highlands Initiative.
- Mowo, J.G., German, L. and Tolera, T. (2006). Local institutions and their role in INRM: A regional synthesis. IN: *Integrated Natural Resources Management in Practice: Enabling communities to improve mountain livelihoods and landscapes*. In: Amede, T., German, L., Opondo, C., Rao, S. and Stroud, A. (eds.), *Proceedings of a conference held at ICRAF HQs, Nairobi, Kenya on October 12 – 15, 2004*. Kampala, Uganda: African Highlands Initiative.
- Munk Ravnborg, H. and Ashby, J.A. (1996). Organising for local-level watershed management: Lessons from Rio Cabuyal watershed, Colombia. *AgREN Network Paper* 65:1-14.

Pender, J. and Scherr, S.J. (2002). Organizational development and natural resource management: Evidence from central Honduras. In *Innovation in natural resource management: The role of property rights and collective action in developing countries*, ed. Meinzen-Dick, R., A. Knox, F. Place, and B. Swallow. Baltimore, MD: Johns Hopkins University Press.

Petekwa R., Wickama, J. and Mansoor, H. (2007). *Influence of Strategic Entry Points in Enhancing Natural Resource Management and Livelihood Improvement*. AHI Site Publication, Lushoto Tanzania

Pretty, J. (2003). *Social capital and connectedness: issues and implications for agriculture, rural development and natural resource management in ACP countries. Contribution of social capital to natural resource management* Technical Centre for Agricultural and Rural Cooperation , 2003

Rocheleau, D. and Edmunds, D. (1997). Women, men and trees: Gender, power and property in forest and agrarian landscapes. *World Development* 25(8):1351-1371.

Schroeder, R.A. (1993). Shady practice: Gender and the political ecology of resource stabilization in Gambian garden/orchards. *Economic Geography* 69(4):349-365

Scott, C.A. and Silva-Ochoa, P. 2001. Collective action for water harvesting irrigation in the Lerma-Chapala Basin, Mexico. *Water Policy* 3:555-572.

Sultana, P., Thompson, P.M. and Ahmed, M. 2002. Methods of consensus building for collective action: Community based aquatic habitat and floodplain fisheries management in Bangladesh and the Mekong delta. Paper presented at the workshop *Methods for Studying Collective Action*, February 25-March, 2002. Nyeri: Kenya.

Swallow, B. M., Garrity, D. P. and van Noordwijk, M. (2001). *The Effects of Scales, Flows and Filters on Property Rights and Collective Action in Watershed Management*. CAPRI Working Paper 16. Washington, DC: International Food Policy Research Institute

Tanner, C.L. (1995). Class, caste and gender in collective action: Agricultural labour unions in two Indian villages. *The Journal of Peasant Studies* 22(4):672-698.

Weingart, A. (2006). *Collective Action and Natural Resource Management in Rural Cambodia*. Paper presented at "Survival of the Commons: Mounting Challenges and New Realities," the Eleventh Conference of the International Association for the Study of Common Property, Bali, Indonesia, June 19-23, 2006.