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What determines the success of community-based institutions for irrigation management?

*Results from Ghana*

by Kadir Osman Gyasi, Stefanie Engel and Klaus Frohberg



# MAIN FINDINGS

## Main Conclusions

**C**ollective action for the maintenance of community irrigation schemes is more likely to be problematic when the user group size is large and ethnically heterogeneous, and where the scheme is shared by several communities.

**U**se of labor intensive techniques in the rehabilitation of irrigation schemes promotes a sense of ownership and moral responsibility that help ensure sustainability.

**A** high quality of rehabilitation works and regular training activities also contribute to successful irrigation management by communities.

**T**he level of cooperation for community management and quality of maintenance are higher where irrigation lands are fairly distributed.

**C**redible threats of sanctions and rules crafted by user groups themselves promote collective action and rule compliance.

**E**nactment of legislation recognizing the Water Users' Associations (WUAs) as the legitimate users and managers of the irrigation systems promote the effectiveness of local institutions.

**R**egistration of WUAs as cooperative organizations and the subsequent application of cooperative norms of periodic auditing of accounts of the associations could help to improve accountability and thereby cooperation within communities.

In many countries, institutional weaknesses and performance inefficiencies of public irrigation agencies have led to high costs of development and operation of irrigation schemes. Poor maintenance and lack of effective control over irrigation practices have resulted in the collapse of many irrigation systems. Moreover, irrigation agencies have largely failed to raise sufficient revenues from the collection of water charges to meet operational expenses. Consequently, there has been growing promotion of community-based irrigation management in many developing countries to improve efficiency and reduce cost.

Indeed, evidence of successful devolution programs in some parts of the world has motivated a lot of donor support for small-scale irrigation schemes under community management. Leading this initiative in Ghana, the International Fund for Agricultural Development (IFAD) has funded the construction and rehabilitation of communally managed dams in the Upper East Region under the Land Conservation and Smallholder Rehabilitation Project (LACOSREP). The success story of LACOSREP has motivated the replication of this model by other NGO and donor-funded programs with irrigation components in northern Ghana.

In spite of the appeal of local management of irrigation systems the devolution process is not without problems. Often the outcomes are mixed, and the assumption that communities and user groups will manage

the systems sustainably may not hold in all cases. Evidence of success especially in the context of small scale irrigation systems is limited. Indeed, previous experiences with community managed irrigation schemes in northern Ghana have not always been positive. Many schemes severely deteriorated or broke down completely in the past due to insufficient maintenance.

The study undertaken at ZEF aimed to explain the reasons why communities differ in terms of economic, environmental and distributional outcomes of irrigation management. The goal was to improve our understanding of the conditions for long-term sustainability of community-based irrigation management strategies, both in terms of sustainability in maintenance and sustainability of local institutions.

The focus of the study was in the Upper East Region (UER) and Upper West Region (UWR) in northern Ghana, which are characterized by low and erratic rainfall regimes, low soil fertility, rapid soil degradation, high population densities and extreme poverty. Agriculture is the main source of livelihood for the majority of the population living in the study area. These regions boast of large numbers of small-scale irrigation schemes, and are in the forefront of community-based irrigation management in Ghana. It is hoped that the research findings provide insights that can guide similar efforts, even in different resource sectors, in other parts of the country with similar agro-ecological and socioeconomic settings.

In the study the socioeconomic contingencies of the area under investigation which could enhance or hinder the success of community management of common-pool



Dam for small-scale irrigation.

resources are reviewed. This includes household organizations and labor exchange arrangements. It is found that communal labor exchange arrangements, which abound in the area, lead to development of social networks, norms and trust upon which people tend to cooperate for common welfare. One other important aspect of the community system relevant for the success of collective action is the fact that the patriarchal household arrangements prevailing in the area make social mobilization easy as households play important roles in mobilizing their members for social and collective activities in the communities. The study identifies a great variety of socio-political and traditional institutions that are crucial for the outcomes of natural resource management in the region. Indeed, indigenous people's knowledge, practices, values and capabilities form the basis for natural resource management in the local communities. Traditional institutions function to activate and enforce social norms of behavior through established patterns of authority and leadership. Thus, individuals in the local communities are constrained by ethi-



cal and moral values that induce co-operative behavior. However, we find that while chieftaincy disputes threaten social cohesion and stability, the declining influence of traditional systems and changing perceptions (including belief systems) about the spirituality of natural resources (due to external pressures e.g., globalization, migration, access to television and the media, introduction of western education and religion, etc.) is weakening the ability of the traditional institutions to promote sustainable natural resource management. Based on the results it is suggested that strengthening the capacities of the traditional authorities to develop systems of cooperation and effective systems of monitoring and enforcement of community regulations can be a key to the success of natural resource management at the community level.

An account is also made of the evolution of participatory irrigation management in northern Ghana to provide an understanding of the impact of institutional and organizational efforts on the efficient management of the irrigation schemes. Indeed, the



Dry season irrigation.

local unit of organization, under the community irrigation strategy, entrusted with the management of the irrigation schemes is the water users' association (WUA). Past experiences of deterioration and collapse of irrigation schemes in the study area make scheme maintenance the most important of the functions of the WUAs, which also include irrigation plot allocation and water distribution, collection of irrigation fees and resolution of disputes. Through collective action, the WUAs mobilize resources for operation and maintenance of the schemes. However, user groups differ substantially in their performance of these functions, with some systems exhibiting very low levels of maintenance.

Dry season gardening practiced at the irrigation schemes plays a very important role in the livelihood strategies of most households in the study area. The dams also remain the most important sources of water for livestock in the area, and for other domestic uses in addition to fishing. The multiple uses of the schemes serve as the incentives for members of the communities to participate in the collective maintenance of the systems. However, as a common property the schemes are open to the problems of collective action (e.g., free riding). The tendency for some households to renege on their maintenance obligations often results in a cycle of insufficient maintenance and declining performance.

To ensure that the economic benefits of the irrigation schemes are equally shared by all, the beneficiary communities were called upon to agree to a land redistribution policy that would ensure that the majority of the people, including women and the landless, have equal access to irrigation land.



Training activities contribute to successful irrigation management.

However, some landlords continue to resist this redistribution policy. In the majority of the schemes plots are fragmented to accommodate large numbers of community members.

On the other hand, the water distribution mechanisms were prescribed on the principles of equal distribution, but de facto it is in proportion to shares of landholdings in the irrigation area. Irrigators with larger plots get proportionally more water. Water distribution arrangements varied across the schemes and took the form of either a continuous flow arrangement or a prearranged time rotation mechanism. Number of villages sharing the use of the same scheme, age of the user group, conflicts and resistance of landlords to land redistribution increase the probability that a user group chooses the rotational system of water distribution. However, there is higher probability of observing continuous flow arrangements in communities that are socio-culturally heterogeneous, as the extent of organization and coordination required under a rotational mechanism will be difficult to achieve in heterogeneous communities.

There are, however, distributional implications for the allocation of land and water, which can be critical to the success of collective action for the management of the irrigation schemes. When resource allocation is perceived to be unfair it could lead to practices that can derail cooperative efforts and render the institutions for managing the resource dysfunctional. The ability of the WUAs to tackle local asymmetries to promote equity and devise appropriate institutions that create incentives for all is important to improve cooperation for the sustainable management of the schemes. It is shown that land conflicts are more likely to emerge where irrigation is more profitable, group sizes are large and where landlords have resisted land redistribution. Lack of opportunities for alternative sources of income also increases the probability of conflict occurrence.

The study also exposes the detrimental effect of the interference of landlords in land distribution on cooperation. Resistance of landlords to land redistribution weakens institutional mechanisms within the WUA, making enforcement of rules difficult. As these landlords allocate land to their favorites, they not only create factionalism within the user groups but also shifting alliances that are likely to be harmful to collective action for the maintenance of the irrigation systems.

The ability of the user groups to sustainably manage the schemes largely depends on concerted effort of all members to abide by rules and contribute effort towards the collective maintenance of the irrigation systems. Local regulatory mechanisms play an important role in ensuring the success of collective action for the maintenance of the



community irrigation schemes. In particular, monitoring and sanctioning limit free-riding and provide incentives for members to fulfill their maintenance obligations. Credible threat of sanctions such as fines and forfeiture of one's right to farm for not contributing to maintenance are associated with high quality maintenance. Similarly, irrigation fee default rates and water poaching are high in groups where deviant behavior receives only a warning. This finding underscores the importance of legal backing that would make institutions designed by the groups for the management of irrigation schemes more credible and durable. Moreover, it supports the views in the literature that suggest that without functioning institutions common-pool resources will not be effectively managed. Enactment of legislation recognizing the WUAs as the legitimate users and managers of the irrigation systems will go a long way to promote legitimacy and effectiveness of local institutions.

Social cohesion and social relationships also matter in the success of community-based resource management. Articulation between users appears to be increasingly problematic where the number of villages using a scheme increases. Indeed, the results of the study suggest that rule conformance is difficult to achieve when multiple villages share the use of the same schemes. Rule conformance is, however, high where by-laws are seen to have been designed by the WUA, rather than being imposed from outside.

Rule conformance is more likely and maintenance quality tends to be higher in smaller groups. In smaller user groups peer monitoring is easier, shared norms and patterns of reciprocity are more common, and social

sanctions are easier to implement through reputation mechanisms. Socio-cultural (ethnic) homogeneity also promotes collective action and for that matter efficient management of the schemes. Indeed, quality of maintenance is higher where villages sharing the use of a scheme are of the same ethnic identity.

The multiple functions of the irrigation schemes in water scarce communities make the sustainability of the schemes a concern for the majority of the households. Household participation in maintenance activities is very high in schemes that experience frequent water shortages. Also of significant effect is household satisfaction with the quality of services they receive, particularly irrigation water schedules. Members who do not get water at the right time and in the required amount resort to digging of shallow wells. This reduces their dependence on the schemes and affects commitment to its maintenance.

Both higher external wages and greater market access have strong negative effects on effort contribution to maintenance.



Poor maintenance of irrigation practices have resulted in the collapse of many irrigation systems.



Market integration generates exit options that reduce the role of irrigation in households' livelihood strategies. Thus, incentives for members to abide by the rules are reduced while the opportunity cost of labor increases. It is possible that, due to the social and economic importance of markets in the study area, maintenance schedules that coincide with market days would receive very poor response. Similarly, higher wages (and in general, exit options) outside the schemes increase the opportunity cost of labor and reduce the incentive for households to participate in the maintenance of the irrigation schemes. This, nevertheless, presents a potential conflict between irrigation maintenance and poverty-alleviation strategies that promote off-farm economic activities.

Transparent and accountable leadership is also shown to be an important concern that affects the incentives for households to contribute to the maintenance of the schemes. Lack of transparency, accountability and incidences of rent-seeking reduce trust and confidence in leadership, and undermine management efficiency. Leaders perceived to be corrupt lose their moral authority to enforce rules and regulations. The envisaged registration of the WUAs as cooperative organizations and the subsequent application of cooperative norms of periodic auditing of accounts of the associations could help to improve accountability and thereby cooperation within the groups.

Appropriate program design can promote effective irrigation maintenance. The results of our study show that the application of labor-intensive techniques during the rehabilitation of the schemes stimulate rule conformance and cooperation for successful

local management of the irrigation schemes later on. This is because physical participation in the rehabilitation program bestows on the participants some skills and a sense of ownership and moral commitment to contribute to the operation and maintenance of the schemes. Perceptions about the quality of rehabilitation work also have a significant effect on household maintenance participation. In communities where dams were perceived to have been poorly rehabilitated, deteriorations are attributed to the poor quality work done by the contractors; the irrigators tend to wait and hope that the contractor is brought back to rectify the anomaly, while the level of deterioration grows worse. Finally, frequent training of group leaders on operation and maintenance techniques is also crucial for achieving a sustainable irrigation management.

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## ZEF Policy Brief

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Center for Development Research  
University of Bonn  
Walter-Flex-Strasse 3  
D - 53113 Bonn  
Germany  
Phone: +49-228-73-1846  
Fax: +49-228-73-1889  
E-Mail: [zef@uni-bonn.de](mailto:zef@uni-bonn.de)  
<http://www.zef.de>

Authors:

Kadir Osman Gyasi (Post-Doctoral Fellow at ZEF),  
Stefanie Engel (Senior Researcher at ZEF) and  
Klaus Frohberg (Director of ZEF's Department  
of Economic and Technological Change)

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Alma van der Veen

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