

## Social Science Approach for Sustainable Water Use and Management in Africa

JICA Research Institute\*

### Policy Recommendations

1. The issue of the sustainable use and management of resources in Africa must be considered not only from the existing approach that emphasizes users' ownership, but also from the perspective of the commons, which focuses on the characteristic and potential availability of the resource, as well as the social relationships among the local residents.
2. To achieve the sustainable use and management of water resources by residents, it is critical to understand the characteristic and potential availability of the resource, people's strategies with regard to their livelihoods, and social relationships. Because people's understanding of water resources changes with factors such as the existence of competing water resources and the results of resource management, continuous monitoring will also be necessary.
3. Harmonization and acceptance of the management system in the society will be essential for maintaining continuous public involvement in water resources management. Thus, it is important to understand the social context and historical background of the system of water resources use and management and their reciprocal relationships with external actors such as the government and market.

In Africa, issues of water shortage and poverty are related to each other via two routes. The first is the route by which the water shortage causes a decrease in the amount of water used to maintain people's lives, which causes a direct effect on health and also a decrease in agricultural productivity. The second is the route by which fewer water resources cause increased competition for resources, excluding the poor from access to them and adversely affecting their livelihoods and survival. The excluded poor migrate to remote areas, generating the same kind of problems at their new locations. Thus, achieving the efficient use and management of limited water resources is a critical issue for poverty reduction, which also contributes to achieving the MDGs (Goals 1, 3, 4, and 7).

Construction of deep wells for domestic water supply and the development of irrigation facilities for improving agricultural productivity are the central measures for poverty reduction support in agricultural villages in Africa, where many impoverished people live. However, numerous problems exist in the maintenance and management of village water supply and irrigation facilities. At present, many village water supply facilities are not working properly. Irrigation facilities have become smaller and have been handed over to residents to manage, as problems in terms of maintenance and management were found in past examples of large-scale management by the government.

JICA has been engaged in efforts to improve the operation, maintenance, and management of water-use facilities in Africa. However, there have not been sufficient evaluations and studies from the perspective of how the residents, who are both the users and the managers of water-use facilities, have actually been involved in the operation, maintenance, and management activities, and what kinds of activities are working where others are not. This policy brief presents policy recommendations based on the findings of studies on the issue of the maintenance and management of water-use facilities in Africa from the perspective explained above.

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\* These recommendations were written by Atsushi Hanatani (Senior Research Fellow) and Mine Sato (Research Associate) based on the Sociological Analysis on Irrigation Development and the Development of Farmers' Organizations in Africa and Study on Village Water Supply Organizations in Africa and the Formulation of a Coordinated Regional Community, which are research projects implemented by JICA-RI.

**Recommendation 1:**

The issue of the sustainable use and management of resources in Africa must be considered not only from the existing approach that emphasizes users' ownership, but also from the perspective of the commons, which focuses on the characteristic and potential presence of the resource, as well as the social relationships among the local residents.

In conventional participatory development approaches, it has often been presumed in establishing an operation, maintenance, and management system that “optimal management can be achieved through residents’ recognition of the resources (such as facilities and water supplied by them) that they have obtained (with help from outsiders) as they are accepted and maintained as ‘own property’ (private goods).” In reality, however, problems such as the insufficient maintenance of facilities, unpaid water charges and water usage costs, and violations of the water allocation rules, are observed irrespective of the size of facilities. Thus, it is hard to say that the facilities are operated, maintained, and managed exactly as outsiders expect.

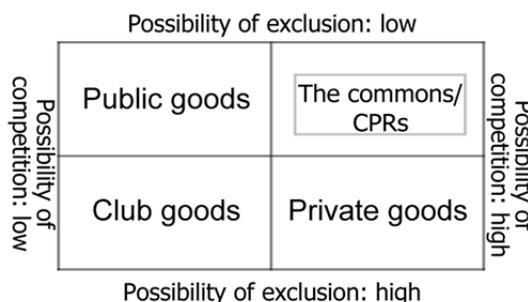
In fact, there are reported cases in which the collection of water charges has not been implemented sufficiently in a participatory water management organization, where the involvement of various stakeholders in operation was secured (e.g., the water supply system in Senegal) or in which the existence of cooperation among residents differs depending on the targeted resources and activities, even for small-scale irrigation facilities voluntarily suggested by the residents (e.g., small-scale irrigation in Malawi). These cases show that there are limitations to the premise of “appropriate operation and management by residents can be expected if ownership is secured.”

One of the reasons these events occur is that the water and water-use facilities that are operated, maintained, and managed are common pool resources (CPRs) which have the characteristic of being “goods that anyone can use (low possibility of exclusion), that decrease in terms of the quantity available for the rest (high possibility of competition) when used by the first person.” These resources are referred to as the “commons.”

Based on collective action theories, the “commons theory” enables us to understand a collective use and

management system for CPRs in relation to the surrounding social context (customs, norms, social relationships, and awareness). Although these theories are usually applied to the management of natural resources such as forest resources or fishing grounds, they can also be applied to man-made resources newly obtained by residents, such as water supply facilities or irrigation facilities.

Water resource facilities as commons



Although the operation, maintenance, and management of water supply facilities and irrigation facilities provide occasions for people to cooperate, since not only benefits but also costs arise from that cooperation, people are constantly tempted to take a free ride. Conversely, concerns about others just taking free rides may make people think twice about cooperating. To facilitate cooperation within a group, it is critical that the benefits obtained from cooperation exceed the cost of cooperation. By adopting the perspective of the commons theory, it becomes possible to clarify this phenomenon in relation to the potential presence of resources and in the social context.



An example of temporary irrigation in Malawi

**Recommendation 2:**

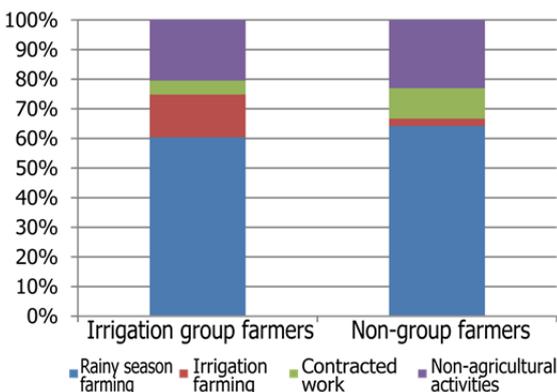
To achieve the sustainable use and management of water resources by residents, it is critical to understand the characteristic and potential presence of the resource, people's strategies with regard to their livelihoods, and social relationships.

Because people's understanding of water resources changes with factors such as the existence of competing water resources and the results of resource management, continuous monitoring will also be necessary.

It is generally assumed that the primary individual benefits of the common management of water resources are safe water in the case of water supply facilities and crop production in the dry season in the case of irrigation respectively.

However, by looking more closely into people's lives, in some regions the need for safe water is not necessarily strong, but appetizing water (which may not necessarily be that safe) or water that is available nearby, and one's own water that can be used freely without thinking about other people, are preferred (e.g., case examples of the water supply system in Senegal). Also, in the case of irrigation, crop production in the dry season may account for merely a partial position within the overall picture of farmers' income-gaining and survival strategies. For instance, in the case of small-scale irrigation in Malawi, it was found that the percentage of irrigation farming in the net revenue of an irrigated farm was about 10%; About 60% of their income still depended on crop production in the rainy season even after the introduction of the irrigation system, while they also maintained non-agricultural means of income, including temporary employment (refer to the following figure).

**Breakdown of the means of livelihood of farmers in Malawi**



For costs, on the other hand, various costs exist from the self-interest point of view, including not only cash expenses such as water charges and the costs of using water, but also social costs accompanying efforts to carry water home and competition over the order of water drawing, opportunity costs of time spent on facilities maintenance and management, and the possibility of suffering losses due to other people getting free rides.

In addition, aid workers and policymakers tend to think of the targeted society as a community in which people share common values and support one another. In reality, residents' social conditioning often includes cleavages according to various factors, including gender, ethnic groups, religious/sectarian groups, and socioeconomic class, and the group of users does not always make up a homogenous community. For example, in the Senegal case, there are several ethnic groups with different religions living in the same village, including some nomads. Under these circumstances, residents cannot be sure that other people will share the same burden of costs as they will.

As explained above, the sense of benefit and loss that determines individual cooperation in the management of CPRs is influenced by the significance of the resource or the social relationships among people. Moreover, people's perception of these things varies over time. Thus, it is necessary to continuously understand public perceptions of the pros and cons of cooperation by understanding the residents' livelihood structures, livelihood strategies, and social relationships.

To reflect these ideas in development projects, it is essential to first carefully understand the need for services provided by the external support. That is, one should take the time to closely observe residents' needs at the time of designing and starting the project, and situate the needs expressed by the residents within the overall context of their lives and livelihoods, through a comparison with competing existing resources and other livelihood strategies. It is also important to build a mechanism for continuous observation/dialogue through monitoring and evaluation, because residents' perception of the benefits and costs changes over time, and that perception may be influenced by the experience of success or failure in the past.

### *Recommendation 3:*

Harmonization and acceptance of the management system in the society will be essential for maintaining continuous public involvement in water resources management.

Thus, it is important to understand the social context and historical background of the system of water resources use and management and their reciprocal relationships with external actors such as the government and market.

Even if the benefits of cooperation in resource management are identified based on the rational evaluation of an individual, achieving sustainability requires that the resource management in question become part of local custom. Unlike the natural resources traditionally used from the past, management systems for man-made resources including water use facilities are usually introduced from an external source. Thus, the management organization and the operation rules will not last long unless they are consistent with other social systems such as the land tenure, and accepted by society.

In the case of large-scale irrigation projects in Tanzania, for example, one study pointed out that the organization controlling water use in which the residents participated did not function as effectively as expected; this was due to weakened “trust” among the residents, caused by mechanisms such as the irrigation organization and administrative structures becoming inconsistent with changing circumstances. Such changes included the increased commercialization of rice through the introduction of modern rice cultivation, intensified conflicts over water, and increases in the number of non-resident landowners. Going forward, it will be critical to establish a mechanism of “trust” building among residents within a social context that is constantly changing.

According to another study on the irrigation organization in Tanzania, the development of such

mechanisms of “trust” is influenced by factors such as 1) the existing resource management system, 2) the degree of accumulation of social capital accompanying past development projects and collaboration with external actors, and 3) the way in which leadership is exerted. Systems and institutions must be established in conformity with the realities of local society described above.

In addition, because the task of harmonizing systems introduced from outside with the social setting of the region goes beyond the capacity of that setting, it is necessary to build a cooperative relationship with governments and markets that exist externally.

In many cases, the maintenance and management of man-made resources require the supply of technologies and components from government organizations and markets. This requires facilitating connections between the community and external actors through improved transportation and telecommunications infrastructure, while improving the capacity of external actors to supply components and services. An example of this is the maintenance service provided by a private-sector company for the repair system of a village water supply facility in Zambia.

To incorporate this perspective into development projects, it is important to always keep in mind the contact with and involvement of other actors outside of a community. Because a resources management system is not a self-contained model that is confined to the regional community, it is necessary to design a system in view of its contact with, and the involvement of, external actors such as governmental organizations, neighboring communities within the region and private markets, to ensure a sustainable CPR management and maintenance system.

(December 2011)

### **Related JICA-RI Working Papers**

- No. 23: Exploring the Causal Mechanism of Collective Action for Sustainable Resource Management  
A Comparative Analysis of Rural Water Supply Systems in Senegal (Atsushi HANATANI, November 2010)
  - No. 24: Linking Resource Users' Perceptions and Collective Action  
An Examination of Water Supply System in Southern Senegal (Atsushi HANATANI, Kana FUSE, November 2010)
  - No. 34: Assessing Effectiveness and Sustainability of Community-managed Informal Irrigation in Africa  
—A Comparative Institutional Analysis of "Temporary" Irrigation in Malawi (Atsushi HANATANI, Mine SATO, August 2011)
- <http://jica-ri.jica.go.jp/publication/workingpaper/>