Title: Community based collective action for safe water in rural sub-Saharan Africa

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Abstract

This paper provides a review of collective action for safe water provision and management in rural sub-Saharan Africa. Water-related collective action is largely premised on norms of trust and reciprocity, institutional arrangements that prescribe and enforce appropriate rules and sanctions, and ecological threats and conditions that favour cooperation. A central argument of this paper is that while community based water management and collective action are important institutional mechanisms for achieving water security, researchers and practitioners need to pay attention to the social ingredients, ecological variables, and governance structures that easily render them ineffective and counterproductive for rural water provision and management. The critical role of the state, mainstreaming the human right to water, and addressing structural inequalities at all levels should form the foundation of rural water policies and programs.

Keywords

Collective Action, Water Security, Sub Saharan Africa, Rural

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1. Introduction

Nearly 90% of the world's population are estimated to use basic drinking water services, defined as water from an improved source with a collection time of less than 30 min for a round trip (UNICEF/WHO, 2017). This number is expected to reach 96% by 2030 if current trends continue, thereby falling short of meeting the Sustainable Developments Goals (SDGs) target of global universal access. In 2017, of the 785 million people who were estimated to have limited services or unimproved sources or surface water, 51%, 20% and 18% were in sub-Sahara Africa (SSA), South-Eastern Asia and Central and South Asia respectively. In these regions, the urban poor and populations in rural areas are the most affected. A confluence of factors including lack of funding, climate change, population growth, and governance challenges account for the access gaps in most regions (UNICEF/JMP, 2017; [18]). While the number of people without access to basic services in SSA might sound alarming, significant gains were made with respect to achieving water targets under the Millennium Development Goals (MDGs). For example, a quarter of the population gained access to at least basic drinking services during the MDG era, the largest percentage point change compared to other regions with similar coverage gaps. However, rural–urban disparities remain across the region. Rural coverage for safely managed services, defined as sources that are on-site, on-demand and, most importantly, free of microbial contamination, is around 12% while urban coverage is around 50% (UNICEF/JMP, 2017).

The rural–urban gap in safely managed water services means that most rural residents with access to improved water services in SSA are served by standalone boreholes and protected springs outside the household premises. While the most ideal situation is to provide safely managed or piped water services for all persons and communities, rural communities in SSA for the most part do not have the demand, finance, and institutional regulations to support piped water delivery systems akin to what is found in urban municipalities [18]. In terms of demand, rural communities that are frequently made up of a few hundred households, for the most part, may not be able to support piped water infrastructure in terms of economies of scale.

With regards to finance, the average annual capital cost of providing basic universal water services in rural areas was estimated at $1.4 billion globally and around $931 million for SSA in 2016 [20]. This is a daunting challenge for many governments in SSA considering the competing demands and development challenges governments are confronted with. In terms of cost-recovery, water tariffs and fiscal arrangements that are used for revenue collection by municipal water service providers in urban areas are often somewhat straightforward to administer. In rural areas, a plurality of payment schemes exist including pay-per-use, daily/weekly or monthly payments, pay-when-broken, one-time payment schemes, in-kind payments, and no payments [14], [18]. These payment schemes may fail to generate the needed revenue to maintain water systems, are premised on what is locally acceptable or what people can pay, and have limited legal prescriptions to penalize defaulters ([14], [18], [24], [36].

To address rural water challenges post-independence, community-based management (CBM) was promoted and has been used as an institutional vehicle to implement and manage rural water supplies in SSA. While this can take many forms, the most popular arrangement involves donors, governments and NGOs providing water infrastructure while communities take charge of managing and funding on-going maintenance and operations [7], [34]. Community members are sometimes required to: 1) contribute to the cost of installation, mostly through labour and locally available materials such as stones and sand; 2) pay user fees to enhance sustainability; 3) volunteer through user committees to manage the system; and 4) volunteer time to clean around the water source. The assumption is that CBM provides opportunities for informed choice and a sense of ownership for communities. CBM is also seen as a mechanism for governments to mobilise local resources, provide water at a relative lower cost, and empower rural communities with technical skills to monitor and undertake repairs of rural water infrastructure. However, these assumptions and the viability of CBM have been challenge by many researchers in part due to the high rate of handpump malfunction under CMB initiatives, financial uncertainty due to low payment of user fees, operational burden and inefficiencies, and high dependence on social cohesion [4], [15], [19], [36]. Further, CBM to a large extent relies on collective action – defined as resident's ability to achieve mutually beneficial cooperative ways of meeting their set expectations [8], [30]. Relying on the "romanticized" notions of community [1], residents are expected to participate from project implementation to on-going maintenance and management, with their eyes set on the end goal–i.e safe drinking water.

Building on the foundation of CBM, this paper provides a review of collective action for safe water provision and management in rural SSA. In the sections that follow, I will first discuss the facilitators and predictors of collective action for the provision, governance, and sustainability of rural drinking water services in SSA. A central argument of this review is that while CBM and collective action are important institutional mechanisms for achieving water security, we need to critically examine the social ingredients, ecological variables, and governance structures that easily render them ineffective and counterproductive for rural water provision and management.

The review draws on examples published in a wide array of disciplines including economics, development studies, rural studies, sociology, and geography. I recognise that the review does not provide a comprehensive overview of collective action theory and all the inherent principles relevant for water governance. Because of space constraints, I have chosen some themes, principles and examples, but not many others. In doing so, I have tried to focus on themes that I feel are most dominant and relevant to current discourse and debates around rural water provision and management in SSA.

2. Collective action

Water-related collective action largely focuses on the importance of common interests and values for initiating, managing, and governing water projects and water governance. Research on collective action and water have been conducted across various scales of governance (from neighbourhood to transnational governance process), water bodies (e.g. from springs to transnational basins) and on various forms of water issues (e.g. drinking water interventions, irrigation schemes, and hydroelectric projects). In general, collective action dilemmas arise when individual actors exhibit uncooperative behaviours because their individual interests do not align with common group interest ([29], [41]. The most common collective action dilemma is found in shared common pool resources, such as forest and irrigation schemes, where individuals who overexploit or fail to cooperate with the larger group are "better off in the short run" [40]:6. While early collective action theories emphasised external regulation, privatization, and provision of selective incentive to avoid "tragedy of the commons", there is compelling evidence that collective action can be achieved through pre-existing social institutions and structures [30], [31]. Over the years, a number of researchers have identified conditions that support or characterize the success of institutions in managing common pool resources, the most popular being the eight elements of successful and stable local common pool resource [30], [12]. With regards to rural water resources, van den Broek and Brown, [34] argue that the effectiveness of communities to undertake collective action is contingent on formal and informal relationships that: (1) restrain water users from freeriding, (2) motivate people to participate in the management of the water source, and (3) aid water users to craft and enforce rules that govern the water system. In the sections that follow I will discuss the role of trust, institutions, and mutual vulnerability in fostering formal and informal relationships and rural water-related collective action.

2.1. Trust

Trust is a critical determinant of collective action and the associated success in common pool resource management. Gambetta (2000, pg. 218) defines trust as “a particular level of the subjective probability with which an agent assesses that another agent or group of agents will perform a particular action, both before he can monitor such action (or independently of his capacity ever to be able to monitor it) and in a context in which it affects his own action”. In water related collective action, trust allows actors to take an action that involves some form of sacrifice or cost (e.g. financial contribution) without being certain of reciprocal behaviour or contributions from other members of the community. In rural communities, frequent interactions among members create opportunities to verify the behaviour of the trusted.
Thus, long term collective action in such communities can be ruined if many people build a reputation of untrustworthiness. For example, users of borehole systems in southern Senegal act (i.e. pay their water tariffs) in response to others’ current behavior when deciding whether or not to cooperate in collective action[17]. That is, people who assumed that other users of the system will contribute financially were more likely to make their own contribution. In this example, water tariff contribution was used as a measure of collective action necessary for management of community motorized borehole systems.

In our research with lakeshore rural residents in Kenya, we investigated the relationship between different forms of social capital (including trust and formal and informal networks) and participation in collective action [8] In this setting, collective action was mostly in the form of contributing labour/cash for the construction of a village water facility and attending village water committee meetings. We found that people who trust others were more likely to participate in collective action compared to those with low levels of trust.

Similarly, findings from studies conducted in Kenya, Zambia, and Ghana by Kelly et al. [22] show that high levels of trust influenced the ability of local water committees to mobilize financial resources, including organizing fundraisers, collaborating with other community institutions, and soliciting labuor from community members. Naiga et al. [26] also found that mistrust reduced the likelihood of participation in communal water projects in rural Uganda. In Malawi, distrust in water committees, largely due to misuse of community funds, led to insufficient financial contributions to adequately maintain water points [11]. Across these case studies, willingness to contribute money or labour was influenced by trust in their local water committee, particularly the committee treasurer or financial secretary. Trust was equally premised on certain (in)actions of the water committees such as presence of a bank account and transparent money use [26], [22]. Further, dense networks, such as youth groups, women groups and local cooperatives are important for developing trust, nurturing trustworthiness, and building norms of reciprocity in rural areas.

Though the evidence above might sound encouraging, the association between trust and water related collective action should be interpreted with caution. In most cross-sectional quantitative studies (Bisung et al. [8], Hanatani and Fuse [17]) the direction of causality is difficult to ascertain. Further, quantitative studies often involve ahistorical analyses of trust, which fails to consider broader inequalities and structural determinants of mistrust. Hence, while trust is an important ingredient for collective action, there is very little empirical evidence on how to build or sustain it over the long term.

2.2. Institutions

I use institutions to broadly describe prescriptions of human actions and outcomes structured by rules, norms and shared strategies[39]. These prescriptions specify actions that are needed, allowed, or prohibited, and the sanctions authorized if the rules or norms are not followed [32], [40]. With regards to safe water, written laws, municipal by-laws and administrative decisions constitute formal rules enforced by public authorities and formalized institutional structures that can facilitate collective action. Formal rules and laws can motivate or discourage individuals' and groups' voluntary participation in water related collective action. For example, fear of retribution from municipal authorities weakened collective action by residents to demand municipal services in New Mpima, a suburb of Kabwe in Zambia [10]. Residents felt that municipal authorities could disproportionately apply existing building regulations and sanctions against them if they initiate any community mobilization activities. Thus, misapplication of formal rules and laws could inhibit voluntary participation in collective action, particularly in instances where there is low confidence in local government structures.

Formal and informal rules can equally facilitate local collective actions particularly under transparent and accountable political regimes. For example, in Ewaso Ng'iro basin of Kenya, local actors created Water User's Associations to address collective action dilemmas related to water allocation among upstream and downstream water users. Policy makers at the national level subsequently created rules and regulations to support the operations of these associations [3]. These regulations provided policy backing, conflict resolution mechanisms and greater coordination among actors at different levels to achieve collective action [3]. In some contexts, however, top-down policy changes to promote collective action can destabilise past community initiatives if clear roles, rules, and responsibilities are not well established (see Naiga et al. [27] for an example in rural Uganda). Similarly, CBM rules that are externally initiated by government agencies and NGO can easily disappear after such agencies leave the community. In rural Namibia, Schnegg and Kaika [36] observed that communities began to change CBM rules and regimes for water systems governance immediately government officials left. Pay per consumption rules were altered to diesel contribution based on a monthly rotation. This led to noncompliance and conflicts because some households failed to contribute their share of diesel when it got to their turn. Thus, water points shifted from being spaces of collective action to conflictive spaces [36].

Self governance of systems (e.g. ponds and cisterns governed by rural communities) that rely on locally generated informal rules tend to facilitate collective action because the norms, networks and workings rules are self-generated. Among pastoralists in Ethiopia, Beyene [6] observed that collective action in the form of volunteer labour toward communal ponds was strictly observed and enforced, with fines applied to individuals who fail to contribute. Fines were set and agreed in advance based on income levels. However, informal norms and rules that prescribed sanctions on uncooperative behaviour were sometimes difficult to monitor, interpreted differently, or applied disproportionately.

In many rural communities in SSA, elders, chiefs, other traditional leaders and elected or appointed leaders are important custodians of rules and sanctions, and facilitate most decision making processes. The effectiveness of such leaders to enforce rules and sanction members depends on many compositional (e.g. leadership skills and capabilities) and contextual factors (e.g. local political environment). Incentive to participate in collective action is reduced in communities where elders' decisions run counter to or override the interest of group members,. Further, where cultural norms promote collective livelihood activities and living arrangements (e.g. collective herding, shared farm plots), application of sanctions can become impractical or difficult to enforce.

In addition, evidence points to widespread non-application of sanctions and penalties under communally manage water systems. In Malawi, laid down penalties or sanctions such as exclusion from water use were seldom applied to people with uncooperative behaviour [21]. Instead, water system managers used moral appeals to encourage cooperative behaviours. For example, defaulters of water fees were often asked to pay in fulfillment of a public good or to reciprocate the good gesture of others. These institutional arrangements did not adversely affect communal management or sustainability of water pumps.

On the contrary, van den Broek and Brown [34] found that weak enforcement of sanctions for non-payment of water fees in Masindi and Kiryandongo districts of Uganda led to collective non-payment of fees by other members. In some cases, water committees are reluctant to apply formal sanctions because strict enforcement can destabilise family connections, exclude people who genuinely do not have money to contribute, affect social cohesion in the community, exacerbate existing tensions and divisions, promote commodification of water, and defeat the moral and ethical imperatives of a human right to water. Based on extensive field work in Uganda, Brown and van den Broek [9] found widespread social norms that consider individual advancement and interest a greater offense than free-riding. These conundrums around application of sanctions imply that water practitioners need to reconcile the implications of sanctions (e.g. exclusions, disconnections, monetary penalties) under CBM with the social realities of rural communities.

2.3. Mutual vulnerability to water insecurity risks

In some settings, socio-political and ecological vulnerabilities and interdependence encourage collective action. Studies among irrigation farmers have found that environmental constraints and ecological repercussions of not following collective management decisions (see [13], [28], [3] for examples in Sri Lanka, Pakistan and Kenya respectively), as wells as dependence on farm income or shared water resources (see [33], [35] for examples from Japan and China respectively) influence participation in collective action. Similar observations have been made with regards to drinking water. In our work in Kenya, we found that residents who relied on surface water (Lake Victoria) for cooking and other domestic uses were more likely to participate in collective action in the form of cash and labour contributions toward a future community water project, compared to those who had access to relatively improved sources (e.g. boreholes and wells) [8]. Based on this finding, we argued that exposure to unsafe sources and other environmental risks could be a major reason for engagement in water related collective action. In addition, sex-disaggregated models from our analysis showed that concerns over water security (i.e. using water from the lake) were significantly associated with collective action among women but not men. This is largely because women were more exposed to health risks associated with collecting water from the Lake compared to men. Indeed, varying levels of risk and vulnerabilities to water insecurity can undermine collective action as the less exposed or those with resources to cope or adapt are likely to be less motivated to contribute toward collective solutions.

In other settings, seasonality affects contributions toward sustainability of water pumps because people depend on other sources (e.g. rain water and reservoirs) during the wet season (see [23] for examples in Ghana, Kenya and Zambia). Thus, increased vulnerability to water insecurity during the dry season motivates people to contribute toward communal pumps while reduced vulnerability during the wet season creates a disincentive to contribute. However, it is possible that collective action could be more difficult to achieve during dry season if competition for water or the need for rationing increases. Thus, the links between seasonality and underlying socioecological conditions that facilitate collective action warrant further in-depth analysis.

2.4. Social heterogeneity and inequality

It is well recognized that local communities are not homogenous and unified organic units with shared norms and institutions to facilitate collective action[1]. Any given community is internally differentiated, has strategic alliances among different heterogeneous groups, and creates spaces of inclusion and exclusion that might be invisible through the *objective* gaze of researchers. The relationship between heterogeneity and collective action is complicated and sometimes ignored. For example, social and cultural heterogeneity within a community could increase the coordination cost of forming and enforcing common rules among members [33]. On the other hand, heterogeneity may help promote cooperation and inclusion if the abilities and unique capacities of all different groups are duly recognized. Based their work in Senegal, Hanatani and Fuse [17] argue that social homogeneity in terms of ethnic diversity may not deter participation in collective action if there is some level of trust within user groups. Contextual understanding of how trust develops in ethnically diverse societies in SSA should be a critical line of investigation in future studies.

Inequalities affect collective action in many ways. For example, income inequalities can create opportunities for economic elites to undermine collective action in order to further their own objectives. In Kebribeyah, Ethiopia, wealthy private cistern owners opposed the construction of communal cisterns because new water sources could lead to a decline in water prices or disappearance of water markets [6]. Aside from income inequalities, differences in ownership of capital assets (e.g. land holding) could hinder participation in water related collective action. In Usoma, Kenya, residents who held strong perceptions of differences in landholding were less likely to participate in collective action. In Kidwera II, Uganda, preexisting tensions and land disputes between households led to animosities and unwillingness to cooperate on water issues and fee payment [34].

3. Women's involvement

Women play a very important role in community mobilization for water and sanitation. Studies have found that women are more likely to participate in water-related collective action [8], are most likely to join savings cooperatives and water groups [5], are tasked with cleaning communal water points [26], [22], are trusted to keep financial contributions [22], and are more likely to make financial contributions toward communal water systems [26]. Yet, their leadership within water committees at the community level is often unrecognized or limited to few positions. This can undermine collective action since true community mobilization requires the involvement and recognition of all members. Indeed, research conducted in Vaniatu and Uganda show that participation of women in water user committees is a significant determinant of continued functionality of water systems [25], [15]. Yet, power hierarchies and control of resources within households and cultural norms affect women's participation in communal water activities [37], [38].

Promoting women's participation should be based on critical appraisal of prevailing social norms and engagement with local stakeholders and power brokers. In some situations, those who administer sanctions to non-cooperative members and fee defaulters are subjected to threats and physical abuse [9], [36]. Such abuse can be traumatizing for women if they are pushed into or take up leadership positions without clear pathways for creating a good social atmosphere or tackling gender inequities. Naiga et al. [26] gives a very discouraging example from Isingiro in Uganda where women who aspire to take leadership positions were given derogatory labels like "macho". Such labels discourage women from taking up leadership positions and continue to perpetuate male dominance in the water sector.

4. Conclusion

For many water practitioners, using collective action to initiate, implement, or sustain rural water infrastructure is attractive because it aligns with romanticised notion of community [1], [2]. It can also look attractive because it partly offloads responsibility from the state to the "responsible", "willing" and "capable" citizenry. However, invoking the community and collective action without due attention to the multiple flaws and complexities apparent in community based water interventions will not achieve the desired outcomes. While community based collective action has brought an alternative to the privatization movement and top-down approaches to water supply in many countries, it should be complemented with clear state led direction and involvement of government agencies at all levels. Aside from active state involvement, other funding and governance mechanisms such as water subsidies and delegated management systems, as well as mainstreaming the human right to water need critical attention in order to achieve the SDGs. Otherwise, collective action will turn into a burden and struggle for only rural residents and the urban poor, since many wealthy urban residents are connected to municipal water systems without any effort on their part. As discussed above, water-related collective action is largely premised on norms of trust and reciprocity, institutional arrangements that prescribe and enforce appropriate rules and sanctions, and ecological threats and conditions that favour cooperation. These factors are not organically present in all rural communities and water systems, neither are they easy to establish.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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