



How can NGOs support collective action among the users of rural drinking water systems? A case study of Managed Aquifer Recharge (MAR) systems in Bangladesh



Muhammad Badrul Hasan^{a,b}, Peter Driessen^a, Annelies Zoomers^a, Frank Van Laerhoven^{a,*}

^a Copernicus Institute of Sustainable Development, Utrecht University, The Netherlands

^b Department of Political Science, Dhaka University, Bangladesh

ARTICLE INFO

Article history:

Accepted 6 October 2019

Available online 25 October 2019

Keywords:

Non-governmental organizations

Community management

Collective action

Managed aquifer recharge

Drinking water systems

Bangladesh

ABSTRACT

In this article, we link NGO-supplied drinking water infrastructure projects with collective action development approaches. Although governing local, shared drinking water systems (DWS) requires users to act collectively, users rarely organize such collective action successfully by themselves. Non-governmental organizations (NGOs) are therefore frequently called upon to support local communities to set up or consolidate the kind of local collective action required for governing DWSs. However, the effectiveness of such forms of NGO support remains unclear. Therefore, this paper attempts to assess the form and impact of this kind of NGO support. Combining insights gained from theory on institutions for collective action in the context of shared resource systems, we develop a set of requirements presumed necessary for guaranteeing both day-to-day and long-term collective action among local shared DWS users. We apply this framework to empirically explore if, how and why NGO support targets these requirements, and whether this support influences users' capacity for collective action. To this end we examine 11 cases where NGOs have worked with users of Managed Aquifer Recharge (MAR) systems in Bangladesh. We collected data through focus group discussions, semi-structured interviews with local leaders, NGO officials, and project staff, and by reviewing project documentation. We find that NGO support favors long-term requirements over the requirements for day-to-day collective action. NGO activities seem based on applying standard approaches to training and awareness raising, and less on empowering users to craft their own solutions. A case for a lasting impact of NGO support on any of the requirements is hard to make. Our results imply that when attempting to organize effective and long-lasting forms of collective action among the users of shared resource systems, both NGOs and commissioners of projects need to engage more explicitly in learning what works and what doesn't.

© 2019 Elsevier Ltd. All rights reserved.

1. Introduction

In this article, we study the link of NGO-supplied drinking water infrastructure projects with collective action development approaches. Despite decades of trying, those in the realms of practice, policy and science still do not seem to have worked out completely how to optimally execute a task that at first sight seems rather straightforward: the provision of safe, reliable, and affordable drinking water solutions for all in rural communities in developing countries. Consequently, failed drinking water projects can

be found in many places in Asia, Africa, and Latin America (Reddy, Rao, & Venkataswamy, 2011; Whaley & Cleaver, 2017). According to Hutchings, Franceys, Mekala, Smits, and James (2017), with specific regard to piped water, 30% of Indian villages that had achieved full drinking water coverage in the past are now back to partial coverage due to system failure. In their study of arsenic mitigation technologies in Southeastern Bangladesh, Hossain et al. (2015) find levels of abandonment of pond sand filter systems and rain water harvesting systems of 87% and 60%, respectively.

In this paper, we apply a system-analytical approach in which drinking water systems (DWSs) are considered the actual infrastructure (i.e., the *resource system*) that produces drinking water (in other words the *resource units*), plus the set of end-users that together with others (i.e., the *actors*) engage in the *governance* of the system. Conceptualizing RDWSs in this way allows us to

* Corresponding author at: Vening Meinesz Building, Room 7.20, Princetonlaan 8a, 3584 CB Utrecht, The Netherlands.

E-mail addresses: badrulhasan@du.ac.bd (M.B. Hasan), p.driessen@uu.nl (P. Driessen), e.b.zoomers@uu.nl (A. Zoomers), f.s.j.vanlaerhoven@uu.nl (F. Van Laerhoven).

disentangle the indicators of RDWS performance in a meaningful manner. Stock performance regards the functionality of the infrastructure and refers to its capacity to supply safe drinking water, reliably. Flow performance regards drinking water quality, e.g. in terms of iron, arsenic, salinity and pathogenic content. Actor performance regards the extent to which RDWS end-users are willing to invest in stock provision, and sustainable flow appropriation. Governance performance regards the extent to which institutional arrangements counter the end-users propensity to under-invest in the stock, and over-harvest from the flow. In our empirical analysis, we focus on the actors and governance performance. We will tentatively speculate about the expected consequences for stock and flow performance in the discussion. Fig. 1 provides a schematic overview of how we conceive of RDWSs as socio-technological systems consisting of components, relations, and feedbacks. It also includes broad-stroke performance indicators associated with each one of the building blocks.

Although we appear to have become reasonably good at building well-working physical infrastructures for supplying drinking water, crafting a well-working governance system still seems to be a major challenge. By governance we mean the range of political, organizational, and administrative processes through which government and non-government stakeholders articulate their interests, exercise their legal rights, take decisions, meet their obligations, and mediate their differences. Broadly speaking, governance refers to an ensemble of *actors*, *institutions*, and *content* (Driessen, Dieperink, van Laerhoven, Runhaar, & Vermeulen, 2012).

Koehler, Rayner, Katuva, Thomson, and Hope (2018) reframe cultural theory (Douglas, 1994) for waterpoint management, and propose a typology of management cultures that is based on contextual risks and values. A *community culture* is defined, in this context, as the adoption of a risk-sharing approach by informal groups. A hierarchist or *bureaucratic culture* represents institutionalized authority, where risk is determined by rules and regulations. An *individualistic culture* sees risk as an opportunity and is characterized by private ownership and entrepreneurship.

Loosely following Koehler et al. (2018), we see archetypical forms of drinking water service models ranging from public provision with no community role (i.e. drinking water as a public good), via community management or self-governance models (i.e. RDWS as a commons, or club good), to private service models (i.e. drinking water as a commodity) (Fig. 2). However, on closer inspection, when implemented in its purest form, each one of these types appears to have a questionable to poor track record.

Prior to the 1980s, most forms of RDWS governance in low- and middle-income countries relied predominantly on public agencies with the exclusive responsibility to plan, construct, operate and maintain (Harvey & Reed, 2006). However, the realization that pure public service models were largely inefficient due to fiscal constraints, a lack of knowledge of communities' needs and preference, and corrupt civil servants" (Isham & Kahkonen, 1998) led to a search for alternative service models.

As of the 1980s, under the flag of a neo-liberal paradigm, international lending institutions, often together with national governments, began to see the privatization of water management as a means to increase the efficiency of water use (Boelens & Zwartveen, 2005). However, by the turn of the century, the realization kicked in that privatization was not the silver bullet that it was once hoped to be. Responses to the impact of privatization on coverage and equitable access remain contested (Prasad, 2006).

As a consequence, with donors, international NGOs, and policy makers warming to the idea of community participation, as of the early 2000s, interest emerged in so-called community management models, where communities operate and maintain the RDWS largely by themselves. However, quoting Reddy et al. (2011) and Baumann (2006) – who point at the high rate of community management failure in Sub-Saharan Africa and Asia – Hutchings et al. (2015) raise valid questions about the ultimate effectiveness and sustainability of the community management model. Quoting Lockwood and Smiths (2011, p. 1), Hutchings et al. (2015, p. 153) state that “for too long the assumption that consumers can run their own water supply has led to situations of ‘communities unable to cope

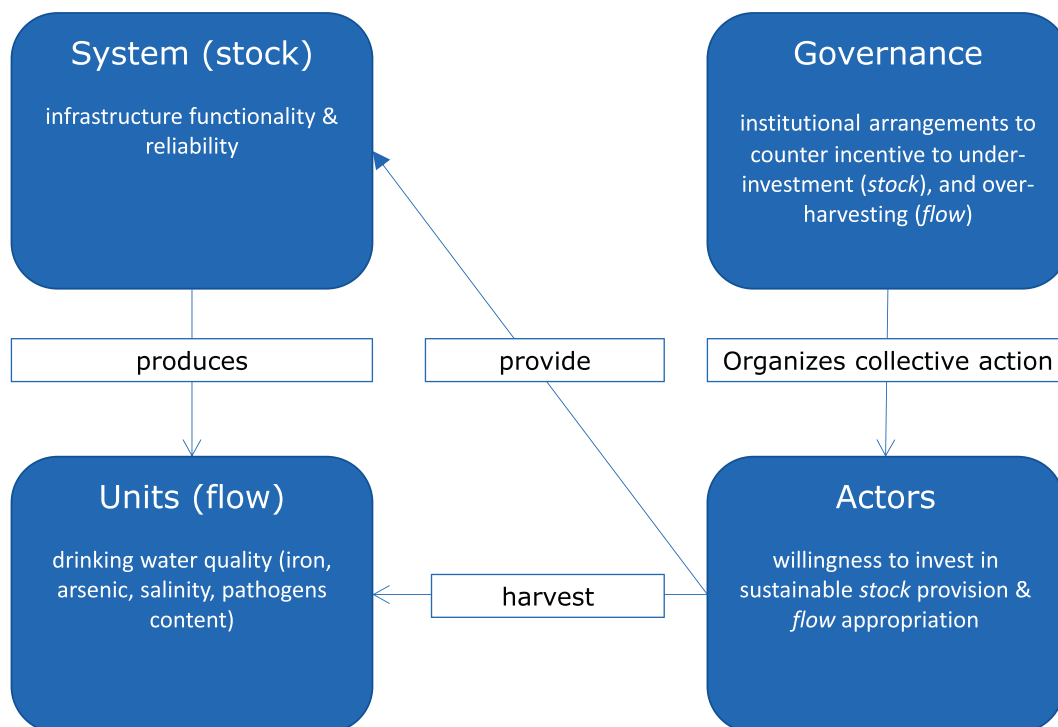


Fig. 1. A system-analytical approach to governing shared resource systems.

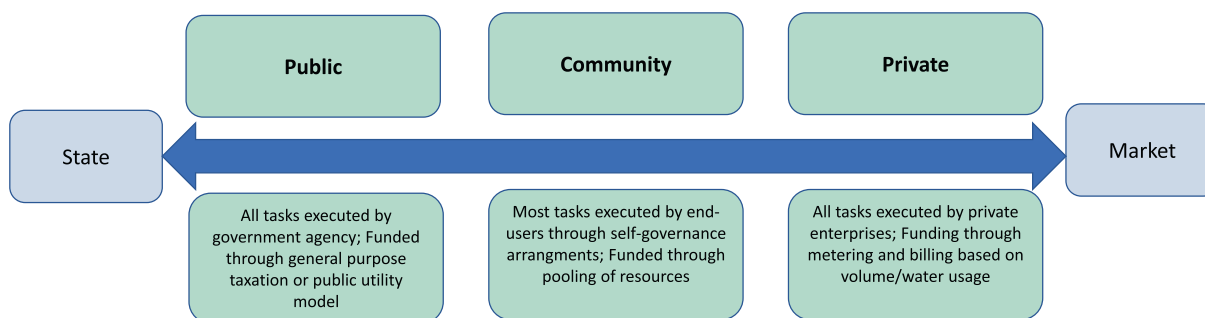


Fig. 2. a typology of drinking water service models.

with management of their schemes, poor maintenance, lack of financing, breakdowns, poor water quality, lack of support and, ultimately, an unreliable and disrupted supply of water to households.”

Carter, Tyrrel, and Howsam (1999, p. 296) hold that for community management models to work, among other things, arrangements for support of community-level organization should be clearly set out. Also, Harvey and Reed (2007, p.365) hold that “[i]f community management systems are to be sustainable, they require ongoing support.” With this now recognized need for community support in mind, both scholars and practitioners set out to explore what it could or should look like. Hutchings et al. (2015) and Hutchings et al. (2017) provide an excellent overview of the literatures and have conceptualized ‘support’ in the context of community management models. Relevant concepts identified include ‘community management plus’ (Baumann, 2006), post-construction support (Bakalian & Wakeman, 2009), and institutional support (Lockwood, 2002), among others.

In this study, we look in particular at NGO-supplied drinking water infrastructure projects that include collective action development components. Collective action refers to activities taken by a group of people in pursuit of a shared interest or a common objective (Olson, 1965). The evidence suggests that shared resource users often face collective action dilemmas that are difficult for them to overcome, independently (Ostrom, 1990). Therefore, external actors – such as NGOs – are often called upon to support, or consolidate collective action among shared resource system users.

We still seem to know little about the precise role and impact of external actors – in particular NGOs – in initiating the kind of collective action in which the end-users need to engage in order to govern a shared resource sustainably (but see Andersson, 2013; Barnes & Van Laerhoven, 2013, 2015; Wright & Andersson, 2013). There is scant evidence of what NGOs working on DWSs do with regard to collective action, why they choose to engage in particular actions, and whether their actions have an impact on the ability of DWS end-users to act collectively regarding drinking water provision, either on a day-to-day basis or in the long run. Consequently, we address the following two research questions in this study: (1) To what extent does NGO support address the requirements for day-to-day and long-term collective action? (2) To what extent does NGO support have an impact on the requirements for collective action? To answer these research questions, we studied a DWS called Managed Aquifer Recharge (MAR)¹ in Bangladesh, a country where NGOs have a long history of involvement in the support of communities with specific regard to drinking water (e.g., Abedin & Shaw, 2018; Peters, Baroud, & Hornberger, 2019).

2. Requirements for organizing day-to-day and long-term collective action

The organization of collective action in a context of shared resource systems such as a DWS is complicated by what are called *provision* and *appropriation* dilemmas (Ostrom, 1990). Individual users face a *provision dilemma*, as costs related to the investment in a resource system (e.g., users investing effort or resources in community management activities) are private costs, whereas the benefits of the joint investment (e.g., a well-working DWS) are shared among the group of users of that system. As a result, rational actors tend to under-invest in the provision of the system. *Appropriation dilemmas* occur because the benefits related to the extraction of harvestable units from a system (water, in the case of a DWS) are private benefits, whereas the costs of this extraction (e.g., decreasing the resource system’s production capacity) are shared among the whole group of resource users. As a result, rational actors tend to over-harvest units (e.g., water) from the system.

These dilemmas make it extremely difficult to organize the type of collective action among end-users that is essential for a successful co-production arrangement for a DWS. Consequently, external actors such as NGOs, ranging from local community-based organizations to large international organizations, can be found supporting local communities to organize the type of collective action deemed necessary for the governance of their shared resource systems (Andersson, 2013; Barnes & Van Laerhoven, 2013, 2015; Barsimantov, 2010; Beitzl, 2014; Espinosa-Romero, Rodriguez, Weaver, Villanueva-Aznar, & Torre, 2014; Jones, 2013; Wright & Andersson, 2013; Van Laerhoven & Barnes, 2014).

Some studies consider NGOs a viable alternative to both the government and private enterprise for promoting development, reducing poverty, and empowering the marginalized (Johnson & Prakash, 2007; Lewis, 2014; Mitlin, Hickey, & Bebbington, 2007). However, a more critical strand in the literature on NGOs questions whether NGOs can make a difference with regard to these issues (e.g. Fisher, 1997; Banks, Hulme, & Edwards, 2015; Bebbington, 2004).

Research on the impact of NGO support for organizing the potential for collective action by the end-users of a shared (natural or manufactured) resources system – i.e., investigating how they approach this task and how effective their support is – is relatively new (e.g., Barnes & Van Laerhoven, 2013, 2015; Andersson, 2013; Wright & Andersson, 2013; Barsimantov, 2010; Espinosa-Romero et al., 2014), and the findings of the studies that have been conducted so far seem inconclusive. Moreover, we have found no studies into the impact of NGOs on the end-users’ capacity for collective action in the specific context of local DWSs.

We know the approximate conditions under which local people are more likely to engage in collective action with respect to the

¹ For more details on MAR, see below (methods section).

Table 1
Requirements for day-to-day and long-term collective action among DWS users.

Requirements	Description	References supporting the indicators
<i>Requirements for day-to-day collective action</i>		
Regular meetings	Resource users have an arrangement of regular meetings in place to discuss the issues related to the operation and maintenance of the resource system	Poteete and Ostrom (2004)
Rules-in-use		
(a) on entry	There is a clear arrangement regarding who has access to the resource system	Poteete and Ostrom (2004)
(b) on appropriation	There are rules in place regarding who can extract how many resource units, and when	Poteete and Ostrom (2004)
Rule enforcement		
(a) monitoring system	There is a mechanism in place to monitor the resource use and rule compliance	Ostrom (1990), Agrawal (2001), Nagendra and Ghatge (2005)
(b) (graduated) sanctioning system	There is a mechanism in place to punish rule breakers	Ostrom (1990), Agrawal (2001)
(c) the monitoring of monitors	There is a mechanism in place to hold monitor/s accountable to the resource users.	Ostrom (1990), Agrawal (2001), Nagendra and Ghatge (2005)
(d) low-cost adjudication	There is a low-cost system in place to resolve conflict between users	Ostrom (1990), Agrawal (2001)
<i>Requirements for long-term collective action</i>		
Understanding of relevant policies	All resource users understand the rules and policies guiding the management of the resource system	Gomes et al. (2018), Ghatge, 2009
Participation of users in decision-making	General users – not only committee members – have the opportunity to participate at all levels of the decision-making process regarding DWS governance	Agrawal (2001), Baland and Platteau (1996), Rydin and Pennington (2000)
Management capacity of resource users	Resource users have the technical and managerial skill and knowledge required to manage and operate the resource system	Ostrom (2005), Gomes et al. (2018)
Fair allocation of benefits	There is a system in place to fairly allocate the benefits associated with the resource among the users	Agrawal (2001), Dayton-Johnson (2000), Baland and Platteau (1996), Ostrom (1990)
Ability of users to pay	The users have sufficient financial means to pay for the operation and maintenance of the resource system	Barnes and van Laerhoven (2015), Gomes et al. (2018)
Willingness of users to pay	The users are willing to pay for the operation and maintenance of the resource system	Islam et al. (2019)
Awareness of users	All the resource users are aware of the resource system, its operation and maintenance rules and the activities of the committee that is responsible for resource management	Cundill and Fabricius (2009)
Dynamic leadership	Leadership is closely familiar with the changing external governance environment, has frequent interactions with resource users and regular contact with local traditional leaders	Baland and Platteau (1996), Lobo et al. (2016)
Supportive external environment	The autonomy of users to manage their resource system is not undermined by any external authority	Agrawal (2001), Pomeroy et al. (2001)

provision of and the appropriation from a shared resource system. According to Poteete and Ostrom (2004), *functioning collective action* is characterized by the following requirements: (i) *regular meetings*; (ii) the presence of *rules* on (a) entry, (b) appropriation; and (iii) the presence of a *system to enforce the rules* by means of (a) monitoring, (b) graduated sanctioning, (c) the monitoring of monitors, and (d) low-cost adjudication. Based on Ostrom's 'design principles' (1990) and on the work of Wade (1988) and Baland and Platteau (1996), Agrawal (2001) compiled a list of 35 critical enabling conditions for the long-lasting community-led governance of shared resources. Upon realizing that only some of the conditions easily lend themselves to being manipulated by NGO interventions, Barnes and van Laerhoven (2015) derived from this list a sub-set of preconditions for durable collective action in the specific context of community forestry in India. This list was in part based on their realization that "it appears that in broad strokes, sustainable forms of collective action are characterized by knowledgeable actors that have management and communication skills, plus sufficient material and financial resources" (p. 195). We adapted the list such that it more accurately reflects the sector-specific and place-specific circumstances. We derived the following requirements for day-to-day (i.e., functioning) and long-term (i.e., durable) collective action in the specific context of governing shared DWSs (Table 1).

When supporting the end-users of DWSs, do NGOs target the requirements that various sources in the literature claim they should be targeting (and what are the reasons for their choice)? Does NGO support targeting these requirements have the expected impact on day-to-day and expected long-term collective action? We kept these questions in mind when deciding on the research methods.

3. Methods

Our research is set in Bangladesh. Hoque (2009) finds that in Bangladesh between 15 and 30 million people lack year-round access to safe drinking water. In the research area in particular (see Fig. 1), drinking water is scarce due to salinity intrusion, arsenic contamination, tidal surges and drought (Mahmuduzzaman, Ahmed, Nuruzzaman, & Ahmed, 2014). The main sources of drinking water in this area are surface water from ponds, pond sand filters (PSF), and the rain water harvesting systems (RWHS). Generally, neither the shallow nor the deep tube-well is feasible due to a lack of suitable aquifers at reasonable depths (Hoque et al., 2004).

The governance of most rural drinking water systems in Bangladesh have a history of community involvement (see Sultana, 2009). Bangladesh's National Policy for Safe Water Supply and Sanitation, dating from 1998, calls for community participation in the governance of drinking water systems and invites support from external actors, including local NGOs. Traditionally, water vendors created market opportunities based on pricing the *distribution* of drinking water. However, the *production* of water through community DWSs is hardly ever based on a commercial business model. In the previous decade pond sand filters (PSF) were installed in the study area by a local NGO (Shushilon) with funding from the World Bank. Rain water harvesting and storage systems have also been promoted by different international NGOs and projects. Currently, another NGO (Rupantor) is implementing reverse osmosis (RO) systems, also with financial support from international donors. Anecdotal evidence suggests that the community management of such systems has mostly underperformed.

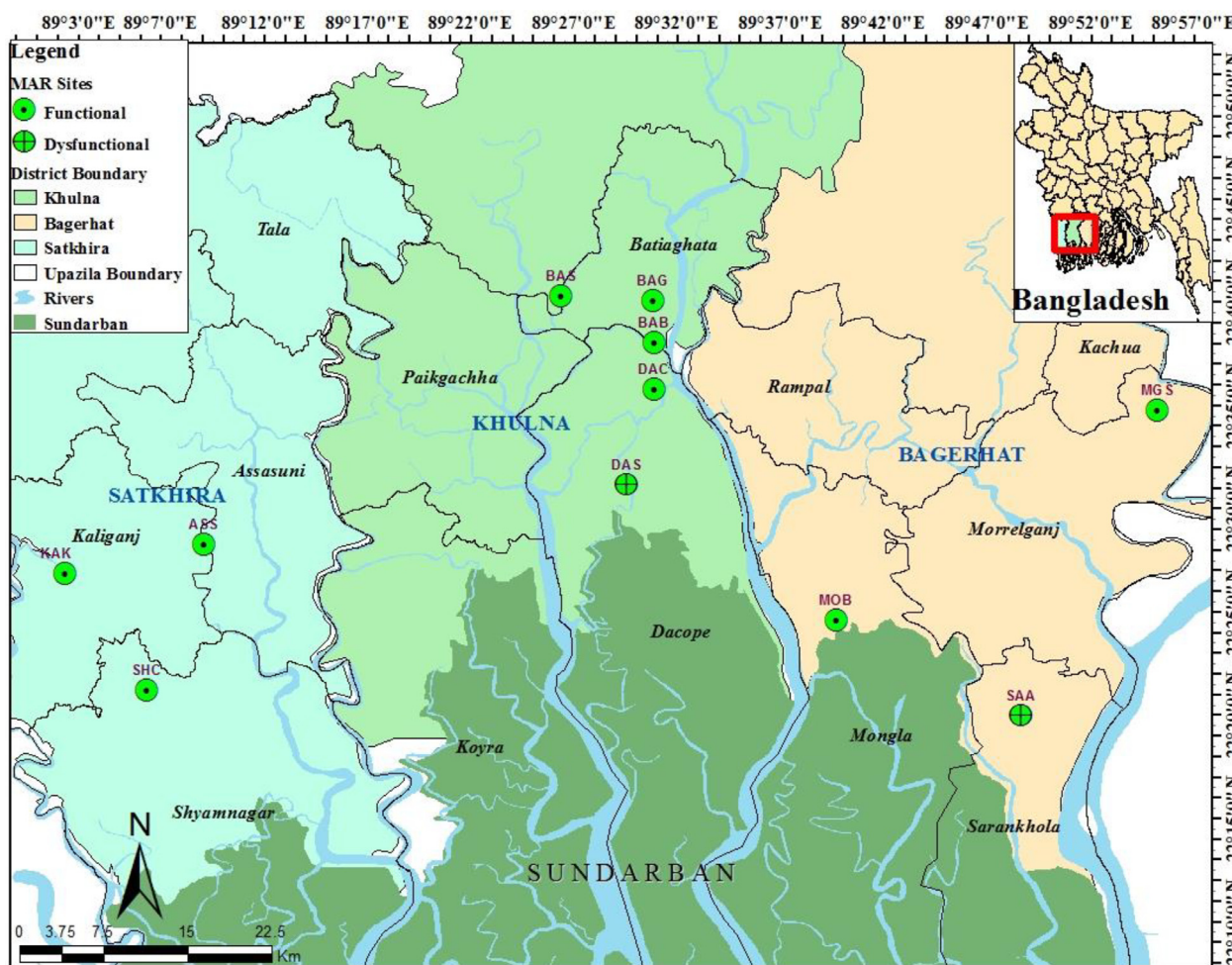


Fig. 3. Study area.

In order to keep control variables constant, we focus on one particular DWS, namely the Managed Aquifer Recharge system (MAR), that has recently been introduced in three southwestern coastal districts: Khulna, Satkhira and Bagerhat (Fig. 3). A MAR is a community-based DWS that is supposed to ultimately be operated and maintained by the local community.

In a MAR system, water is collected from ponds and rooftop rainwater. After passing through a sand filter, the water is infiltrated into the aquifer to create a bubble of fresh water. Users can subsequently abstract the water using standard hand tube-wells. Compared to other major systems in the area, MAR is contamination- and cyclone-proof, and it is reliable as it provides water in sufficient quantities throughout the year. In terms of installation costs, MAR is considerably less expensive than the available alternatives. It is also relatively easy to operate.

As is the case with most drinking water technologies in developing countries, external actors played a major part in the introduction of MAR. In 2009, a consortium of Dhaka University's Geology Department (DU), the Department of Public Health Engineering (DPHE) and Acacia Water (AW, a Dutch consultancy firm) started implementing MAR in the coastal areas as part of a pilot²: DU was responsible for selecting the sites, based on geohydrological

and socio-economic indicators. DU, together with AW then provided a site-specific design. The MARs were built by DPHE. UNICEF and the Dutch Embassy in Bangladesh provided the funding. Given the pilot character of the MAR project, contrary to some other existing drinking water systems in the area (such as pond sand filters) local governments – i.e., Upazila Parishad and Union Parishad – have no formal role in the governance of MAR, yet. However, we observed that sometimes local governments engage themselves informally (e.g. with regard to site selection, liaising with DPHE on behalf of the community, or granting time to awareness-raising and community mobilization efforts during local government meetings).

DU and DPHE started by consulting with community leaders and local government representatives to gauge local drinking water needs and preferences – i.e. in theory, prospecting communities are given the choice to opt in or out. In case of an apparent match between supply and demand, DU and DPHE proceeded to organize a plenary meeting with prospecting MAR users in the community, to discuss respective roles and responsibilities. Emphasis was put on preparing users to ultimately carry out a community management model. In parallel, DU proceeded to engage with local stakeholders to select the most appropriate site – this could be on the premises of the local school, on public or on private land, depending on geohydrological suitability and/or the willingness of land owners to have a MAR system built on their land.

Given that MAR systems were not built in response to an explicit community demand, the project consortium did not expect local communities to become meaningfully engaged in MAR com-

² As MAR has only recently been developed to fit the Bangladesh context, and given the fact that the introduction is in its pilot phase, still, the technology cannot be purchased on the local market, yet. This also requires inquiry into institutional design and enablers to set up collective action.

Table 2
MAR sites in our study.

District	Upazila (Sub-district)	Union Parishad ¹	MAR sites (#)	Respondents (#)	Households using MAR (#)
Khulna	Batyaghata	Gangarampur	2	10x2=20	50+50=100
		Surkhali	1	10	50
	Dacope	Chalna	1	10	60
		Kamarkhola	1	10	60
Bagerhat	Mongla	Sundarban	1	10	50
	Morolganj	Hoglapasha	1	10	50
	Shoron khola	Dhansagor	1	10	60
Satkhira	Kaliganj	Kusholia	1	10	50
	Ashasuni	Sreeula	1	10	50
	Shyamnagar	Shyamnagar	1	10	60
Total	8	10	11	110	590

A Union Parishad is smallest rural administrative and local government unit in Bangladesh.

munity management without some form of support. In 2013, the DU signed a memorandum of understanding (MoU) with seven NGOs (Tolk, Tuinhof, ter Winkel, Ahmed, & Bolton, 2014). Six are local NGOs with a staff of between 16 and 55, the seventh is a national NGO with a staff of 666. The NGOs were instructed to provide support to the community with regard to site management, community mobilization, technical supervision, capacity building, the development of guidelines for operation and maintenance, and building relationships with local government entities. However, the NGOs had considerable discretion regarding the implementation of these tasks and responsibilities. Thus, it was expected that community management models could be tailored to the needs and preferences of the community.

From 2009 to 2015, a total of 20 MARs were installed as part of a pilot project. Given our interest in the effect of NGOs on communities' collective action capacity, we chose to work with the eleven MAR sites that had been handed over to community management

by the time of our data collection (Table 2)³. Of our sample of eleven MARs, two had already ceased functioning by the time of our data collection. In both, the abandonment was triggered by a technical problem that required major repair work. A combination of lack of knowledge and resources, but above all the availability of other affordable drinking water alternatives in the localities, seems to have led to the collapse of the MAR. We found little variation in terms of performance between the remaining nine functioning MAR sites.

In the guidelines drafted by the consortium running the pilot, it is stated that the MAR user group must select a caretaker, to be paid by the users, for the day-to-day operation of the system. A user committee consisting of 5–7 members (at least one of whom should be female) is to be elected by all users. The committee should meet once every month, and it should collect a monthly

³ At the time of our data collection, at nine out of the 20 installed MARs, NGOs were still in the process of completing the community support activities. Hence, the complete hand-over of these sites to the communities was still pending.

Table 3
Operationalization of criteria: example.

Criteria	Description	Interview topic list for focus group discussion with MAR users	Interview topic list for NGO representatives
Regular meetings	Resource users have an arrangement of regular meetings in place to discuss the issues related to the operation and maintenance of the resource system	<ul style="list-style-type: none"> • Do/did you have user committee • If yes, how did the user committee get selected in this community? • Does it have female members? • Does it meet? How frequent? • Did you receive support from an NGO with regard to establishing a committee? What did the support consist of? 	<ul style="list-style-type: none"> • Does/did this community have a user committee? • If yes, how did the user committee get selected in this community? • Does it have female members • Does it meet? How frequent? • Did you provide support with regard to establishing a committee? What did the support consist of? • If not, why not?

fee from all users to cover operational and maintenance costs (including the caretaker's salary). Households are to contribute approximately 30 Bangladesh taka (approximately US\$0.40) per month (however, in practice, we find that actual payment varies from household to household based on the households' economic status). The user committee is to open its own bank account to manage its finances. Furthermore, the committee is expected to take responsibility for monitoring the technical operation of the MAR and its users' behavior, and to resolve any conflict that may occur. MAR water can only be used for consumption (drinking and cooking), and not for irrigation or other purposes. In case of major technical problems, the DPHE is expected to help repair the MAR.

Between October 2017 and January 2018, we organized eleven focus group discussions (one for each site) with local MAR users, including user committee members. Each session was attended by at least 10 participants drawn from both the user committee and general users⁴. We purposefully aimed for active participation by females, as they are their household's main water managers. At each site, we also conducted in-depth, semi-structured interviews with the chairperson of the user committee. In addition, we conducted semi-structured interviews with a total of 15 NGO staff members (in their headquarters and in field offices), who together represented all seven local NGOs responsible for supporting local governance of the eleven MARs in our sample. We also interviewed four Dhaka University MAR officials, and we held informal discussions with the local social elite (an average of two people per site) and eleven local government officials (i.e., Union Parishad elected representatives). When we found persistent differences or contradictions in the information extracted in these ways, we gave priority to the community's response. Table 3 provides an example of how data on one of the criteria ('regular meetings') was collected by means of survey questions or a topic list from members of the users committee and NGO representatives, respectively⁵. Additionally, data was

collected by reviewing official documents, field reports, and annual reports at Dhaka University's MAR office and the NGO offices.

The data gathered in this way allowed us to establish if the NGO had targeted a specific requirement for collective action. The setup of both surveys allowed us to triangulate: In case an NGO claimed to have undertaken a certain activities, but the community stated that the NGO didn't, we opted for the community response. The data furthermore allowed us to establish whether a requirement for collective action appeared to be met in a community (e.g. Do users meet regularly? Are there rules on entry? Etc.). The discussions that resulted from the surveys and topic list, and the document reviews led to a wealth of additional details that were interpreted qualitatively through coding principles based on the requirements listed in Table 1.

Our data collection was driven by our objective to operationalize the requirements listed in Table 1. First, we looked for variation in the way in which the NGOs addressed the requirements, as well as in the extent to which they did so. Second, we looked for correlations between reported NGO activities geared towards certain requirements and currently ongoing community action regarding the same requirements. Based on our findings, below we discuss the impact of NGOs on collective action capacity of DWS users.

4. Results

We will first present an analysis of the types of support offered by the NGOs in an attempt to increase potential for local collective action. We will then present an analysis of the impact of this support.

4.1. Analyzing types of NGO support

4.1.1. NGO support for day-to-day collective action

Within our sample of MAR sites, of the seven enabling requirements we identified as representing day-to-day collective action (see Table 1), only four were reported to be targeted by NGO support (Table 4).

⁴ We excluded the committee's chairperson when discussing the chairperson's performance (for example when reviewing participation of all users in decision-making, the fair allocation of benefits, and dynamic leadership).

⁵ Questionnaires used for this research can be provided upon request.

Table 4
NGO support addressing the requirements for day-to-day collective action.

	Requirements for day-to-day collective action (# of NGOs)	Reported NGO activities
All sites (11)	Rules on monitoring (11)	Setting up and running a monitoring system with users, and gradually handing it over to the community
Most sites (6-10)	Regular meetings (9)	Convening monthly meetings with the user group; Providing informal guidelines for the continuation of monthly meetings
	Rules on entry (7)	Conducting household surveys to assess (i) willingness to join and (ii) household drinking water needs; Selecting 50 to 60 prospective households based on the outcome of the survey
	Rules on appropriation (9)	Providing formal (written) and informal (verbal) instructions on MAR operation and maintenance
Few sites (≤ 5)	n.a.	n.a.
No sites	Graduated sanctions	n.a.
	Availability of low-cost adjudication	n.a.
	Accountability of monitors and other officials to users	n.a.

In all eleven sites in our sample, NGOs were found to have supported the creation of a monitoring mechanism. They provided the communities with monitoring guidelines on the usage of the MAR, on the payment of fees (to support the caretaker and to cover repair expenses), on the functionality of the system, and on the performance of the caretaker. They took the lead in setting up and running the MAR, after which it was gradually handed over to the users.

In most of the sites (9), NGOs helped MAR users to arrange and hold regular meetings. The creation of a functioning meeting structure was mostly stimulated by (i) NGO officials directly convening meetings, (ii) providing informal guidelines and (iii) motivating people to continue to hold such meetings. The guidelines included advice on roles and responsibilities (for example of users and committee members, specific leadership roles, and the composition of the committee), topics for the agenda (regular versus emerging issues), and decision-making procedures (quorum rules, discussion rules, and expression of opinions).

At most of the sites, we also found that the NGOs supported MAR users in drawing up rules on entry (7) and appropriation (9). This was done by first surveying households to assess their

water needs and their interest in joining, and subsequently selecting 50–60 prospective households and providing them with formal (written) and informal guidelines for MAR use.

The reason for focusing on these particular forms of support appears to be related to the content of the MoU instructions as well as to the core values of the NGOs, as is illustrated by the following quote from an NGO official:

“Apart from a clear instruction from the MAR implementing authority to provide the users with necessary guidelines on entry, appropriation, regular meetings and monitoring the enforcement of guidelines of MAR, we focus on these guidelines as we also found these crucial for the sake of a smooth operation and maintenance of MARS”

Conflict may occur, for example when certain individuals tap too much water or do not contribute the agreed upon fees. Sanctioning mechanisms to penalize people who do not abide by the rules is often mentioned as a critical factor in rule enforcement in the context of shared resource management (e.g. [Ostrom, 1990](#)). None of the NGOs was found to support MAR users in developing a graduated sanctioning and/or a low-cost adjudication system. NGO representatives mentioned that they preferred not to deal with issues related with conflict and sanctioning, as this was seen as potentially stirring up tensions regarding local politics, socio-economic relations, or cultural–religious identities. One high-level NGO official remarked that:

“We cannot provide any sanction and conflict resolution mechanism to the community as there is hierarchy and heterogeneity among the local users related with political identity, economic status, clan, religion, gender, etcetera. If we were to do so, this might be used against the poor and weaker section of the community. However, we can impose such kinds of sanctions and conflict resolution mechanisms on the community people and force them to follow those rules if they [the sanctions] are registered under a certain formal body.”

In none of the sites were the NGOs found to have contributed to the development of mechanisms for holding monitors accountable. NGO representatives saw this as the responsibility of the MAR users themselves. When pressed, some NGO representatives reported that the voluntary nature of MAR monitoring made it difficult to urge MAR users to monitor the monitors.

What is striking in these results is the top-down nature of much of the reported NGO support regarding meeting the requirements for day-to-day collective action: the guidelines and instructions are imposed rather than developed together with the communities. The NGOs appear to rely on what [Barnes and van Laerhoven \(2015, p. 196\)](#) call an objective approach to institutional design: “The NGO itself is the primary change agent. Activities are focused on creating incentives through designing institutions. It applies a generic approach, imposing institutional arrangements that have proven to work elsewhere.”

4.1.2. NGO support for long-term collective action

Our results indicate that NGOs seem to emphasize the support of long-term collective action requirements. Of the nine requirements we identified as representative of requirements for long-term collective action, no less than eight were targets of NGO support ([Table 5](#)).

At all sites in our sample, the NGOs were found to have aimed at supporting the management capacity of MAR users by giving formal and informal training to caretakers on the operation of the motor, cleaning the MAR equipment, bookkeeping, collecting monthly fees from the users, and providing basic tools

Table 5
NGO support addressing the requirements for long-term collective action.

	Requirements for long-term collective action (# of NGOs)	Reported NGO activities
All sites (11)	Management capacity of resource users (11)	Training the caretaker; providing basic tools
	Dynamic leadership (11)	Training the chairperson of the user committee; organizing workshops with committee chairpersons; connecting the user committee chairperson with local governments and agencies
Most of sites (6-10)	Understanding of relevant policies (8)	Conducting monthly meetings with user groups; organizing workshops with the user committee chairperson
	Participation of users in decision-making (9)	Providing informal advice to the user committees; motivating user committees to include the general users in decision-making processes
	Ability of users to pay (10)	Assisting the user group in collecting community contributions (to cover operational costs and set up emergency funds); setting up a monthly payment structure; Providing material support
Few sites (≤ 5)	Willingness of users to pay (9)	Motivating users through monthly meetings with them; informal household visits
	Awareness of users (9)	Meetings at the Upazila (sub-district) premises involving local administrator, local government representatives, DPHE officials and local people; monthly meetings (i.e., tea stall meetings, yard meetings, mosque meetings) with the user group; Bi-weekly meetings with female users; bi-weekly sessions with teachers and students at educators; regular door-to-door visit to households; Handing out leaflets to local people; banners on MAR in the villages
	Supportive external environment (9)	Advocacy and lobbying with external actors (i.e. Dhaka University MAR office, DPHE, local administration, and local government representatives, etc.)
No sites	Fair allocation of benefits	n.a.

for testing water quality and minor repairs. In addition, at all eleven sites the leadership qualities of committee chairpersons were targeted by means of workshops on mobilizing community people connecting with local governments and relevant government agencies.

Moreover, at eight of the eleven sites in our sample, the NGOs were reported to have targeted their support at increasing MAR users' understanding of relevant policies. They aimed to do so by means of monthly meetings with the user group and by organizing workshops with the user committee chairperson.

At nine sites, the NGOs aimed to ensure that general users participated in making decisions about the governance of the MAR. This was done by giving informal advice and by motivating the user committee to involve general users in major decisions.

At nine sites, the NGOs were found to have tried to enhance the ability of MAR users to contribute financially to the operation and maintenance of their DWS. To that end, the NGOs assisted user groups in collecting financial contributions from the users. They were reported to have helped set up a monthly payment system to cover the costs of the day-to-day operation and maintenance of the MAR and to have suggested that user groups create an emergency fund as a buffer for covering major repairs. They also provided some material support. We found that at eight sites the NGOs tried to boost users' willingness to pay for MAR operation and management, for example by means of monthly meetings with users and frequent household visits.

At nine of the sites in our sample, the NGOs were found to have targeted user awareness of the system, the rules, and the role of the user committee. They did so through (1) meetings on the Upazila (i.e., sub-district) premises, which involved local administrators, local government representatives, DPHE officials, and local people; (2) monthly meetings (i.e., tea-stall meetings, yard meetings, and mosque meetings) with user group members; (3) bi-weekly meetings with female users; (4) bi-weekly sessions with teachers and students; (5) frequent door-to-door household visits; and (6) distributing leaflets and banners.

In nine MAR sites, the NGOs had supported users by ensuring the support of external actors by means of advocacy and by lobbying the Dhaka University MAR office, the DPHE, and the local administration.

None of the NGOs was found to have supported the users in developing the mechanism for the fair allocation of benefits from the MAR. NGO officials pointed out that they did not see this as their responsibility, adding that users can create such a mechanism themselves. One NGO official pointed out:

"Community people are better positioned to set up mechanisms for the fair allocation of MAR water. We cannot do this because different families have different financial means and different numbers of family members, resulting in different drinking water requirements. A poor family with many family members needs much water but cannot afford to buy it from outside. If we were to impose a mechanism of water usage, then those poor people would be likely to suffer".

The NGOs seemed to give more emphasis to the requirements we have associated with long-term collective action than to those related with day-to-day collective action. They appeared less willing to become involved in issues that are or may be controversial due to strong local norms and values (i.e., sanctioning, conflict resolution, and fair allocation of resources).

Again, what strikes us – as also noted above with regard to NGO support targeting day-to-day collective action – is that most forms of NGO support relating to long-term collective action seem to be

based on a top-down, objective approach to institutional design. We found no evidence of NGOs working jointly with user groups to craft tailor-made solutions. When asked, the NGOs indicated that the manner in which they deploy their activities and target the requirements for collective actions is partly rooted in routines and experience gained in previous situations. This is illustrated by the following quote from an NGO representative:

“Along with carrying out instructions of the implementing authority [i.e., the Dhaka University MAR office], we also implemented other community mobilization and capacity development activities based on our previous knowledge and experiences in these regards”.

4.2. Analyzing the impact of NGO support for collective action

After having established whether, how, and why the NGOs targeted what we consider to be key requirements for collective action, we now explore whether their work can be argued to have had an impact on the ability of MAR users to sustainably govern their shared resource system. We do this by relating the reported NGO support (Section 4.1) to evidence of MAR users continuing to meet the requirements for day-to-day and long-term collective action, also after the NGOs have withdrawn and MAR users no longer have their assistance. In Fig. 4, any box that combines a green area with a yellow area indicates a relationship established between NGO support (green) and a community continuing to meet the given requirement after NGO support has stopped (yellow). In case of a relationship, we try to determine its cause, based on data retrieved from focus group discussions with MAR users and in-depth interviews with NGO officials.

4.2.1. The impact of NGO support on day-to-day collective action

In all eleven sites, the NGOs supported user groups in developing a set of formal and informal monitoring rules. At eight sites, MAR users continued to have monitoring rules even after the withdrawal of the NGO. There were nine sites where we found evidence of NGO support regarding the design of appropriation rules; at seven of these, such rules were still in place after the withdrawal of the NGO. This occurrence of community action with regard to appropriation and monitoring rules is attributable to NGO support. In a focus group session with users, a schoolteacher remarked that:

“There were some rules for regulating appropriation and monitoring that we initially could not understand. After the NGO explained the rules during various meetings, we can understand them more easily”.

This quote also illustrates the top-down or objective approach to institutional design, as generically designed rules are imposed and then explained, rather than crafted by the empowered community itself.

NGO support regarding entry rules and regular meetings is much less strongly associated with ongoing community attention to these requirements. At only two of the nine sites where NGO support for regular meetings was found were meetings still held regularly. Moreover, at only two of the nine sites that received support did we find evidence of entry rules still in place. Respondents reported that the meeting structure imposed by the NGOs did not match well with the daily schedules and priorities of the proposed attendees. The entry rules resulting from NGO support proved ineffective due to social and religious factors: most of the NGO officials stated that it is almost impossible to restrict

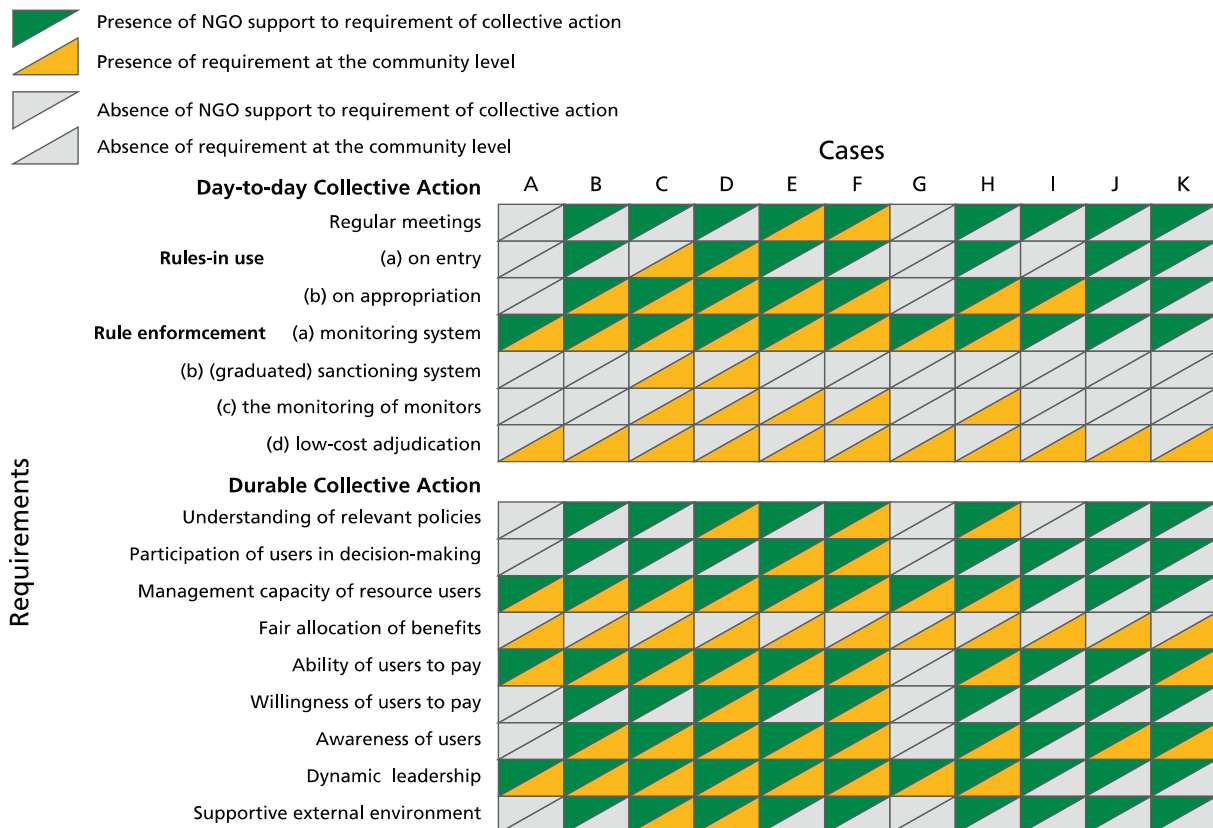


Fig. 4. Apparent impact of NGO support to requirements of day-to-day and long-term collective action.

local people from accessing MAR. As one high-level NGO official pointed out:

“Although we make an exclusive list of households that are allowed to use MAR, in reality, many people beyond that list use MAR water. Social norms and values do not allow anybody to restrict people from accessing to MAR water”.

4.2.2. Impact of NGO support for long-term collective action

The NGOs engaged in capacity-building activities at all eleven sites. At eight, we found evidence of sufficient management capacity among users. It seems reasonable to claim that NGO support contributes to the present-day management capacity of MAR users, particularly the caretakers. In a focus group discussion with users, a participating caretaker remarked that:

“NGO officials trained us in operation and maintenance procedures of MAR and they also frequently came to us to show MAR’s operation and maintenance procedures. As a result, some of us now can operate and maintain this MAR site properly”.

It is more difficult to explain the strong association between the eleven sites that have benefited from NGO support regarding dynamic leadership and sites where we found evidence of ongoing dynamic leadership, as the NGOs did not select MAR leaders randomly but instead worked with local leaders who arguably already had leadership qualities. Nor is it easy to explain the relationship between NGO support to increase MAR users’ ability to contribute financially (ten sites) and the ongoing ability of users to pitch in (eight sites), as our surveys revealed that the NGOs tended to list households with sufficient financial means to participate in MAR initiatives.

The NGOs put much emphasis on awareness raising, which seems to have been part of their core business, independent of their involvement with MAR. At eight of the nine sites where we found evidence of NGO support for this requirement, MAR users still showed evidence of high awareness after the withdrawal of the NGO. As with capacity building, this association is unsurprising. One elected representative of Union Parishad (the lowest tier of local government) stated that:

“NGOs had frequent meetings and sessions with us where they told us about the background of MAR, MAR water quality, operation and maintenance procedures, the role of the users committee and their responsibilities. Before the NGOs’ programs, we knew nothing about MAR”.

Although at eight sites the NGOs supported the requirement that users are to understand relevant policies, we found evidence of sufficient continued comprehension of the policies at only three of the sites. MAR users suggested that the NGO staff were not well informed about policies themselves, a contention that was partly corroborated in our interviews with NGO representatives.

Attempts to guarantee the structural inclusion of all MAR users in decision-making – a requirement for long-term collective action that is prominently mentioned in the literature – were part of NGO support activities at nine of our sites. However, we found evidence of continued participation of all users in decision-making at only two sites. NGO officials and MAR users both attributed the failure to establish a more inclusive form of MAR governance to the prevailing hierarchy, according to which decisions are virtually always made by the local elite.

We found that at nine sites the NGOs had been making an effort to increase the willingness of MAR users to contribute financially,

but at only two sites did we find evidence of continued willingness to pay. Most NGO officials stated that they lacked the time and resources to conduct adequate motivational activities (an argument that underlines the blurred boundary between NGOs and consultants). In addition, people have long been used to having free drinking water. In this respect, a high-level NGO official remarked that:

“The time and resources we got for motivating the MAR users were in no way enough. Most people of this area have long been accustomed to using drinking water from ponds and rain for free. For orienting and motivating them to a new technology like MAR and make them willing to pay for MAR water, it takes more time and effort that we did not get in this project”.

Attempts by NGOs to create a supportive external environment also appear to have had little impact in most cases: only two of the nine sites where we found evidence of NGO activities targeting this reported that they saw the support from local governments (i.e., the Upazila Parishad and Union Parishad) and government agencies (e.g., the DPHE) as constructive. Many of our NGO respondents attributed this limited impact to the fact that local governments had not been assigned a formal role in the design of the MAR pilot project.

5. Discussion and conclusions

We explicitly set out to study whether and how NGO activities address the criteria that are claimed to be associated with successful collective action in the context of the governance of a shared resource. We were also interested as to whether such NGO activities have an impact on the extent to which communities ultimately meet these criteria. To this purpose, we derived a set of putative requirements for day-to-day and long-term collective action from relevant empirical literatures. Although it was explicitly not our goal to test whether or not meeting these criteria does ultimately lead to improved RDWS performance, a quick scan of the of the system components’ performance seems to suggest that there is a correlation between the extent to which requirements for collective action are met, on the one hand, and stock, flow, and actor performance, on the other (Table 6).

Using multiple methods and sources of data collection we explored whether, how and why NGOs supporting the users of eleven DWSs in Bangladesh targeted these requirements. We then established whether and to what extent DWS users still met the requirements after the NGO’s withdrawal. We used any association between evidence of past NGO support and ongoing user attention for the requirement in question as the basis for determining whether the correlation was causal, in other words, did NGO support actually have an impact?

Regarding the *day-to-day collective action*, we found that in our sample of eleven sites, most NGOs support four of the seven requirements that we listed in this category, namely *rules on entry*, *rules on appropriation*, *monitoring*, and *regular meetings*. The NGOs’ support appears to be largely positively associated with the occurrence of community action relating to *rules on appropriation* and *monitoring*. However, the relationship between NGO support and community action regarding *rules on entry* and *regular meetings* was much weaker. Overall, our results suggest that the NGO support has had only minimal impact on day-to-day collective action among the MAR users. This observation is consistent with the findings of Wright and Andersson (2013) and Barnes and van Laerhoven (2015). Our analysis also shows

Table 6
RDWS performance.

	Stock performance*	Flow performance**	Actor performance***	Governance performance****
A	Moderate	Moderate	Moderate	Moderate (2, 4)
B	High	High	Low	Moderate (3, 5)
C	High	Moderate	Low	High (6, 6)
D	High	High	Moderate	High (6, 8)
E	High	High	Moderate	High (5, 6)
F	Moderate	Moderate	Moderate	High (5, 8)
G	Moderate	Moderate	Low	Low (2, 3)
H	Moderate	Low	Low	Moderate (4, 6)
I	Moderate	Moderate	Low	Low (2, 1)
J	Low	Low	Low	Low (1, 2)
K	Low	Low	Low	Low (1, 3)

Data source: Stock performance and actor performance scores are based on interview data. Flow performance scores are obtained from Dhaka University's Geology Department. Governance performance scores are based on the analysis presented in this paper (see in particular Fig. 4.)

* Stock performance: low = has not supplied water during the last 6 months; moderate = supplies water during some time of the year; high = supplies water uninterruptedly.

** Flow performance: low = iron, arsenic and salinity levels exceeding acceptable levels; moderate = iron, arsenic and salinity present but at acceptable levels; high = water is free of iron, arsenic and salinity.

*** Actor performance: low = very few users are willing to contribute money, time and labor; moderate = some users are willing to contribute; high = many user are willing to contribute.

**** Governance performance: low = between 0 and 5 of the requirements for collective action are met; moderate = between 6 and 10 of the requirements are met; high = between 11 and 16 of the requirements are met. (In parentheses the number of requirements for day-to-day, and long-term collective action, respectively, are reported.)

that NGOs tend not to become involved in sensitive issues. This might account for the lack of reported support for the requirements related to *graduated sanctioning*, *low-cost adjudication*, and the *monitoring of monitors*. The findings are also in line with those from previous studies (e.g., Cleaver, 2002; Afroz, Cramb, & Grunbuhel, 2016).

In our study, the NGO support addresses most of the requirements for *long-term collective action*. Eight of the nine requirements we listed under this category are well-covered by NGO support. The exception is *fair allocation of benefits*: none of the NGOs targeted this requirement; yet, interestingly, at all sites there was evidence of users having been able to meet this requirement. There was no one-to-one association between NGO support and the extent to which users were continuing to meet the requirements after NGO withdrawal. Only four requirements (i.e., *management capacity*, *users' ability to pay*, *awareness of users*, and *dynamic leadership*) show a positive association between NGO support explicitly targeting the requirement on the one hand, and ongoing attention to the requirement from MAR users after the withdrawal of the NGO, on the other.

The impact of NGO support on management and user awareness should not come as a surprise; providing training on management tasks and providing information on the ins and outs of the DWS may be expected to have a lasting effect. The ability of NGOs to influence *ability to pay* should be accepted with caution, given a clear selection bias: NGOs seem to prefer working with prospective users that have been found to have sufficient means. Caution is also necessary in relation to the positive relationship found regarding dynamic leadership, as the community members the NGOs targeted for leadership training arguably already possessed leadership qualities. This tendency of NGOs to work with communities that are likely to respond more favorably to their support has been described elsewhere (see Kerr, Pangare, & Pangare, 2002).

The association between NGO support and ongoing community action is much less pronounced for *understanding of relevant policies*, *users' participation in decision-making*, *users' willingness to pay*, and a *supportive external environment*. We suggest that the lack of impact of NGO support may be related to the quality of the NGO

support (e.g., NGO staff who are insufficiently aware of relevant policies), local norms (e.g., no tradition of inclusive decision-making and a history of free access to drinking water), and pilot project design (e.g., not embedding MAR in the existing institutional arrangements from the start).

Overall, we found that the NGOs relied on routines and experiences gathered during previous engagements, during which they focused on capacity building, training, awareness raising, and social mobilization. When working with MAR users, they tended to continue to apply the generic approach that emerged from previous work. As such, we would label many of the NGO support strategies that we encountered in our research as examples of *objective institutional design*, which Barnes and van Laerhoven (2015) oppose to the alternative of a *subjective institutional crafting* approach. In the latter approach the NGO would consider the target community as the primary change agent. Moreover, this approach aims at facilitating a reflective-dialogic process among resource users with the ultimate purpose of empowering communities (e.g., through action research techniques) to allow them to define their own problems along with tailor-made preferred, viable solutions. Related to the generic nature of most forms of NGO support that we encountered is the observation that overall there appeared to be no coherent vision of promoting collective action. The NGOs never explicitly or implicitly framed their work and objectives in terms of collective action; they were largely unaware of the progress reported in academic literature on this topic. As a result, their activities targeting the requirements we derived from that literature were often rather ad hoc.

An important caveat that cannot remain unmentioned here, regards the role of historic power relations in community management models. O'Toole and Meier (2004) hold that inclusive or participatory governance is political, i.e. it magnifies the tendency toward inequality already present in the social setting. Also Swyngedouw (2005) assesses governance-beyond-the state (2005) critically: it inherently empowers some while disempowering others, and may thus lead a democratic deficit. The fact that community management of shared resources may lead to elite capture, has been documented, before (e.g. Andersson & Van

Laerhoven, 2007). Sultana (2009) provides a compelling argument regarding how community participation in water resource management in Bangladesh responds to this same logic and may result in exacerbated inequality, for example along gender lines. In our case, community leaders and local authorities served as the first point of entry when MAR was introduced. This approach raises questions about whether site selection and the allocation of leadership roles were based on and subsequently spurred truly inclusive decision-making. However, we argue that this concern is partly addressed by our focus on the analysis of NGOs activities that regard things like the monitoring of monitors, low-cost adjudication, participation of users on decision-making, and the fair allocation of benefits.

What we have gained in terms of internal validity is – as mostly happens with case study designs (see Gerring, 2006) – offset by what we have lost in terms of external validity. External validity is also compromised by the fact that our sample consists of cases from one single project. Consequently, we are limited in our ability to extend our analysis results beyond the specific context that we studied. However, we place ourselves in a tradition of scholars keeping track of the interface of theory and practice in the specific context of developing the collective action potential of communities of commoners (see e.g., Andersson, 2013; Barnes & Van Laerhoven, 2013, 2015; Wright & Andersson, 2013). With this caveat in mind, we propose the following recommendations.

In view of our findings, we recommend that NGOs prioritize the support of collective action among the users of shared resource systems – DWSs in particular – over more conventional forms of support that focus on knowledge transfer (such as training, capacity building, and awareness raising) and resources (such as infrastructure and financial contributions). In doing so, it appears necessary to develop an explicit vision and strategy that prioritize collective action among users of shared resource systems. Experimenting with different approaches and activities, as well as monitoring and evaluating their outcomes over an extended period of time, should then focus on learning what works and what does not – in other words, on the approaches and support activities that actually influence the long-term capacity of shared resource users to overcome and solve provision and appropriation dilemmas. Preferably, this kind of learning should take variation in local contexts into account, such as local norms, values, and relationships. In this regard, we recommend trying out approaches, focusing on community empowerment, and allowing users to craft their own ways of meeting the requirements for successful and durable forms of collective action, rather than imposing generic design principles based on earlier experiences. As NGOs often operate as de facto contractors, the commissioners (e.g., donors, project consortia, and government agencies) will need to move away from providing NGOs with rigid instructions based on predefined problem definitions.

Our study contributes to the development of emerging theory on how to support community management of shared resources such as RDWSs. Hutchings et al. (2015) hold that community institutions need a 'plus' in order for community management models to work. The most common external 'plus' factors that they find in successful cases include financial support and provision of materials, capacity building on technical skills, capacity building on management, access to advice on technical issues, access to advice on management and finance, access to loan and microfinance, access to supply chain of spare parts and services, decentralized system/regulatory framework which includes monitoring and evaluation. We complement these findings by showing how 'external pluses'

(in the form of NGO support) could contribute to a necessary 'internal plus,' namely, long enduring collective action among RDWS end-users.

In terms of a *support focus*, NGOs seem to show a tendency to shy away from supporting contentious requirements for collective action (e.g., sanctioning and conflict resolution) and emphasize long-term over day-to-day requirements. In terms of *support activities*, they arguably tend to focus on what they have previously proven to be good at (e.g. capacity building and awareness raising) without questioning the relevance or effectiveness of these activities in a different context. In terms of a *vision on support*, they tend to prefer imposing generic, top-down approaches over approaches focused on bottom-up, community empowerment. Our study confirms the seemingly ad hoc nature of NGO support to collective action. Whereas most applications in our domain have so far studied community forestry cases, ours is one of the few that have looked at a context of DWS governance. We think that we have shown more clearly than previous studies that despite the effort, NGO support in its current form does not seem to have an impact on the continued capacity of shared resource system users to act collectively for an extended period.

Future research should substantiate the findings and claims based on this research. Firstly, the validity of the set of requirements for collective action that we have mentioned here needs to be assessed. Do groups of users of shared resource systems that meet these requirements manage to stay engaged in the forms of collective action necessary for resource governance for an extended period? Should the list be expanded and is there scope for this? Should items be removed or redefined? Can weights be associated with the requirements? Do different social or physical contexts alter the configuration of requirements? Secondly, the ways in which external actors – particularly NGOs – can be expected to leave their mark on the requirements must be studied more thoroughly. Our modest sample of eleven sites cannot presume to be representative, given the multitude of NGOs active in community organizations worldwide, the variation in shared resource system users that they are working with, and the range of approaches, strategies, and activities that all of them have been employing for multiple decades. We hope that the learning approach of NGOs to systematically work out what works, where it works, and when it works will strengthen the ways in which practice and science can learn from each other.

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.

Acknowledgments

This research was carried out as part of the DeltaMAR project, part of the Urbanizing Deltas of the World program funded by the Netherlands Organization for Scientific Research (NWO) and the Foundation for Scientific Research of the Tropics and Developing Countries (WOTRO). We acknowledge the valuable suggestions and remarks on this paper from my colleagues of Copernicus Institute of Sustainable Development, Utrecht University. The paper has greatly benefitted from the valuable suggestions by two anonymous reviewers. The authors want to thank all research respondents for their participation. The English was edited by Joy Burrough and Fulco Teunissen. Any errors and omissions are ours.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.worlddev.2019.104710>.

References

- Abedin, M. A., & Shaw, R. (2018). Constraints and coping measures of coastal community toward safe drinking water scarcity in Southwestern Bangladesh. In R. Shaw, K. Koichi Shiwaku, & T. Izumi (Eds.), *Science and technology in disaster risk reduction in Asia*. Academic Press.
- Afroz, S., Cramb, R., & Grunbuhel, C. (2016). Collective management of water resources in Coastal Bangladesh: Formal and substantive approaches. *Human Ecology*, 44(1), 17–31.
- Agrawal, A. (2001). Common property institutions and sustainable governance of resources. *World Development*, 29(10), 1649–1672.
- Andersson, K. (2013). Local governance of forests and the role of external organizations: Some ties matter more than others. *World Development*, 43, 226–237.
- Andersson, K., & Van Laerhoven, F. (2007). From local strongman to facilitator: Institutional incentives for participatory municipal governance in Latin America. *Comparative Political Studies*, 40(9), 1085–1111.
- Bakalian, A., & Wakeman, W. (Eds.). (2009). *Post-construction support and sustainability in community-managed rural water supply: Case studies in Peru, Bolivia, and Ghana*. Washington: World Bank. Water Board Discussion Papers Series.
- Baland, J. M., & Platteau, J. P. (1996). *Halting degradation of natural resources: Is there a role for rural communities?*. Oxford: Clarendon Press.
- Banks, N., Hulme, D., & Edwards, M. (2015). NGOs, states, and donors revisited: Still too close for comfort? *World Development*, 66, 707–718.
- Barnes, C., & van Laerhoven, F. (2013). Helping to self-help? External interventions to stimulate local collective action in Joint Forest Management, Maharashtra, India. *International Forestry Review*, 15(1), 1–17.
- Barnes, C., & van Laerhoven, F. (2015). Making it last? Analysing the role of NGO interventions in the development of institutions for durable collective action in Indian community forestry. *Environmental Science and Policy*, 53, 192–205.
- Barsimantov, J. A. (2010). Vicious and virtuous cycles and the role of external non-government actors in community forestry in Oaxaca and Michoacan, Mexico. *Human Ecology*, 38(1), 49–63.
- Baumann, E. (2006). Do operation and maintenance pay? *Waterlines*, 25(1), 10–12.
- Bebbington, A. (2004). NGOs and uneven development: Geographies of development intervention. *Progress in Human Geography*, 28(6), 725–745.
- Beitl, C. M. (2014). Adding environment to the collective action problem: Individuals, civil society, and the mangrove-fishery commons in Ecuador. *World Development*, 56, 93–107.
- Boelens, R., & Zwarteveen, M. (2005). Prices and politics in Andean water reforms. *Development and Change*, 36(4), 735–758.
- Carter, R. C., Tyrrel, S. F., & Howsam, P. (1999). The impact and sustainability of community water supply and sanitation programmes in developing countries. *Water and Environment Journal*, 13(4), 292–296.
- Cleaver, F. (2002). Reinventing institutions: Bricolage and the social embeddedness of natural resource management. *The European Journal of Development Research*, 14(2), 11–30.
- Cundill, G., & Fabricius, C. (2009). Monitoring in adaptive co-management: Toward a learning based approach. *Journal of Environmental Management*, 90(11), 3205–3211.
- Dayton-Johnson, J. (2000). Determinants of collective action on the local commons: A model with evidence from Mexico. *Journal of Development Economics*, 62(1), 181–208.
- Douglas, M. (1994). *Risk and blame: Essays in cultural theory*. London: Routledge.
- Driessen, P. P., Dieperink, C., van Laerhoven, F., Runhaar, H. A., & Vermeulen, W. J. (2012). Towards a conceptual framework for the study of shifts in modes of environmental governance—experiences from the Netherlands. *Environmental Policy and Governance*, 22(3), 143–160.
- Espinosa-Romero, M. J., Rodriguez, L. F., Weaver, A. H., Villanueva-Aznar, C., & Torre, J. (2014). The changing role of NGOs in Mexican small-scale fisheries: From environmental conservation to multi-scale governance. *Marine Policy*, 50(PA), 290–299.
- Fisher, W. F. (1997). Doing good? The politics and antipolitics of NGO practices. *Annual Review of Anthropology*, 26(1), 439–464.
- Gerring, J. (2006). *Case study research: Principles and practices*. Cambridge, MA: Cambridge University Press.
- Ghate, R. (2009). Decentralizing forest management: Pretense of reality? *Paper presented at the WOW-IV Conference*.
- Gomes, S., Hermans, L., Islam, K., Huda, S., Hossain, A. T. M., & Thissen, W. (2018). Capacity building for water management in peri-urban communities, Bangladesh: A simulation-gaming approach. *Water*, 10(11), 1704.
- Harvey, P. A., & Reed, R. A. (2006). Community-managed water supplies in Africa: Sustainable or dispensable? *Community Development Journal*, 42(3), 365–378.
- Hoque, M. R. (2009). *Access to safe drinking water in rural Bangladesh: Water governance by DPHE*. Dhaka, Bangladesh: BRAC University.
- Hoque, B. A., Hoque, M. M., Ahmed, T., Islam, S., Azad, A. K., Ali, N., & Hossain, M. S. (2004). Demand-based water options for arsenic mitigation: An experience from rural Bangladesh. *Public Health*, 118(1), 70–77.
- Hossain, M., Rahman, S. N., Bhattacharya, P., Jacks, G., Saha, R., & Rahman, M. (2015). Sustainability of arsenic mitigation interventions—an evaluation of different alternative safe drinking water options provided in MATLAB, an arsenic hot spot in Bangladesh. *Frontiers in Environmental Science*, 3, 30.
- Hutchings, P., Chan, M. Y., Cuadrado, L., Ezbakhe, F., Mesa, B., Tamekawa, C., & Franceys, R. (2015). A systematic review of success factors in the community management of rural water supplies over the past 30 years. *Water Policy*, 17(5), 963–983.
- Hutchings, P., Franceys, R., Mekala, S., Smits, S., & James, A. J. (2017). Revisiting the history, concepts and typologies of community management for rural drinking water supply in India. *International Journal of Water Resources Development*, 33(1), 152–169.
- Isham, J., & Kahkonen, S. (1998). *Improving the delivery of water and sanitation: A model of coproduction of infrastructure services (Working Paper No. 210)*. College Park: IRIS Center.
- Islam, M., Akber, M., & Islam, M. (2019). Willingness to pay for improved drinking water in southwest coastal Bangladesh. *Water Science and Technology: Water Supply*, 19(1), 1–10.
- Johnson, E., & Prakash, A. (2007). NGO research program: A collective action perspective. *Policy Sciences*, 40(3), 221–240.
- Jones, S. (2013). How can INGOs help promote sustainable rural water services? An analysis of wateraid's approach to supporting local governments in Mali. *Water Alternatives*, 6(3), 350–366.
- Kerr, J. M., Pangare, G., & Pangare, V. (2002). *Watershed development projects in India: An evaluation*. Washington: International Food Policy Research Institute.
- Koehler, J., Rayner, S., Katuva, J., Thomson, P., & Hope, R. (2018). A cultural theory of drinking water risks, values and institutional change. *Global Environmental Change*, 50, 268–277.
- Lewis, D. (2014). *Non-governmental organizations, management and development*. London: Routledge.
- Lobo, I. D., Vélez, M., & Puerto, S. (2016). Leadership, entrepreneurship and collective action: A case study from the Colombian Pacific region. *International Journal of the Commons*, 10(2), 982–1012.
- Mahmuduzzaman, M., Ahmed, Z. U., Nuruzzaman, A. K. M., & Ahmed, F. R. S. (2014). Causes of salinity intrusion in coastal belt of Bangladesh. *International Journal of Plant Research*, 4(4A), 8–13.
- Mitlin, D., Hickey, S., & Bebbington, A. (2007). Reclaiming development? NGOs and the challenge of alternatives. *World Development*, 35(10), 1699–1720.
- Nagendra, H., & Ghate, R. (2005). Role of monitoring in institutional performance: Forest management in Maharashtra, India. *Conservation & Society*, 3(2), 509–532.
- Olson, M. (1965). *The logic of collective action: Public goods and the theory of groups*. Cambridge: Harvard University Press.
- Ostrom, E. (1990). *Governing the commons: The evolution of institutions for collective action*. New York: Cambridge University Press.
- O'Toole, L. J., Jr, & Meier, K. J. (2004). Desperately seeking Selznick: Cooptation and the dark side of public management in networks. *Public Administration Review*, 64(6), 681–693.
- Peters, C. N., Baroud, H., & Hornberger, G. M. (2019). Multicriteria decision analysis of drinking water source selection in Southwestern Bangladesh. *Journal of Water Resources Planning and Management*, 145(4).
- Pomeroy, R. S., Katon, B. M., & Harkes, I. (2001). Conditions affecting the success of fisheries co-management: Lessons from Asia. *Marine Policy*, 25(3), 197–208.
- Poteete, A. R., & Ostrom, E. (2004). Heterogeneity, group size and collective action: The role of institutions in forest management. *Development and Change*, 35(3), 435–461.
- Prasad, N. (2006). Privatisation results: Private sector participation in water services after 15 years. *Development Policy Review*, 24(6), 669–692.
- Reddy, V. R., Rao, M. R., & Venkataswamy, M. (2011). 'Slippage': The bane of rural drinking water sector: (a study of extent and causes in Andhra Pradesh). *Journal of Social and Economic Development*, 13(2), 163–189.
- Rydin, Y., & Pennington, N. (2000). Public participation and local environmental planning: The collective action problem and the potential of social capital. *Local Environment*, 5(2), 153–169.
- Sultana, F. (2009). Community and participation in water resources management: Gendering and naturing development debates from Bangladesh. *Transactions of the Institute of British Geographers*, 34(3), 346–363.
- Swyngedouw, E. (2005). Governance innovation and the citizen: The Janus face of governance-beyond-the-state. *Urban studies*, 42(11), 1991–2006.
- Tolk, L., Tuinhof, A., ter Winkel, T., Ahmed, K.M. & Bolton, M. (2014) Underground fresh water storage: A practical solution to increase water security in saline deltas.
- Van Laerhoven, F., & Barnes, C. (2014). Communities and commons: The role of community development support in sustaining the commons. *Community Development Journal*, 49(suppl_1), i118–i132.

- Wade, R. (1988). *Village republics: Economic conditions for collective action in South India*. Oakland: ICS Press.
- Whaley, L., & Cleaver, F. (2017). Can “functionality” save the community management model of rural water supply?. *Water Resources and Rural Development*, 9, 56–66.
- Wright, G., & Andersson, K. (2013). Non-governmental organizations, rural communities and forests: A comparative analysis of community-NGO interactions. *Small-Scale Forestry*, 12(1), 33–50.