Rainwater Harvesting Tank Distribution Activities by NGOs and the Exclusion of Poor Households in Southwest Coastal Bangladesh

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Abstract

Drinking water is indispensable for human life. This study investigated the distribution of rainwater harvesting tanks (RWHTs) by non-governmental organizations (NGOs) to address the drinking water crisis in southwest coastal Bangladesh. Field surveys conducted in Shyamnagar Upazila revealed that NGOs more often subsidise rather than donate RWHTs. NGOs subsidised RWHTs for wealthier households because they fulfil criteria such as tin roofs possession and NGO-organised activities involvement. Accordingly, poor households were excluded from NGO RWHT distribution activities as they failed to meet the required criteria. The phenomena may be due to the commercialisation of NGOs and the NGO policy of generating a sense of ownership toward RWHT among villagers. However, excessive commercialisation of NGOs may hamper the provision of safe drinking water to the people most in need, even though the commercialisation of NGOs and the generation of a sense of ownership toward given assets are essential for the sustainability of NGOs and their activities.

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INTRODUCTION

Drinking water is one of humanity's most essential resources. Since the United Nations Water Conference was held in Mar del Plata, Argentina, in 1977, international society, including government agencies, international aid organisations and non-governmental organisations (NGOs) have been working to solve the world's drinking water problem. International Labour Organization (1977) stated that drinking water supply is an indispensable service that should be provided to all communities. The World Bank (1980) indicated that water is a basic human need. Gleick (1998) and United Nations Office of the High Commissioner for Human Rights (2010) noted that access to water is a human right. However, safe drinking water remains one of the biggest issues facing the world. The Millennium Development Goals' final report stated that half of the population of Sub-Saharan Africa and a quarter of the population of South Asia drink water from unsafe sources (United Nations, 2015). In addition, the 2019 Sustainable Development Goals annual report stated that approximately four billion people face drinking water scarcity at least once a year and that approximately 785 million people worldwide have no access to safe sources of drinking water (United Nations, 2019).

Bangladesh is located in South Asia, facing one of the world's worst drinking water crises. In particular, the southwest coastal areas of the country are severally affected by saline intrusion into groundwater and surface water (Figure 1). Electrical conductivity of seawater is around 20,000 to 50,000 μS/cm in general. The figure depicts that groundwater in the southwest coastal region of the country has high saline concentration of more than 11,500 μS/cm. Previous studies have indicated that increased salinity in that area is caused by cyclones, which frequently hit the southwest region (Alam et al., 2003), and extensive shrimp cultivation (Deb,

1998; Haque et al., 2010b)[1]. Therefore, coastal populations face difficulties in obtaining drinking water from groundwater and surface water. Khan et al. (2011) indicated concerns about the adverse effects of excessive salt intake on the human body.

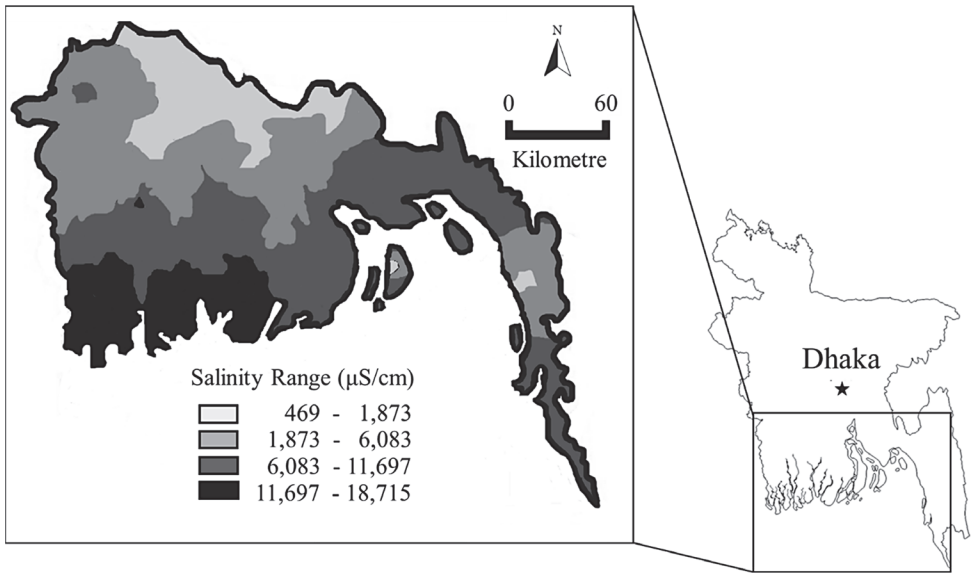

Figure 1. Map of Groundwater Salinity Levels at a Depth of (110 feet) before Tide in the Coastal Regions of Bangladesh.

Source: map of Bangladesh (right) was generated from a blank map; map of groundwater salinity at 110 feet intervals from ground level before tide (left) was generated from Bangladesh Agricultural Development Corporation (2011).

Therefore, rainwater is, in many cases, the only safe source of drinking water for many rural households (Haque et al., 2010a) and is one approach of solving the drinking water challenges facing southwest coastal Bangladesh (Ministry of Water Resources, 1999). Rainwater harvesting technology has solved drinking water problems in other Asian countries, such as Sri Lanka, Taiwan and Thailand (World Health Organization, 2000). These results are obtained because rainwater is safe enough to drink (e.g., Hoque et al., 2000; Jakariya et al., 2003) when collected and stored properly. Furthermore, rainwater is free of salinity (Howard et al., 2006). Coastal populations of Bangladesh agree that rainwater is safe to

1) There is a possibility of further salinity in the region due to increased crab farming in recent years.

drink (Ghosh et al. 2015; Islam et al. 2014), and thus, traditionally rural residents use small vessels to harvest rainwater for acquiring drinking water (Ahmed et al. 2013). Islam et al. (2007) mentioned that rainwater storage technology is found to be technically, economically and socially acceptable in rural Bangladesh.

However, rainwater is a limited source of drinking water in Bangladesh as the majority of the rainfall occurs during the monsoon season in July–October (Bangladesh Bureau of Statistics, 2020). Although Islam et al. (2000) mentioned that rainwater harvesting is the ideal method to solve drinking water problem in Bangladesh because villagers can get a sufficient amount of rainwater during monsoon, Alam and Rahman (2010) pointed out that rainwater cannot meet year-round drinking water requirements. Karim (2010) and Karim et al. (2015) also mention that even rainwater harvesting tanks (RWHTs) of 1,000–5,000 L capacity distributed primarily by government agencies and NGOs are not sufficient for storing year-round drinking water.

Several studies have been conducted regarding the distribution of RWHTs to local residents from the perspective of social network. Samaddar et al. (2018) found that education is an important factor when it comes to possessing RWHTs because people who are highly educated and have networks outside of their community, such as teachers and opinion leaders, purchase RWHTs earlier than other villagers. As they tend to have connections with NGO workers and outsiders of their community, they can easily access the information related to RWHTs (Samaddar and Okada, 2008). Through these types of villagers, information on RWHTs is disseminated into their community (Samaddar et al., 2014; Samaddar and Okada, 2008; Samaddar et al., 2018). Therefore, not only NGO workers and outsiders but also community members are crucial actors for spreading RWHTs in rural communities, and the network of adopters who start to possess RWHTs earlier than others is particularly important (Samaddar and Okada, 2008). Moreover, Samaddar et al. (2014) suggested to locate RWHTs at public spaces, such as schools, religious centres, clubs and local markets, to increase the opportunities for villagers to observe RWHTs because villagers investigate functions of RWHTs and try to reduce risks for adopting RWHTs through direct observation.

Despite the findings of previous studies, there remains only fragmentary understanding of the outcomes of development assistance related to

the distribution of RWHTs. None of the aforementioned studies have focused on the actors involved in providing RWHTs, and those actors have generally only reported on the number of RWHTs they have constructed or distributed.

This study evaluates the activities of NGOs and investigates ways through which they distribute RWHTs to coastal populations to address the drinking water crisis in the region. NGOs were chosen as the focus of this study as Bangladesh has been called the "NGO capital of the world" (Karim, 2001) and the "land of NGOs" (Haider, 2011). Numerous NGOs have emerged in Bangladesh due to the failure of the government to satisfy the needs of the people (Hasan et al., 1992; Nobusue, 2002). Shigetomi (2002) pointed out that NGOs distribute resources beyond the reach of governments, the market and communities. Moreover, they meet a desire for collective goods that cannot be met by governments or the market (Salamon, 1995). Therefore, NGOs are an alternative channel for the provision of services (Hulme and Edwards, 2013). However, Zohir (2004) noted that Bangladeshi NGOs are commercialised and involve profit-making activities (Davis and MacGregor, 2000; Haque, 2002). One of the most famous commercial activities of NGOs is microfinance introduced by Grameen Bank in Bangladesh in the mid-1970s. Since then, NGOs have adopted a microfinance approach (Devine, 2003, Hoque et al., 2011) in response to the demand from donor agencies for sustainability and self-reliance (Ahmed, 2013; Devine, 2003; Hoque et al., 2011). This study considers this phenomenon in assessing the achievements of NGO activities in Bangladesh. This study addresses the drinking water problem by analysing NGO development assistance, which is currently lacking. In addition, the study contributes to the field of development studies by advancing the understanding of NGO practices, particularly regarding the extent to which their activities to distribute resources and/or goods contribute to solving social problems.

Methods

I. General Information of the Study Hamlet

To achieve the study objective, field surveys were conducted in a southwest coastal hamlet (*para* in Bengali) in the village of Munshiganj

Union, Shyamnagar Upazila[2], Satkhira District (Figure 2) from 1st April to 6th May, 2019, and from 7th to 31st December, 2019. During the study, the hamlet had a population of 1,001 in 237 households. The main livelihood sources of the study area are agriculture and aquaculture, which are common in southwest coastal Bangladesh. Many households also earn income from non-agricultural and/or non-aquacultural employment, including wage labour. The average annual income of 101,533 BDT[3] in the hamlet was less than that of 160,236 BDT in rural Bangladesh (Bangladesh Bureau of Statistics, 2017). Due to the area's proximity to West Bengal, India, most of the hamlet population is Hindu, despite Bangladesh's Muslim majority.

Southwest coastal Bangladesh has, for a long time, been severely affected by saline intrusion into groundwater and surface water (e.g., Chowdhury, 2009; Khanom and Salehin, 2012; Rahman and Bhattacharya, 2014), and this became especially severe following Cyclone Aila in 2009. The average annual rainfall is 1,754 mm in Satkhira District (Bangladesh Bureau of Statistics, 2020), which is less than that recorded in other parts of the country (Figure 2). However, rainwater harvesting is a common practice for villagers to secure drinking water and avoid salt water. Villagers can acquire RWHTs from NGOs for free, for a fee or through purchase at local markets. Regarding the hamlet selected for this study, villagers mentioned that following Cyclone Aila, pond water became saline and salt water flowed out when shallow tubewells were dug. Moreover, five NGOs, as explained below, had or have projects to distribute RWHTs in the study hamlet. Given these facts, the hamlet was recognised as a suitable site for this study because of the typical social and environmental condition of southwest coastal Bangladesh and because NGOs were active to distribute RWHTs.

2) In the context of Bangladesh, villages are formed by a group of hamlets. Unions are the smallest administrative units, and upazilas are sub-units of districts.

3) USD $1.00 was nearly equal to 85 BDT (as of 31st of December, 2019).

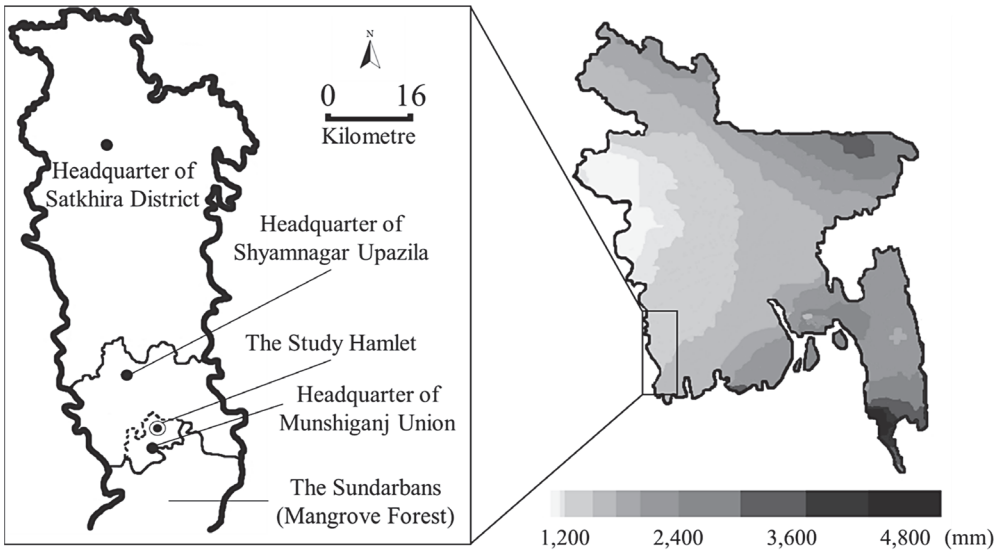

Figure 2. Map of the Research Area (left) and Annual Rainfall in Bangladesh (right)

Source: map of the research area was generated using data from Local Government Engineering Department (1999); map of annual rainfall in Bangladesh was generated using data of seasonal climate analysis from a rainfall time series (January – December, 1981–2017) from Bangladesh Meteorological Department (n.d.).

II. Interviews with Sampled Households and NGO staffs

Semi-structured interviews were conducted with all 34 RWHT-owning households (hereinafter, tank holders) and with 51 randomly sampled non-RWHT-owning households (hereinafter, non-tank holders) from the 237 households in the study hamlet. The random sampling for non-tank holders was performed by using Excel to extract from a list of all households in the study hamlet. The study hamlet had a total of 38 RWHTs, with two households owning two RWHTs each and one household owning three. Semi-structured interviews were also conducted with the staff members of NGOs that distributed RWHTs in the study hamlet.

Both tank holders and non-tank holders were asked their total annual income. Tank holders were asked regarding the price and capacity of their RWHTs as well as the organisation or agency through which they got their RWHTs. Tank holders were also asked the reasons for acquiring RWHTs. Non-tank holders were asked regarding their reasons for not owning RWHT. NGO staffs were asked regarding their tank distribution projects, especially regarding RWHT prices, capacities and distribution

methods. Furthermore, NGO staffs were asked about criteria for being beneficiaries of their RWHT distribution projects. As the author lacked adequate knowledge of Bengali, all interviews were conducted with the help of Bengali–English translators.

RESULTS AND DISCUSSION

I. Rainwater Harvesting Tanks Sold in Local Markets or Made by Villagers

Tank holders acquired RWHTs from NGOs, local markets, relatives or friends and by constructing them at home. Six tank holders acquired RWHTs from relatives or friends, but these were excluded from this study as these were provided as marriage gifts or upon request to the original owner. This section focuses on market-bought and home-made RWHTs to differentiate between the services provided by NGOs and by other actors.

Most tank holders who owned market-bought RWHTs possessed 1,000 L capacity plastic tanks, which were on sale for 7,000 BDT at several local markets. The price of RWHTs depended on tank capacity and tank manufacturer. RWHTs bought at local markets were paid for in full at the point of purchase, as shops in local markets did not have an instalment payment system. In addition, villagers faced additional costs while purchasing RWHTs at local markets. As no RWHTs were available for sale in the study hamlet, villagers were required to pay the transport costs of going to and returning from local markets as well as the cost of transporting the RWHT home. Most market-bought RWHTs were obtained from the main market of Shyamnagar Upazila, approximately 16 km from the study hamlet. Residents in the study hamlet travelled to this market by bus, rickshaw van or other vehicle, all of which incurred transportation costs. None of the shops in Shyamnagar Upazila provided delivery services. Therefore, most tank holders hired rickshaw vans at a cost of approximately 400 to 500 BDT. Accordingly, the price per litre of water in a market-bought RWHT was more than 7.4 BDT. One non-tank holder said it was a burden for villagers to buy RWHTs at local markets because of the distance and associated transportation costs.

Home-made RWHTs were made from cement, and the costs for construction depended on the quantity of materials used. According to tank

holders who constructed their own RWHTs, a 500 L capacity tank costed 3,000 BDT; a 4,500 L capacity tank costed 18,000 BDT; and a 14,000 L capacity tank costed 50,000 BDT. Although it is difficult to calculate the price per litre due to the different methods that villagers used to construct RWHTs, the price per litre of water stored was roughly around 3.6 to 6.0 BDT and was cheaper than market-bought RWHTs. However, not all villagers can construct RWHTs as its production requires the knowledge of plaster work and the collection or purchase of all the necessary materials.

II. NGO Rainwater Harvesting Tank Distribution Activities

During the survey, five different NGOs had distributed 18 RWHTs in the study hamlet (Table 1). Of these, 15 RWHTs were sold to villagers at discounted prices or through an instalment payment system by three NGOs (NGO-1, NGO-2 and NGO-3), and three RWHTs were donated free of charge by two NGOs (NGO-4 and NGO-5). Of the donated RWHTs, NGO-4 donated two 500 L capacity plastic tanks to the same household. This tank holder volunteered for NGO-4 and was, therefore, able to obtain those two RWHTs. According to this tank holder and other villagers, NGO-4 was not well-known for supplying RWHTs in the study hamlet. NGO-5 donated only one 1,500 L capacity plastic tank in the study hamlet. However, it donated RWHTs to poor and vulnerable households of several villages. Therefore, the NGO's RWHT donation activities are not common in the study hamlet. Of the NGO-distributed RWHTs, one tank, which had been sold at a discounted price, was abandoned because the tank holder changed the household's drinking water source from rainwater to bottled water. RWHT distribution systems of each of the three remaining NGOs (NGO-1, NGO-2 and NGO-3) are discussed in the following sub-section.

Table 1. Information on NGOs That Distributed Rainwater Harvesting Tanks (RWHTs) Shown only for Activities in the Study Hamlet

Name	Methods to Distribute	RWHTs Distributed in the Study Hamlet				Project Continuity	Target to Distribute RWHTs
		Capacity (Litre)	Price (BDT)	Number (Total)			
NGO-1	Subsidisation (discount)	3,200	5,500	5	(7)	Finished	● Households with well economic condition and with tin roofs
		10,000	8,750	2			
NGO-2	Subsidisation (monthly payment system)	1,000	7,700	5	(7)	Continued	● Households that belong to the microfinance group with well economic condition
		2,000	16,000	1			
		3,000	22,000	1			
NGO-3	Subsidisation (discount)	1,000	2,500	1	(1)	Continued	● Households that belong to the agriculture and aquaculture group with tin roofs
NGO-4	Donation	500	0	2	(2)	Finished	● Households that are involved in volunteer work
NGO-5	Donation	1,500	0	1	(1)	Continued	● Households that are poor and vulnerable

Source: Fieldwork data. NGO-1 shouldered over 75% of the total construction costs of RWHTs and NGO-3 shoulders around 36% of the total costs of RWHT for providing to villagers.

1. NGO-1: Active and Semi-Commercialised NGO

NGO-1 conducted a project from 1996 to 2010 to distribute cement RWHTs to several villages, including the study hamlet. During the interview, this project had already ended. The project was funded by another NGO that provided support to NGOs in Bangladesh. NGO-1 conducted the first rainwater harvesting project in the study hamlet and sold seven RWHTs during the project. A staff member of NGO-1 stated that the project sought to popularise rainwater harvesting for drinking water among the residents in the study hamlet. They aimed to create model households from whom other villagers can learn regarding rainwater harvesting.

NGO-1 provided RWHTs to villagers by shouldering over 75% of the total construction costs. It distributed two types of RWHT: a 3,200 L capacity tank for single household use and a 10,000 L capacity tank for the shared use of four to five households. The smaller tank was priced 5,500 BDT, with the actual construction cost of 22,000 BDT incurred. The larger tank was priced 8,750 BDT, with the actual construction cost of 35,000 BDT paid. The 10,000 L capacity RWHT cost each beneficiary around 1,750 to 2,188 BDT, as the tank was shared by several households. As no instalment payment system existed, villagers had to pay for the RWHT in lump sum. However, beneficiaries were not required to pay transportation or construction costs, as NGO-1 hired plasterers to build the RWHTs on site and the cost of labour was included in the tank cost. Therefore, the price per litre of water from RWHTs sold by NGO-1 was around 0.9 or 1.7 BDT and, therefore, cheaper than either market-bought or home-made tanks.

A staff member of NGO-1 mentioned that criteria had been set for subsidising the sale of RWHTs to villagers. NGO-1 sought beneficiaries that could afford RWHTs based on their economic condition. In addition, it subsidised RWHTs for households with tin roofs, as other roof materials, such as straw, could contaminate rainwater, while tin roofs lower this risk. Tin roofs are generally found on the houses of more economically advantaged households owing to high expenditure required to maintain them. Moreover, in each village where it operated, NGO-1 formed village water committees to choose RWHT beneficiaries. Committees comprised teach-

ers, imams and female members of union parishads[4]. Because the head office of NGO-1 was located close to the headquarter of Shyamnagar Upazila, approximately 16 km from the study hamlet, the village water committee of the study hamlet was responsible for selecting the project beneficiaries in the hamlet. A village water committee member from the study hamlet noted that the committee considered the distance between beneficiary households. Therefore, one household was refused its request to buy a tank because the house next door was already in possession of a tank provided by NGO-1. Furthermore, although NGO-1 staff had visited the study hamlet with the village water committee to choose beneficiaries, three of the seven beneficiary households purchased their RWHTs from NGO-1 by proactively asking to do so.

2. NGO-2: Active and Commercialised NGO

NGO-2 has been running a project since 2016 that distributes plastic RWHTs to several villages, including the study hamlet. The project is funded by a Bangladeshi governmental organisation that mainly supports microfinance institutions. To date, seven households in the study hamlet have received RWHTs from NGO-2.

NGO-2 subsidises the purchase of RWHTs with an instalment payment system that generates a 10% interest rate and requires repayment within one year[5]. NGO-2 does not produce its own plastic RWHTs but rather purchases them from local markets. NGO-2 then installs the RWHTs in beneficiaries' homes. The most common NGO-2 RWHT in the study hamlet had a 1,000 L capacity. NGO-2 bought this tank for 7,000 BDT and sold it to households for 7,700 BDT, which included 10% interest rate. Therefore, the price per litre of stored water in the 1,000 L capacity RWHT was 7.7 BDT. This was more than either market-bought or homemade RWHT but had the advantage of allowing householders to pay in 12 instalments of 642 BDT per month. Besides 1,000 L capacity tanks, NGO-2 distributed one 2,000 L and one 3,000 L capacity tanks in the study hamlet.

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4) Parishad is the word used in South Asia to describe a governmental assembly or council.

5) NGO-2 has another project to donate RWHTs for households that involve either a physically disabled person, a widow or for households with monthly income of less than 3,000 BDT. However, there are no beneficiaries of this donation project in the study hamlet.

A staff member of NGO-2 said there are criteria for choosing beneficiary households. Beneficiaries must belong to a microfinance group organised by NGO-2. Members with enough money to repay the full cost of the RWHT within the designated period were especially targeted. As the regional office of NGO-2 was located in Munshiganj Union, which houses the study hamlet, staff members visited the homes of villagers involved in microfinance groups to promote the RWHT project.

3. NGO-3: Not Very Active and Semi-Commercialised NGO

NGO-3, funded by a German Christian NGO, runs a project that distributes plastic RWHTs to several villages, including the study hamlet. NGO-3 does not actively provide RWHTs in the study hamlet and, thus far, has distributed only one. However, a staff member said NGO-3 has distributed RWHTs to other villages since around 2016.

NGO-3 does not produce its own plastic RWHTs but rather purchases them from local markets and sells them to beneficiaries at discounted prices. A 1,000 L capacity RWHT purchased in local markets for 7,000 BDT was sold to the beneficiary for 2,500 BDT, which had to be paid in a lump sum. In other words, NGO-3 shoulders around 36% of the total cost of RWHTs, making the price per litre of water stored 2.5 BDT, which was cheaper than that of either market-bought or home-made RWHTs.

As with the other two NGOs, NGO-3 set criteria for choosing the RWHT beneficiary. In this case, the beneficiary was required to be a member of the agriculture and aquaculture groups formed by NGO-3. In addition, NGO-3 prioritised tin roofed and, therefore, more economically advantaged households concerning the lower risk of water contamination. The head office of NGO-3 was located in Munshiganj Union, and staff members visited the homes of potential beneficiaries to promote the installation of RWHTs when it was purchased.

III. Exclusion of Poor Households from NGO Rainwater Harvesting Tank Distribution Activities

Table 2 presents the economic classes of households that purchased RWHTs from NGOs in the study hamlet and the percentage of households in each economic class. As mentioned above, the average annual income in

the hamlet was 101,533 BDT. Households with annual income < 50,000 BDT (i.e. less than half the average annual income) are defined as poor in this study[6]. According to Table 2, poor households constituted only 13% of NGO RWHT beneficiaries, while middle-class households constituted 53% and the wealthy class 33%. Only 2% of poor households in the study hamlet purchased RWHTs from NGOs when compared with 18% of wealthy households. Most beneficiaries who bought RWHTs from NGOs were middle class.

Table 2. Economic Classes of Households Purchasing Rainwater Harvesting Tanks from NGOs

Classification of Economic Classes by Annual Income (BDT)	Number of Households in the Study Hamlet	Number of Households that Purchased RWHTs from NGOs	Percentage of Households that Purchased RWHTs from NGOs
Wealthy (200,000 ≤ x)	28 (12%)	5 (33%)	18%
Middle (50,000 ≤ x < 200,000)	114 (48%)	8 (53%)	7%
Poor (x < 50,000)	95 (40%)	2 (13%)	2%
Total	237 (100%)	15 (100%)	8%

Source: Fieldwork data. The average annual income in the hamlet was 101,533 BDT. Households with annual income < 50,000 BDT (i.e. less than half the average annual income) are defined as poor.

Poor households were largely excluded from purchasing NGO RWHTs because all the three NGOs had specific criteria for choosing the households it would subsidise, thereby prioritising more economically advantaged households for providing RWHTs. As seen above, NGO-1 required beneficiaries to be economically stable households with tin roofs. Of the four households that were prompted to buy RWHTs from NGO-1, only one could be categorised as poor and two could be categorised as wealthy. Of the seven households that bought RWHTs from NGO-1, three could be categorised as rich. NGO-2 and NGO-3 insisted that beneficiaries belonged to

6) This classification of economic strata is defined by the author. The study hamlet can be considered as poor in comparison with the other villages because the average annual household income is 160,236 BDT in rural Bangladesh (Bangladesh Bureau of Statistics, 2017).

groups organised by the NGOs. In the case of NGO-2, which formed microfinance groups, two interviewees, one a tank holder and the other a non-tank holder, said that their request to buy RWHTs had been refused because they did not belong to the microfinance groups. Of the seven households that bought RWHTs from NGO-2, two could be categorised as rich, four could be categorised as middle and only one could be categorised as poor. It was difficult for poor households to participate in microfinance groups because they found it difficult to pay their loans back on time; thus, they were excluded when other households formed such groups (Islam and Sharmin, 2011). NGO-3, which organised income-generating agriculture and aquaculture groups, excluded poor households unable to join these groups and those that did not meet the tin roof criterion of eligibility to buy a RWHT. In the study hamlet and other villages in southwest coastal Bangladesh, tin roofs tend to be owned by wealthier households. In fact, the single household that purchased a RWHT from NGO-3 could be categorised as middle class. This beneficiary clearly stated that his household had been selected because of its better economic condition relative to other group members.

Because of these criteria, even though the discounted price or the instalment payment system of RWHTs made them cheaper than market-bought or home-made tanks, they remained too expensive for many villagers to purchase. Furthermore, 40 out of 51 non-tank holders interviewed (78%) claimed that they were unable to buy RWHTs because of their poor economic circumstances, and 13 respondents (33%) stated that even NGO's RWHTs were beyond their means. Non-tank holders were restrained not only by the price of RWHTs but also by the cost of installation and the repayment period. Two non-tank holders explained that they had refused an offer by NGO-2 to sell RWHTs on the instalment payment system because they realised that the total cost would be greater than that when they bought RWHTs at local markets. They also claimed that tank sales were nothing more than a profit-making enterprise for NGO-2.

Therefore, in the study hamlet, NGOs targeted middle-class households and largely excluded poor households from their RWHT distribution activities. This is indicated in Table 3, which was created in the same way as Table 2. Table 3 presents that half of those households encouraged by NGOs to buy RWHTs were middle class. Of the three economic strata, poor households were approached the least by NGOs to buy RWHTs, while

around one third of beneficiaries were wealthy households.

Table 3. Economic Classes of Households Encouraged to Buy Rainwater Harvesting Tanks from NGOs

Classification of Economic Classes by Annual Income (BDT)	Number of Households in the Study Hamlet	Number of Households Encouraged to Buy RWHTs from NGOs
Wealthy (200,000 ≤ x)	28 (12%)	5 (31%)
Middle (50,000 ≤ x < 200,000)	114 (48%)	8 (50%)
Poor (x < 50,000)	95 (40%)	3 (19%)
Total	237 (100%)	16 (100%)

Source: Fieldwork data. The average annual income in the hamlet was 101,533 BDT. Households with annual income < 50,000 BDT (i.e. less than half the average annual income) are defined as poor.

IV. Context for the Exclusion of Poor Households

1. Commercialisation of NGOs

Poor households have been largely excluded from NGO RWHT distribution activities as it partly relates to the commercialisation of Bangladeshi NGOs (Zohir, 2004) and their involvement in profit-making activities (Davis and McGregor, 2000; Haque, 2002). All three NGOs in this case study had or have intent to generate benefits from or recover the costs of selling RWHTs. NGO-1 and NGO-3 are partially commercialised organisations, given that, while they targeted mainly well-off households, they shared the RWHT costs with the households. However, their activities are unlikely to affect villagers in the study hamlet in the future because the NGO-1 project has now come to an end and the NGO-3 project remains on a very small scale. NGO-2, meanwhile, is more commercialised because, due to its added 10% interest rate, it sells RWHTs to villagers at a price higher than those of market-bought or home-made tanks. In addition, NGO-2 targets only members of the microfinance groups, that is, more or less wealthy households, while excluding less well-off households. Because NGO-2 continues to be active, this situation is likely to continue into the future. In other words, only financially stable households will benefit from drinking water aid, and poor households will continue to be excluded from

aid.

Previous studies have criticised the commercialisation of NGOs in Bangladesh and elsewhere because commercialised NGOs do not carry out traditional social programmes (Devine, 2003; Hoque et al., 2011) nor do they empower the vulnerable and the poor (Hoque et al., 2011; Islam, 2014). Banks and Hulme (2012) indicated that NGOs prioritise the interests of donors while failing to act upon the needs of people in the project sites. Therefore, NGO activities have become indistinguishable from the activities of other organisations (Hailey, 2000). Microfinance, which remains one of the most famous examples of commercial NGO activity, is criticised as being unable to reach the poorest of the poor (Datta, 2004; Islam and Sharmin, 2011; Stiles, 2002).

However, commercialisation is an important method through which NGOs can achieve organisational independence from their donors (Davis and McGregor, 2000; Haque, 2002; Khieng and Dahles, 2015). Commercialisation can improve governance and the financial and administrative systems of NGOs (Khieng and Dahles, 2015). Generating long-term funds at the project site increases the efficiency and accountability of NGO activities (Edwards and Hulme, 1996). Accordingly, the activities of NGOs have become broader (Hailey, 2000). Hence, the commercialisation of NGOs cannot be unequivocally criticised as some positive aspects of commercialisation have led to enhanced development activities.

However, the drinking water sector differs from other project sectors such as microfinance or income generation because drinking water is an essential resource to satisfy basic human needs. Excessive NGO commercialisation is not amenable to this purpose as the water needs of the most needy people like poor households cannot be met. In light of the original development goals of NGOs, the current situation in which well-off households have become the targets of their drinking water projects needs to be corrected.

2. Policy to Generate Beneficiaries' Sense of Ownership toward Rainwater Harvesting Tanks

The policy that requires villagers to bear the cost of RWHTs for generating their sense of ownership has led to the unintended consequence of excluding poor villagers. In fact, beneficiaries' sense of ownership toward a

given asset is considered one of the most important factors for sustaining the impact of development activities. Beneficiaries' sense of ownership toward a given asset can be generated when awareness of interests increases among them (Burns and Worsley, 2015). In the case of drinking water, Manikutty (1997), based on a case study in India, indicated that beneficiaries' sense of ownership toward facilities can be enhanced when costs of facilities were shared by the beneficiaries themselves. Marks and Davis (2012) also found from a case study of water supply in Kenya that beneficiaries' sense of ownership toward water facilities is generated only when they share large capital costs. From those studies, it can be said that financial sacrifice from beneficiaries may help them to increase their sense of ownership toward water facilities. In case of the study hamlet, the policy of generating beneficiaries' sense of ownership toward RWHTs was considered successful in terms of requiring that tank holders pay a certain amount of money because all the RWHTs that have been distributed continue to be used except for one, which was abandoned because of the shift of household's drinking water source from rainwater to bottled water.

However, poor households find it difficult to bear the financial burden of RWHTs. As mentioned above, of the 15 households who purchased RWHTs from NGOs in the study hamlet, only two poor households benefited from the RWHT projects. This point shows that the policy of generating a sense of ownership toward RWHTs through the current distribution method may not be able to reach poor households.

Therefore, NGOs need to change distribution methods of RWHTs to reach poor households and generate beneficiaries' sense of ownership toward RWHTs. Since drinking water is indispensable for the fulfilment of basic human needs, NGOs should ensure that unequal income levels among the households do not cause inequality of access to drinking water.

Conclusions and Policy Implications

This study evaluated NGO RWHT distribution activities in southwest coastal Bangladesh. The results of field surveys revealed that NGOs sell RWHTs at discounted prices or through instalment payment systems rather than donating these tanks to households. NGOs targeted financially middle and wealthy classes as RWHT beneficiaries based on the criteria difficult for poor households to meet. As a result, RWHTs continue to be

too expensive for poorer households, even though NGOs have set the RWHT price being less than market-bought or home-made ones (either the price per litre of stored water or the price for a one-off payment for the tank). Therefore, poor villagers are largely excluded from NGO RWHT distribution activities. This phenomenon may be related to the general trend of the commercialisation of NGOs in Bangladesh because they combined RWHT distribution activities and financial support projects such as microfinance and income generation. However, it is argued that excessive NGO commercialisation as observed in the high proportion of commercialised NGOs in the drinking water sector is an obstacle to tackling poverty in the country.

Therefore, this study suggests the need for NGOs to shift their focus from wealthier households to inclusion of more poor households in their RWHT projects. NGOs can include poor households by reducing the interest rate and extending its repayment period of RWHTs. For example, NGOs reduce the interest rate and extend its repayment period for households with small annual incomes while applying the current system to households with higher incomes. Such subsidisation can include more poor households and generate beneficiaries' sense of ownership toward RWHTs while helping maintain the financial sustainability of NGOs. Drinking water is indispensable for human survival; thus, such changes are needed to meet the needs of people who can least afford it.

This study, however, sampled only one hamlet in southwest coastal Bangladesh to investigate NGO RWHT distribution activities. In addition, the case of NGOs donating RWHT and financial situations of NGOs are not considered in this study. Therefore, further research on the donation activity and financial conditions of NGOs is needed in order to understand the complete aspect of NGO activities related to RWHT distribution in southwest coastal Bangladesh.

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REFERENCES

Ahmad, Aka F. (2013) *Rural Development by NGOs in Bangladesh: Perspective, Performance and Paradoxes*, Dhaka, Osder Publications.

Ahmed, Musfique., Rifat Anwar, and Miah A Hossain. (2013) 'Opportunities and Limitations in Practicing Rainwater Harvesting Systems in Bangladesh', *International Journal of Civil Engineering*, 2(4), pp. 67-74.

Alam, Md M., Md A Hossain, and Sultana Shafee. (2003) 'Frequency of Bay of Bengal Cyclonic Storms and Depressions Crossing Different Coastal Zones', *International Journal of Climatology: A Journal of the Royal Meteorological Society*, 23(9), pp. 1,119-1,125.

Alam, Md A. and Md M Rahman. (2010) 'Comparative Assessment of Four Alternative Water Supply Options in Arsenic Affected Areas of Bangladesh', *Journal of Civil Engineering*, 38(2), pp. 191-201.

Bangladesh Agricultural Development Corporation. (2011) *Identification of Underground Salinity Front of Bangladesh*, Bangladesh Agricultural Development Corporation, Government of the People's Republic of Bangladesh. http://badc.portal.gov.bd/sites/default/files/files/badc.portal.gov.bd/page/81ea5152_816d_4114_9a6f_0f5cab677bf9/Salinity_Front%20(2).pdf, accessed 03 October, 2020.

Bangladesh Bureau of Statistics. (2017) *Preliminary Report on Household Income and Expenditure Survey 2016*, Dhaka, Bangladesh Bureau of Statistics, Government of the People's Republic of Bangladesh.

Bangladesh Bureau of Statistics. (2020) *Statistical Yearbook Bangladesh 2019, 39th Edition*, Dhaka, Bangladesh Bureau of Statistics, Government of the People's Republic of Bangladesh.

Bangladesh Meteorological Department. (n.d.) *Seasonal Climate Analysis, Rainfall time series (January to December, 1981-2017)*, Bangladesh Meteorological Department, Government of the People's Republic of Bangladesh. http://datalibrary.bmd.gov.bd/maproom/Climatology/Climate_Analysis/seasonal.html?resolution=.05&YearStart=1981&YearEnd=2017&seasonStart=Jul&seasonEnd=Dec&var=Rain&yearlyStat=Mean, accessed 03 October, 2020.

Banks, Nicola. and David Hulme. (2012) *The Role of NGOs and Civil Society in Development and Poverty Reduction*. Brooks World Poverty Institute Working Paper, 171, pp. 1-39.

Burns, Danny. and Stuart Worsley. (2015) *Navigating Complexity in International De-*

velopment: Facilitating Sustainable Change at Scale, Rugby, Practical Action Publishing.

Chowdhury, Nasima T. (2009) 'Water Management in Bangladesh: An Analytical Review', *Water Policy*, 12(1), pp. 32-51.

Datta, Dipankar. (2004) 'Microcredit in Rural Bangladesh: Is It Reaching the Poorest?', *Journal of Microfinance / ESR Review*, 6(1), pp. 55-81.

Davis, Peter R. and J A McGregor. (2000) 'Civil Society, International Donors and Poverty in Bangladesh', *Journal of Commonwealth & Comparative Politics*, 38(1), pp. 47-64.

Deb, Apurba K. (1998) 'Fake Blue Revolution: Environmental and Socio-Economic Impacts of Shrimp Culture in the Coastal Areas of Bangladesh', *Ocean & Coastal Management*, 41(1), pp. 63-88.

Devine, Joseph. (2003) 'The Paradox of Sustainability: Reflections on NGOs in Bangladesh', *The Annals of the American Academy of Political and Social Science*, 590(1), pp. 227-242.

Edwards, Michael. and David Hulme. (1996) 'Too Close for Comfort? The Impact of Official Aid on Nongovernmental Organizations', *World Development*, 24(6), pp. 961-973.

Gleick, Peter H. (1998) 'The Human Right to Water', *Water Policy*, 1(5), pp. 487-503.

Ghosh, Gopal C., Sayka Jahan., Basabi Chakraborty, and Asma Akter. (2015) 'Potential of Household Rainwater Harvesting for Drinking Water Supply in Hazard Prone Coastal Area of Bangladesh', *Nature Environment and Pollution Technology*, 14(4), pp. 937-942.

Haider, Sheikh K U. (2011) 'Genesis and Growth of the NGOs: Issues in Bangladesh Perspective', *International NGO Journal*, 6(11), pp. 240-247.

Hailey, John. (2000) 'Indicators of Identity: NGOs and the Strategic Imperative of Assessing Core Values', *Development in Practice*, 10(3-4), pp. 402-407.

Haque, M S. (2002) 'The Changing Balance of Power between the Government and NGOs in Bangladesh', *International Political Science Review*, 23(4), pp. 411-435.

Haque, Md A., A Haque, and M S Ansari. (2010a) 'Water, Sanitation and Health Status of Aila Affected Coastal Area of Bangladesh', *Bangladesh Journal of Environment Science*, 19, pp. 51-56.

Haque, Munirul A M M., Sarwar M Jahan, and Md A K Azad. (2010b) 'Shrimp Culture Impact on the Surface and Ground Water of Bangladesh', *Iranian Journal of Earth Science*, 2(2), pp. 125-132.

Hasan, Samiul., George Mulamoottil, and John E Kersell. (1992) 'Voluntary Organizations in Bangladesh: A Profile', *Environment and Urbanization*, 4(2), pp. 196-206.

Hoque, Bilqis A., A A Mahmood, M Quadiruzzaman, Md F Khan, Sadia A Ahmed, Sakam Shafique, Mohammad M Rahman, Golam Morshed, Tridib R Chowdhury, Mahmudur A S Rahman, F H Khan, Md Shahjahan, Mosammat R Begun, and Md S Hoque. (2000) 'Recommendations for Water Supply in Arsenic Mitigation: A Case Study from Bangladesh', *Public Health*, 114(6), pp. 488-494.

Hoque, Monzurul., Muhammad Chishty, and Rashid Halloway. (2011) 'Commercialization and Changes in Capital Structure in Microfinance Institutions: An Innovation or Wrong Turn?', *Managerial Finance*, 37(5), pp. 414-425.

Howard, Guy., M F Ahmed, Abu J Shamsuddin, Shamsul G Mahmud, and Daniel Deere. (2006) 'Risk Assessment of Arsenic Mitigation Options in Bangladesh', *Journal of Health, Population, and Nutrition*, 24(3), pp. 346-355.

Hulme, David. and Michael Edwards. (2013) 'NGOs, States and Donors: An Overview', in David Hulme and Michael Edwards (eds), *NGOs, States and Donors: Too Close for Comfort? (2nd Edition)*, Hampshire, Palgrave Macmillan, pp. 3-22.

International Labor Organization. (1977) *Employment, Growth and Basic Needs: Development Strategies in Three Worlds*, Geneva, International Labour Organization.

Islam, Kamal Z., Md S Islam, Jean O Lacoursière, and Lisa Dessborn. (2014) 'Low Cost Rainwater Harvesting: An Alternate Solution to Salinity Affected Coastal Region of Bangladesh', *American Journal of Water Resources*, 2(6), pp. 141-148.

Islam, Md M., Frederick N-F Chou, M R Kabir, and C-H Liaw. (2010) 'Rainwater: A Potential Alternative Source for Scarce Safe Drinking and Arsenic Contaminated Water in Bangladesh', *Water Resources Management*, 24(14), pp. 3,987-4,008.

Islam, Md M., M R Kabir, and Frederick N-F Chou. (2007) 'Feasibility Study of Rainwater Harvesting Techniques in Bangladesh', *Rainwater and Urban Design*, 2007, pp. 726-733.

Islam, M R. (2014) 'Improving Development Ownership Among Vulnerable People: Challenges of NGOs' Community Empowerment Projects in Bangladesh', *Asian Social Work and Policy Review*, 8(3), pp. 193-209.

Islam, M R. and Koyela Sharmin. (2011) 'Social Exclusion in Non-Government Organizations' (NGOs') Development Activities in Bangladesh', *Sociology Mind*, 1(2), pp. 36-44.

Jakariya, Md., A M R Chowdhury, Zabed Hossain, Mizanur Rahman, Quaiyum Sarker, Ruhul I Khan, and Mahfuzar Rahman. (2003) 'Sustainable Community-based Safe Water Options to Mitigate the Bangladesh Arsenic Catastrophe: An Experience from Two Upazilas', *Current Science*, 85(2), pp. 141-146.

Karim, Lamia. (2001) 'Politics of the Poor? NGOs and Grass-Roots Political Mobilization in Bangladesh', *Political and Legal Anthropology Review*, 24(1), pp. 92-107.

Karim, Md R. (2010) 'Assessment of Rainwater Harvesting for Drinking Water Supply in Bangladesh', *Water Science and Technology: Water Supply*, 10(2), pp. 243-249.

Karim, Md R., Rifath A Rimi, and Md S Billah. (2015) 'Analysis of Storage Volume and Reliability of the Rainwater Harvesting Tanks in the Coastal Area of Bangladesh', *Desalination and Water Treatment*, 54(13), pp. 3,544-3,550.

Khan, Aneire E., Andrew Ireson, Sari Kovats, Sontosh K Mojumder., Amirul Khusru., Atiq Rahman, and Paolo Vineis. (2011) 'Drinking Water Salinity and Maternal Health in Coastal Bangladesh: Implications of Climate Change', *Environmental Health Perspectives*, 119(9), pp. 1,328-1,332.

Khanom, Sayma. and Mashfique Salehin. (2012) 'Salinity Constraints to Different Water Uses in Coastal Area of Bangladesh: A Case Study', *Bangladesh Journal of Scientific Research*, 25(1), pp. 33-41.

Khieng, Sothy. and Heidi Dahles. (2015) 'Commercialization in the Non-Profit Sector: The Emergence of Social Enterprise in Cambodia', *Journal of Social Entrepreneurship*, 6(2), pp. 218-243.

Local Government Engineering Department. (1999) *Digital Map of Satkhira District, Khulna Division.* Local Government Engineering Department, Government of the People's Republic of Bangladesh. https://oldweb.lged.gov.bd/UploadedDocument/Map/KHULNA/satkhira/satkhira.pdf, accessed 03 October, 2020.

Manikutty, S. (1997) 'Community Participation: So What? Evidence from a Comparative Study of Two Rural Water Supply and Sanitation Projects in India', *Development Policy Review*, 15(2), pp. 115-140.

Marks, Sara J. and Jennifer Davis. (2012) 'Does User Participation Lead to Sense of Ownership for Rural Water Systems? Evidence from Kenya', *World Development*, 40(8), pp. 1,569-1,576.

Ministry of Water Resources. (1999) *National Water Policy*, Dhaka, Ministry of Water Resources, Government of the People's Republic of Bangladesh.

Nobusue, Ken'ichi. (2002) 'Bangladesh: A Large NGO Sector Supported by Foreign Donors', in Shinichi Shigetomi (eds), *The State and NGOs: Perspective from Asia*, Singapore, Institute of Southeast Asian Studies, pp. 34-56.

Rahman, Md M. and Amartya K Bhattacharya. (2014) 'Saline Water Intrusion in Coastal Aquifer: A Case Study from Bangladesh', *Journal of Engineering*, 4(1), pp. 7-13.

Salamon, Lester M. (1995). *Partners in Public Service: Government-Nonprofit Relations in the Modern Welfare State*, Baltimore, The Johns Hopkins University Press.

Samaddar, Subhajyoti., Makoto Murase, and Norio Okada. (2014) 'Information for Disaster Preparedness: A Social Network Approach to Rainwater Harvesting Technology Dissemination', *International Journal of Disaster Risk Science*, 5(2), pp. 95-109.

Samaddar, Subhajyoti. and Norio Okada. (2008) 'Implementation Challenges of Rainwater Harvesting Practice Reducing Drinking Water Pollution Risks in Coastal Bangladesh – A Social Network Analysis', *Disaster Prevention Research Institute Annuals,* 51B, pp. 167-178.

Samaddar, Subhajyoti., Norio Okada, Xinyu Jiang, and Hirokazu Tatano. (2018) 'Who are Pioneers of Disaster Preparedness?: Insights from Rainwater Harvesting Dissemination in Bangladesh', *Environmental Management*, 62(3), pp. 474-488.

Shigetomi, Shinichi. (2002) 'The State and NGOs: Issues and Analytical Framework', in Shinichi Shigetomi (eds), *The State and NGOs: Perspective from Asia*, Singapore, Institute of Southeast Asian Studies, pp. 1-33.

Stiles, Kendall. (2002) International Support for NGOs in Bangladesh: Some Unin-

tended Consequences', *World Development*, 30(5), pp. 835-846.
United Nations. (2015) *The Millennium Development Goals Report 2015*, New York, The United Nations.
United Nations. (2019) *The Sustainable Development Goals Report 2019*, New York, The United Nations.
United Nations Office of the High Commissioner for Human Rights. (2010) *Fact Sheet No. 35, The Right to Water*, Geneva, The United Nations.
World Bank. (1980) *Meeting Basic Needs: An Overview*, Washington, DC., The World Bank.
World Health Organization. (2000). *Towards an Assessment of the Socioeconomic Impact of Arsenic Poisoning in Bangladesh*, Geneva, World Health Organization.
Zohir, Sajjad. (2004) 'NGO Sector in Bangladesh: An Overview', *Economic and Political Weekly*, 39(36), pp. 4,109-4,113.