Action Research on Rain-water Harvesting: An Overview

Foreword

Bangladesh has been relatively successful in achieving high coverage of physical water supply facilities. However the average coverage does not reflect the true picture. Sharp disparity exists between different hydro-geological areas in terms of coverage, access, and water quality and quantity. The recent scenario is that a remarkable number of tube-wells are discharging water with high concentration of arsenic. Access to safe water is now estimated to be around 70%. About 30 million people are said to be potentially at risk of arsenicosis. Also, access to safe water varies depending on socio-economic status and population density. Persistent problems that impede progress in safe water access are saline intrusion in coastal areas, lowering of ground water table during the dry season, and problems in rocky and hilly areas. All these threatening issues have prompted NGO Forum for Drinking Water Supply & Sanitation promoting different type of safe water supply options for improving the safe water supply situation in Bangladesh.

Rain-water offers a good alternative drinking water source. As a pioneer organization in the WatSan sector NGO Forum has taken up an Action Research on Rain-water Harvesting System with a view to investigating and assessing the feasibility of Rain-water Harvesting System in Bangladesh. The research has been in progress in the severely arsenic affected villages in low-water table areas under Charghat and Bagha upazila in Rajshahi district.

NGO Forum realizes that some positive changes in terms of safe water supply has been ensured in the villages with the

conduction of the Action Research on Rain-water Harvesting Systems. Therefore NGO Forum has conducted an assessment on the impact of the Action Research on Rain-water Harvesting Systems implemented by itself. Some coverage villages under 2 Thanas namely Charghat and Bagha has been covered under this assessment. We believe the overall status of the outcome of the Action Reasearch on Rain-water Harvesting System comes out from this assessment will focus light to replicate the experiences in other parts of the country.

I thank the beneficiaries of this Action Research Project and partner NGOs for their valuable contribution who are the most important and inseparable part of NGO Forum's efforts. I express my gratitude to Mr. Dwijen Mallick for his relentless efforts in conducting the study and finally making this Booklet published. All my colleagues deserve my special thanks for their all out cooperation behind the publication of this Booklet.

I hope the Publication will find quite a volume of interested and potential readers.

S.M.A. Rashid
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Preface

Bangladesh has an easy access to available natural water resources either from the water-bodies like rivers, canals, springs, ponds or from the underground. Not only that it also experiences an abundant rainfall every year. Nevertheless, in the recent years, the nation has been facing an acute crisis in safe water supply. It is because, at present the shallow aquifer which is once perceived as the only source of safe drinking water has been contaminated with arsenic poison and other problems like excessive iron concentration in tube-well water, declination of water table, saline intrusion and so on. NGO Forum, by virtue of its working principle has been involved in mitigating these problems.

In the face of these realities, NGO Forum has been initiating for installation of different water supply technologies throughout the country considering different geo-physical situation. As a part of this, the Forum has been implementing an Action Research on Rain-water Harvesting System from 2000 through its partner NGOs namely Swallows, SNKS and Sachetan in Bagha and Charghat upazila in Rajshahi district. The area has been selected as the low water table area. Through this Project the Forum has been investigating and assessing the feasibility of the System in Bangladesh. Under this Project, the Forum has been initiated to demonstrate and develop Rain-water Harvesting System as a suitable, safe, socially acceptable, affordable and sustainable alternative source of water specially for drinking and cooking in the rural areas. The Forum has initiated to consolidate and document the progress, success and social acceptability of the Systems, and its Programme approach. As a part of it the Forum has conducted a study on the Action Research Project and gave the final shape of it.

The study observed that since the community people has learnt from the Project intervention that rain-water is crystal clear, clean and free from bacteria and chemical substances, therefore, social acceptability of the System has been increased. In the Project area, there has been made a positive change among the people's attitude and behaviour towards using of rain-water as the safe source for drinking and cooking purposes. Hence demand on the System has been created among the community people. As a consequence, they from their own are sharing costs for the technology.

Different types of hardware and software activities have been undertaken under this Research initiative. In hardware part different types of Rain-water Harvesting Systems have been designed and constructed on pilot basis, based on regional different (Nepalese, Thai and Sri Lanka) models. For addressing all levels of income group in the community 'do it yourself' models have also been introduced, such as, earthen pot (Motka).

NGO Forum feels, only hardware supports will not bring the sustainability of the technologies. Therefore, the Forum operated different types of software activities like workshop, community meeting, training etc. to enhance the capacity of the community people regarding operation and maintenance of the technologies. With all these options, the study has also found, after the Project intervention awareness level of the community people on safe water, health and hygiene has been increased, because of this health situation of the community has been improved.

I would like to express my gratitude and thanks to the resource person, the project staff and certainly the respective community people, who have contributed in conducting the study and making this publication successful. My colleagues

deserve the special thanks for giving their hard labour for publishing the Booklet.

I Hope, the Booklet will be helpful and interesting to the potential readers and stakeholders.

Joseph Halder
December 2002

Introduction

NGO Forum for Drinking Water Supply & Sanitation has initiated an Action Research Project – Rain-water Harvesting in Bangladesh covering 15 villages under Bagha and Charghat upazila in Rajshahi in the year 2000. The Project achievement has so far been proven a success in terms of an alternative source of providing arsenic and other pollution-free water for the rural community as well as changing people's attitude and behaviour towards rain-water for drinking and cooking purposes. The Project has phased out the first step. At this stage, NGO Forum has assessed the progress of the Project as well as consolidated the result and learning of the Action Research with the goal that the findings will help taking further initiatives to ensure sustainability of Project achievement, and at the same time to identify more suitable options for the effective expansion of the programme.

A Study, conducted in a participatory way, tried to consolidate the understanding of the beneficiaries and the key stakeholders on the progress and success of the Project intervention. The Study also focussed on the perception of people about the use of rain-water for drinking and cooking as an alternative to arsenic contaminated ground water, the reality and the driving forces behind the success of the Project, the progress of the Project and the existing institutional arrangement through which the communities and different actors work together to address the urgent need of the local communities in the context of safe water supply specially the arsenic menace.

The Study adopted an approach of "sharing and learning" with the active participation of the beneficiaries and the implementing agencies. Some effective techniques were

followed to get feedback from the beneficiaries and the concerned people about the progress of the Project.

Some Focus Group Discussions (FGDs) were held with the Community people at different locations considering the duration of the Project intervention, concentration of arsenic in tube-well water, lowering of ground water table and spatial distribution of the RWHS across the villages under the Project. The Project beneficiaries, caretakers and members of Village Development Committee (VDC) actively participated in each FGDs and gave their opinions about the interventions and the resulted impacts of the Project, i.e., their increased access to rain-water, increase of awareness about safe water, health and hygiene, changes in people's attitude and behaviour towards rain-water using for drinking and cooking, operation and maintenance of the system, social acceptance of rain-water, and improvement of community health.

A number of case studies have been conducted to document the personal views and experiences of different users of rain-water and the benefits they received from the rain-water harvesting system as an alternative source of safe, and arsenic and pathogen-free water for drinking and cooking. All the consultations and in-depth discussions with the community people and the stakeholders have contributed getting valuable insights, feedback and forward looking of the concerned people about the positive result of the Action Research on Rain-water Harvesting System.

The result of the Project is encouraging and it is evident that the programme has achieved a tremendous success not only by giving a best alternative to arsenic contaminated ground water for the rural communities, but it also has changed people's attitude and behaviour to a great extent towards using of rain-water.

Action Research on Rain-water Harvesting: An Overview

Ground water has long been considered to be pure and safe for drinking and the campaign by the government agencies, NGOs and media for safe drinking water in the 1980s encouraged common people to sinking of hand tube-wells in the country, particularly in the rural areas. As a result, more than 95% of country's population had been in the facilities of access to safe drinking water. This resulted in significant decreasing of water-borne diseases particularly the incidence of diarrhoeal cases. But this striking achievement was overshadowed by the detection of excessive presence of arsenic in ground water in the early 1990s. Since then, efforts are being made by different agencies to develop and promote technologies for arsenic mitigation. Still there is no reliable solution for rural communities to make tube-well water free from arsenic. A simple, affordable, technically and environmentally viable and socially acceptable safe drinking water supply system is urgently needed in the arsenic affected rural areas. In this context, different alternative sources of safe drinking water are being explored i.e., filtering of tube-well water, Solar Disinfection System (SODIS), rain-water harvesting, etc.

Rain-water is clean, clear and free of bacterial and chemical substance. It is also free from arsenic contamination, and rain-water harvesting has been adopted in many countries of the world including Bangladesh since the ancient time. People generally use rain-water when conventional water supply systems are not available or failed to meet the need. Bangladesh, being a tropical country, experiences plenty of rainfall every year. An average of 2500 mm rainfall occurs annually in Bangladesh. In most parts of the country, people

normally can have the access to rain-water for 6-8 months on an average.

NGO Forum considers rain-water harvesting as a feasible option for safe drinking water with great importance. It is felt that rain-water has enormous potential as an easy solution to drinking water problem in the arsenic affected areas. Being prompted with its practical realization NGO Forum has initiated an Action Research Project – Rain-water Harvesting in Bangladesh in Rajshahi district. The overall objective of the Action Research is to demonstrate that rain-water harvesting can be a suitable, safe, sustainable and socially acceptable alternative source of water specially for drinking and cooking purposes in the rural Bangladesh for 8-10 months of the year.

The Action Research Project has been investigating the fine balance between socio-cultural, financial and technical considerations with a view to formulating definitive and practical recommendations for appropriate designs of rain-water harvesting systems and promoting strategies for the expansion of the systems. The Action Research Project has been under implementation by a number of local NGOs who are associated with NGO Forum as partners namely Swallows Thana Para Project, Sachetan and Samata Naree Kallyan Sangstha. The specific objectives of the Project:

- To consolidate the work carried out in the project period and to extend research towards replicable solution for lower income groups;
- Demonstrating simple technical models of 'do it yourself';
- Documenting the good experience and learning from the project and disseminate those among the sector agencies including the community people; and

- Promoting and encouraging the private sector actors so that they could play an effective role for promotion of the Rain-water Harvesting System.

A total of 3,290 families have been living in the 15 villages namely Miapur, Anupampur, Arazi Sadipur, Chandpur, Talbaria, Kaluhati (West), Kaluhati (East), Batikamari, Fakirpara, Jotnasti, Kishorpur, Beelpara, Monigram, Habashpur and Bajubagha under the Project. The average family size ranges between 4.3 to 5.2 members across the villages. Majority of the people in the villages are engaged in agriculture, wage labour and small business for earning their livelihood. About 60% households are very poor who live in deficit income. Another 30% households are marginal, who do not have any savings and only 10% households are solvent and rich in the villages.

The major Project activities are categorized as technical, promotional activities, training and skill development, operation and maintenance of the systems, monitoring, encouraging private sector investment and promotion of market. The technical activities include developing replicable model, operation and maintenance, water security and water quality, product development etc., while the key promotional activities are: Courtyard Meeting, Community Meeting, mobilization of Village Development Committee (VDC), promotion of community participation and ownership, and hygiene promotion.

The Action Research Project covers 15 villages in total under Bagha and Charghat upazilas of Rajshahi district. The villages have been selected considering the concentration of tube-wells affected with arsenic in the upazilas. The NGO Forum in association with the respective partner NGOs tested the water of all the 1,406 tube-wells in the upazilas. Out of those 636

tube-wells were found contaminated i.e. over 45% of the tube-wells under the Project villages were found highly contaminated with arsenic. The baseline survey conducted during 2000-2001 also found 78 seriously affected arsenicosis patients in the project villages.

Considering the needs and priorities of the communities, a total of 195 Rain-water Harvesting Systems have been set-up under the Project in the 15 villages of Bagha and Charghat upazilas in the last two years in association with NGO Forum's partner NGOs and local producers of rain-water harvesting systems.

Marking a Difference in Safe Water Supply

Increasing Access to Rain-water

The Action Research Project has promoted 6 types of Rain-water Harvesting Systems having different level of capacity, which ranges from 300 litres to 3,200 litres. The Systems are called: Ferro-cement Tank, Ferro-cement Jar, Brick Tank, Sub-surface Brick Tank, R.C.C. Ring Tank and Earth-made Tank (Motka). Brick Tank, Ferro-cement Jar and Earthen *Motka* have gained comparatively higher demand among the community people. The Ferro-cement Tanks also have a high demand among the rural community. The community has greater demands of medium types of systems having a reserving capacity of 2500 litres. The Project has installed 72 systems of the same capacity of Ferro-cement Tanks, Jar, Brick Tank and R.C.C. Ring Tanks in the villages.

Present Status of RWHS

Plant Capacity	Type of RWHS	Total Plant
3200 Litres	▪ Ferro-cement Tiles Tank = 4	4
2500 Litres	▪ Ferro-cement Tiles Tank = 17 ▪ Ferro-cement Jar = 22 ▪ Brick Tank = 29 ▪ RCC Ring Tank = 4	72
200 Litres	▪ Ferro-cement Jar = 6 ▪ RCC Ring Tank = 1	7
1000 Litres	▪ Ferro-cement Jar = 7 ▪ Brick Tank = 5 ▪ RCC Ring Tank = 6 ▪ Earthen Motka = 22 ▪ Chari Made Tank = 1	41

Plant Capacity	Type of RWHS	Total Plant
500 Litres	▪ Brick Tank = 8 ▪ Earthen Motka = 6 ▪ Gazi Tank = 2	16
600 Litres	▪ Earthen Motka	21
300 Litres	▪ Earthen Motka	34
Total:	**Six Types of RWHS**	**195**

The users of different Rain-water Harvesting Systems and other allies in the project villages have expressed themselves that around 100% of the villagers used to drink tube-well water. They were also practised with the use of tube-well water for cooking, washing and other household chores. A very few people were found using dug-well and pond water for cooking and washing. But at that time, the villagers did not know about the danger of arsenic in tube-well water.

In between the mid to late 1990s, like many other parts of the country, there had been serious problem of arsenic contamination in the tube-well water in many villages in Charghat and Bagha upazilas. In few villages, more than 50% tube-wells were detected contaminated with arsenic concentration higher than the tolerance level for human body. A markable number of people were badly affected with arsenicosis. Few of them finally died.

At present, with the implementation of the Action Research Project, almost all the households, covered under the Project have been found using rain-water for drinking and cooking at around 10 months in a year, and during the time when rain-water is not available, they collect water from the green-

marked tube-well i.e. arsenic-free tube-well. In the lean period the villagers also use dug-well water after boiling and purifying with medicine. No one in any family at present, drink red-marked tube-well water, because the villagers know that those tube-wells are contaminated with high level of arsenic. The community people hold a strong feeling that they are greatly benefited with the implementation of the Project which has been providing them with safe water supply facilities and saved them specially from the danger of arsenic.

Motka: A Good Reserve of Safe Water

Jharna Begum (20), a housewife was brought up at her native village named Kazipara. She was married to a marginal farmer, about 5 km away from Kazipara at Monigram village about 4 years ago. During her childhood, her family used to drink tube-well water while they used pond water for cooking, bathing and washing.

Jharna observed, every family in Monigram used tube-well water for drinking, cooking, washing etc., and the villagers were very happy using tube-well water. All on a sudden, the villagers came to know about arsenic contamination, which also caused health hazards seriously. They also learnt that this problem has spread severely in their locality due to excessive arsenic in tube-well water. But they did not know how to purify arsenic contaminated water, or what was the alternative to arsenic contaminated tube-well water.

In such a situation, Samata Naree Kallyan Sangstha (SNKS) a partner of NGO Forum came to their village and talked about the cause and consequences of arsenic at a meeting. After a few days, they came to test tube-well water and marked the tube-wells with green and red colour and advised the villagers not to drink water from red-marked tube-wells.

They also discussed about the advantages of rain-water harvesting and use for drinking and cooking purposes.

The village people become very curious about RWHS and they were very happy when those systems came into operation. Jharna in consultation with her husband, Md. Aslam, have had a two Motka system at their home last year. They have experienced one rainy season. Jharna and her family members have continued with rain-water from their system for drinking and cooking, during the whole rainy season. They still have good reserve of rain-water up to November 2002, and she expects that the family would be able to drink rain-water for another two months.

Jharna said, "The RWHS has saved us from arsenic danger. It also has saved my time". She had to collect water for drinking and cooking from neighbour's tube-well, which was time consuming and laboursome, but now she can get water for drinking and cooking at her door-step.

Jharna further mentioned, "We did not get good taste of rain-water in the early stage, but now we do not have any problem with the taste of rain-water. It is clean and cool. Every member of my family drink rain-water and we will drink water from green-marked tube-well in the coming few months if there is no rain in the dry months", Jharna adds without any dissatisfaction.

Jharna further informed that the villagers are saving money through VDC and the VDC has already provided few Motkas among the very poor families. She is very optimistic "Every family of this village will have a RWHS and thus they will be out of the risk of arsenic problem in near future. I am grateful to NGO Forum and SNKS for their sincere efforts in terms of awareness raising and providing us with the alternative source of safe water", Jharna expressed herself.

All the users at each village have mentioned that they strongly believe that rain-water is clean and free of arsenic and any other harmful content for human health. Many of them also believe that rain-water is a gift of nature and grace of almighty God. It is clean and pure. It is not only arsenic-free, but it is also good for their health. Some of the users have mentioned that they have got cure of gastric problem after starting drinking rain-water.

While asked about the pre-project situation, the villagers mentioned that though few people were using rain-water for cooking, but none of them were using rain-water for drinking before the Project. Because many of them had misconception about preservation and using of rain-water. They used to think that the rain-water might contain germs and many harmful materials for human health. They did not even know how to preserve rain-water for a long period in a safe container. The users at every village have informed that they have learnt about preserving and using rain-water for drinking and cooking from NGO Forum and its partners involved in the Project implementation. Further, in the initial stage, many of them had confusion about the quality of rain-water, but now everybody in the villages believe that rain-water preserved in the tank, jar and Motka is pure and free of any harmful material. Among the villagers those who do not have the Rain-water Harvesting System yet have expressed their interest to get the System for them.

Every member of the families, who have the Rain-water Harvesting of their own, has been found drinking rain-water for at least 8 months every year. Each household is also cooking their food with rain-water. The villagers also feel some additional benefits of cooking food with rain-water as it gives good taste to food, because rain-water does not contain any iron content. The women of the respective households have

expressed their satisfaction with the System, because now they have the safe water source at their doorstep, and they need not to pump out water from tube-well, or to carry water from any distant place.

The beneficiaries and the villagers have informed that many of their neighbours, who don't have the System of their own, very often want to collect water from the System of their neighbouring beneficiary group specially for drinking purpose. Some of the villagers in Monigram and Anupampur have set-up the Rain-water Harvesting System by their own efforts being mobilized and motivated about usefulness and benefit of the System. It is evident that their is lot of interest among the common people about the System. It means that the Project, besides testing the System, gains tremendous success in demonstrating that rain-water is an easy and safe alternative to arsenic contaminated tube-well water for the rural community.

Many-fold Benefits for Mita

"Water is a gift of nature. We had plenty of water from river, pond, tube-well and rain. We abused it in the past. But when we got arsenic in tube-well water, we found no source of safe water. At last we learnt from NGO Forum that rain is a source of safe water, but it is limited and scarce" said Mita Sarker, a 38-year old housewife of Miapur village in Charghat thana, Rajshahi.

Mita is a married woman. She has eight members in the family. Her family has three earning members including a school teacher, a service holder and a businessman. In her childhood, around 25 years ago, people used to take well water and there had been one tube-well in their locality. People used to drink well water and tube-well water, but they used pond and river water for bathing, washing and

cooking. Due to this people suffered from cholera, diarrhoea, jaundice and other water related diseases at that time.

In late 1980s, they installed a tube-well for their own household and they started using tube-well water for drinking, cooking, washing and bathing. They got some problem due to excessive iron in water. In course of time they became aware about arsenic problem in the mid 1990s through TV and Radio. They finally became very scared when Pinjira Begum of this village was affected by arsenic and many people including NGOs came to see Pinjira and put up the news to media. They tested their tube-well water in their upazila and found arsenic in their tube-well water in 1999.

Mita found a RWHS installed by NGO Forum in other part of the village near Pinjira's house. She also learnt about RWHS from postering and participating in the Courtyard Meeting and finding no other option she became very interested to have a RWHS for their own.

Mita became a member of VDC in 2000 and she got a Ferro-cement Tank of 2500 litres provided by NGO Forum. She bore 10% of cost (Tk. 400) of the System and she was very pleased to pay the partial cost in getting the System. Most of the household members of Mita have been drinking rain-water for 8-10 months. She uses rain-water also for cooking.

Mita said, "Now we do not abuse water, because it is limited and we cannot collect rain-water round the year. We use certain amount (3-5 buckets of water) everyday so that we do not get run out of water very soon. We do not very often allow our neighbours to take water from our system".

Mita is very happy and feels proud of having the RWHS at his home. She mentioned "We are now safe from arsenic threat and we are out of risk from many other water related diseases".

Social Mobilization for Rain-water Harvesting

Under the Action Research Project, the NGO Forum and the collaborating partner NGOs have been facilitating a number of promotional activities to increase the level of awareness and to change people's attitude and behaviour with respect to rain-water use as well as to promote health and hygiene status of the rural community. Different type of orientations and training activities are also conducted under the Project. Besides orientation and training for the users, caretakers, masons and staff members of partner NGOs, the Project arranges Community Meeting, Courtyard Meeting, Mobilization of VDC, and some other hygiene promotion activities in the Project villages.

The users at every village have appreciated the formation of Village Development Committee (VDCs), which works as the community organization to mobilize the people as well as to facilitate the programme implementation alongside the implementing bodies, and arranging of Courtyard Meetings, Community Meetings and other promotional activities including orientation and awareness campaign, rally, postering, film-show, etc. Most of the villagers expressed themselves that Courtyard Meeting was very useful and effective for awareness raising on use of rain-water and overall hygiene practices. The villagers informed that they had been unaware about the danger of arsenic, and many of them were affected by arsenicosis in their villages. The social workers of Swallows and NGO Forum mobilized them aware about arsenic concentration in tube-well water and the deadly impact

of drinking water from those tube-wells. The workers also talked about the alternative sources of tube-well water i.e. rain-water specially in the Courtyard Meeting, Community Meeting and VDC Meetings. The villagers also learnt about better environment, cleanliness, sanitary latrine and hygiene practices with their participation in the promotional activities.

The users at other location also hold similar views and they feel that there is need to conduct more meeting with the community people, particularly to cover those who could not participate in the meetings conducted earlier. A number of women from different villages such as Mita Sarker (38) at Miapur, Mazeda Begum (35) of Anupampur, Monoara Begum (35) of Monigram, Mahima (32) and Papia Sultana (16) at Bajubagha have mentioned that the Courtyard Meetings have opened up their eyes and widened their understanding about safe water use, particularly about the use of rain-water round the year. In the Courtyard Meeting, Community Meeting and other hygiene promotional initiatives the villagers have been oriented and made aware of many things of everyday life including better health and hygiene practices for the family and the community.

The Awakened Villagers

"We were very happy to drink tube-well water and have been ignorant about the danger of arsenic in tube-well water. We did not know – we were taking poison everyday. Our brothers from NGO Forum – awakened us from the deadly ignorance", states Rafia Biswas, a school teacher of Charghat.

As a member of the VDC, Rafia participated in the VDC Meetings and Courtyard Meetings. She also enjoyed film-show on health and hygiene. According to Rafia, meeting with the community people involving people from all walks

of life including women and youths was very important for the promotion of rain-water as an alternative to tube-well water. The VDC Meeting also has contributed to upholding the importance of safe WatSan. The meeting has upgraded general people's understanding about health and hygiene including awareness about arsenic and it's deadly consequence to human health.

She got married seven years ago but she lives with her parent's family in Anupampur. Her husband is a service-holder working in Narsingdi district. Rafia recalls her childhood, when people of this village used to drink tube-well water and take bath in the pond, or canal. People were ignorant about sanitary latrine. Home environment as well as personal hygiene was very poor. Rate of education was very low and there had been outbreak of many diseases like diarrhoea, small pox, cholera at that time.

In the 1980s, she noticed a great change in relation to use of water. Many people could manage to have their own a tube-well and they started using tube-well water for drinking, cooking, bathing and washing. This resulted in decrease of many water-borne diseases in their localities.

Rafia says, in the late 1990s, they got arsenic problem in tube-well water. Though many people suffered from arsenic contamination, but they were not very much aware of the causes and consequences of arsenic. It was NGO Forum and the local partner NGO, who awakened those people and disseminated information, shared knowledge and awareness on arsenic. "People's attitude and behaviour were changed a lot towards rain-water, which is arsenic-free, and better health and sanitation through the social mobilization and promotional activities under the Project", she mentioned.

She has highly appreciated the Courtyard Meeting organized by the project, where women could participate with great enthusiasm. "Women learnt many important things about community health and personal hygiene from the courtyard meetings. Women received not only information and knowledge from those meeting, they were also motivated to change their behaviour and practices towards safe WatSan including use of arsenic-free water for drinking and cooking", she said. Once women were well aware of and motivated, they have improved the home environment and child health. She thinks posters showing arsenic patients have been very effective to motivate people to change their long habit of drinking tube-well water.

She has mentioned, "The project people talked about the danger of arsenic in both VDC Meetings and Courtyard Meetings. They also raised awareness among the community in general and women in particular about the use of arsenic-free water from RWHS and green tube-well for drinking and cooking". Rafia has said that both the VDC Meetings and Courtyard Meetings have been of great importance to change people's behaviour, and attitudes towards using of rain-water.

Rafia's family has installed a RWHS at their home in 2001. Everybody of her family drinks rain-water for 8-10 months from the plant. During the dry-season, they drink water from the green-marked tube-well. They do not use red-marked tube-well water for drinking and cooking food.

She has also attended training on operation and maintenance of RWHS. She can maintain and mend the system properly. She very often helps other users if they get any problem in operation of their system.

Rafia says, "We have learnt a lot about arsenic, safe water and personal hygiene from the people of NGO Forum. She always tries to share her knowledge and experience with other people. "I talk about health and hygiene while teaching the children at my school, which might have a long-term impact", she hopes. "These children as tomorrows adults will bring in the ultimate change" – believes an optimistic Rafia.

The Action Research Project has undertaken training for caretakers, masons and potters alongside the conduction of promotional activities. These have been proven very important and helpful for the stakeholders and beneficiaries to develop their own capacity for the promotion i.e. the installation, use, operation and maintenance of the Rain-water Harvesting System.

The training for the masons under the Project has contributed significantly developing the technical skills among a markable number of people in the villages who now can construct the Rain-water Harvesting System and they have proven their skills in installing the System successfully. It has been observed that some private producers have started installing the System being inspired by the success of the Project and the growing demands of different types of the System among the rural community.

Matin Becomes an Entrepreneur

Abdul Matin, a 40-year old private producer of RWHS used to work as a Construction Worker (Building) in Bagha in 1980s and gradually he became a very innovative businessman. He worked with a neighbour as a contractor. They were engaged for construction of the dormitory in the Upazila during the reign of Ershad. He also worked with a construction firm for BDR in Rangpur in the early 1990s.

He started making ring and slab for sanitary latrines, when he was an unemployed due to unavailability of construction work. He started his workshop and business in Putyia Upazila in 1990s but his business failed, since people were not very much interested to buy ring-slab there. One of his friends advised him to shift his business to Bagha Upazila and fortunately he was involved in a project of the NGO Samata Naree Kallyan Sangstha after 1998 flood to prepare 800 sets of ring & slab. He has been greatly benefited by SNKS who helped him to get NGO Forum's assistance for VSC as a private producer.

However Samata Naree Kallyan Sangstha's target-group of people very often came to his VSC to buy his products. Thus his business ran smoothly and prospered at Bagha. Gradually, he started having increasing interactions with NGO Forum and other local NGOs. He attended a training on RWHS construction organized by NGO Forum's partner NGO SWALLOWS in 2000 and he became involved in RWHS construction. He constructed 40 RWHS for the project in Jotnasti, Beelpara, Monigram, Bajubagha, Habaspur, Talbari and Fakirpara villages. He constructed all six types of RWHS that include tiles tank, ferro-cement tank, ferro-cement jar, RCC ring tank, brick tank and earthen Motka types of RWHS.

Matin says, "People are greatly benefited from the project in terms of getting information, awareness and skills." He further mentions, "I have been benefited by the project. The project has given me skills and resources to start the production centre and the products have been increasing demand in the society."

He thinks that promotional activities are very useful but these are confined to target village, it should be expanded to other places too so that increasing number of people can be benefited. Since the arsenic problem is acute in the locality, there is the need for this alternative technology. Therefore, there is further scope of expanding his business. He looks forward to production and construction of RWHS. He suggests that the programme should be introduced in many other arsenic affected localities. He wants to continue to prepare RWHS and serve people as there is great need in the society. He needs some technical and financial support for this, he adds. He is very happy as he is engaged in construction of RWHS for people, through which he can run his business as well as serve the society particularly in the context of reducing arsenic hazard.

Under the Project, some trainings for the traditional potters have also been arranged in the potter's village, where the traditional potters from other villages also participated, and they have gained new skills for producing Motka suitable for harvesting rain-water. Some potters of Arani village in Charghat upazila have impressed that they had almost lost their business and their professional skill was going to be diminished. The provision under the Action Research Project has created new opportunities for them to employ their traditional skills to produce specially the Motka for harvesting rain-water. This has been helping them to upgrade their living status as well as contributing in the improvement of community health, particularly of the rural poor through harvesting rain-water using Motka as a safe container.

The Potters Get a New Direction

"I was about to give up my profession, which I have inherited from my father and forefather. The earthen pots,

we prepare have little seasonal demands – and we were serving with no future. At that bad time, I got a call from NGO Forum to prepare Motka for rain-water harvesting. It was an oasis for me in the deadly desert", said Nabadeep, a stout man of middle age.

Nabadeep Paul (47) is a potter of Arani, a remote village in Bagha, Rajshahi. He has studied up to class 5 and has been involved in pottery from his childhood.

He has learnt how to make earthen pots from his father and forefather. In 40-50 years ago during his father's time, there had been huge demand of earthen pots. People are now using aluminium and plastic goods and as a result, the demands of earthen pots (pitcher, cooking pot and other pots) decreased greatly.

There had been 40 families of potters in that village 30-40 years ago and now many of them left the occupation and migrated to other places. Now there are only 10-12 families involved in pottery in the village. But there is little demand of pots particularly for preserving molasses and few other household purposes.

He is inspired by the new opportunity of the demand among people of big Pot (Motka) for rain-water harvesting. He participated in a workshop in Dhaka, where he spoke about the usefulness of the pots. He also attended training on preparation of Motka for RWHS organized by the project.

He has supplied 54 Motkas for poor people under the RWHS project. Paul said, "There are lots of scope for involving potters in making Motka that may help poor people to use rain-water and get rid of arsenic problem."

He further mentions, "We will need further training and financial support to continue the business. It has tremendous scope to enhance livelihood of poor potters as well as the promotion of using rain-water for the poor." He suggests that by undertaking more awareness campaign and promotion of market of Motka the arsenic-free safe drinking water crisis can be met to a great extent. He observes that the initiatives to explore the scope of modification of Motka with better clay and improved fuel (gas) for burning the Motka may expand the opportunity for using of Motkas widely.

Change in Attitude, Behaviour and Practices

In the initial stage of the Project, the respective community people were not that aware of arsenic in tube-well water and health and hygiene matters. They did not believe that rain-water could be harvested for drinking and cooking for a long period in a year. Few people used rain-water very occasionally for cooking, but they could not think of preserving rain-water for months for drinking and cooking.

Earlier, people had suspicion that after preserving water in tank, jar or in Motka, it might contain harmful germs for human health. They apprehended that the quality of rain-water could not be maintained if preserved for long in tank or jar. So, people in general were very cautious in drinking rain-water. They did not get good taste in rain-water like tube-well water. Particularly the old people and children did not drink rain-water in the initial stage of the Project. But the social mobilization, the awareness campaign by the NGO Forum and partner NGOs has changed their attitudes and behaviour in relation to use of rain-water within a short span of time.

Demonstration of rain-water harvesting in the field as an alternative source of arsenic-free water for drinking and

cooking has been a great success of the Project and this demonstration at the same time has helped people to change their attitude, behaviour and practice in relation to use of safe water primarily for drinking and cooking. Furthermore, those who did not drink rain-water in the initial stage of the Project have changed their attitude at least to drink water from green-marked tube-well. They have become aware of the danger of arsenic in tube-well water, and the promotional activities of NGO Forum and the partners have contributed to a great extent in this awareness raising.

Caretakers' training and continuous monitoring and supervision by the Project personnel have been very helpful to change people's attitude towards rain-water. It has been proved in the reality that if preserved and maintained well, rain-water remains pure and fresh for long time. People have learnt it from their experience with the help from NGO Forum field workers and have got immense benefits from the RWHS.

At present every member of the households having RWHS drink rain-water for at least 8 months while they take water form green-marked tube-well in the lean period when rain is not available and their plant becomes empty. The Project has made people very cautious about the use of safe water. The villagers do not collect water from river, canal, or ditch even for ordinary use such as washing of clothes and taking bath. They try to get themselves access to safe water for all domestic works.

The social mobilization for safe water and better health and hygiene, as a part of overall water supply and sanitation programme of the NGO Forum, has changed their values, behaviour and practices regarding preservation of food, maintaining personal hygiene, home environment and use of sanitary latrine. Almost every household under the Project has

been maintaining the habit of sanitary latrine use and they know how to use and maintain personal and domestic hygiene behaviour.

The users and the key persons at Miapur, Anupampur, Bajubagha, Kaluhati and Monigram have said that there had been unhygienic practices in their villages before the advent of the Project. Many people had been using open latrine. Children had the habit of open defecation. There had been dirty environment in the village. During the last two years, people of the villages have got a lot of information about health and hygiene and they have improved their home environment, food preservation and sanitation. Thus the Project has brought multiple benefits to the rural community.

People have become more aware of diseases and prevention of diseases through drinking safe water and maintaining improved sanitation practice. They have also got new orientation about the use of scarce water resources. They have got a realization that safe water has immense value. Nowadays, the community people think that safe water is not merely a gift of nature. Rather, it has an economic value and cost. So, they do not abuse water, particularly the rain-water. They have made a habit of preserving water for dry season.

Arsenic Menace Got a Halt

The villagers have informed that there had been arsenicosis patients in every village and they were in a great danger of arsenic infection one or two years ago. Many suffered from severe infection and few also died due to presence of high level of arsenic in their body. The users of Miapur have informed that there had been more than 40 arsenicosis patients in their village and 5 of them died in the last two years. No new patient have been found in the villages after they started drinking rain-

water. The users of Anupampur have informed that no people died from arsenicosis in their village, but there had been over 20 patients suffering from arsenicosis seriously and there were few who still bearing symptoms of arsenicosis.

The people of Monigram have informed that there had been 5 arsenicosis patients in their village. One survived from very critical condition. But there is no new patient in their village after installation and use of RWHS in their village. There are 17 arsenic contaminated tube-wells in their village, but nobody drinks water from the red-marked tube-wells, because they have learnt about the danger of arsenic as they have learnt it from the NGO Forum and Samata Naree Kallyan Sangstha (SNKS).

The villagers of Bajubagha have mentioned that 25 tube-wells out of 105 are arsenic contaminated in their village and few people had the symptoms of arsenicosis. They have installed 20 RWHS in their village. At present, everybody drinks rain-water who has RWHS, while the other people drink water from green tube-wells. So, there is no new patient of arsenicosis in the village.

People in Kaluhati village have informed that there were 7 arsenicosis patients in their village in 2000 while the number of patients increased to 12 in their village in 2002. They think that this happened in cases of people who had a long habit of taking arsenic contaminated water without any knowledge about the source and nature of the disease, and perhaps it took sometime for the symptoms to become visible. However it should be mentioned here that the symptoms of arsenicosis may take 6 months to 20 years time to become visible in human body. At present, no people drink water from the red-marked tube-wells. They drink rain-water for around 8 months every year and during the dry season, they take water from green-

marked tube-wells. Few household members also take water from dug-well and use pond water after boiling properly.

While consulting with the concerned people of the partner NGOs, they have also viewed that now people are not in the fear of arsenic as there are alternative sources of water including rain-water and PSF. People do not drink arsenic contaminated water from red-marked tube-wells and arsenic menace has got a halt. They take water from green-marked tube-wells and RWHS.

Dr. Imrul Kaies, Medical Officer of the Project Management Unit of the WatSan Partnership Project, being implemented in the Rajshahi district, has informed that there had been 258 arsenicosis patients of different categories in the Project villages in 2001, and there were no such report of new arsenicosis patients in the Project villages at present. But there has been increase of arsenic patients in the non-project villages. He observes that the medicines, he prescribes for the moderately affected patients, have good results compared to the severely affected patients of arsenicosis. He urges that the existing government health programme should attribute highest priority to arsenic related health problems and the local physicians need orientation and training on arsenic issues so that they can guide the rural poor people.

Improvement of Community Health

It is evident from the conduction of FGDs, consultations and case studies that people are well aware of the safe sources of water including rain-water, health and sanitation practices. Beside arsenic, many water and air-borne diseases like diarrhoea, dysentery etc. have completely disappeared from the villages after the implementation of the Project activities in the localities.

The beneficiaries at Anupampur and Monigram have mentioned that many people have got cured of their chronic gastric problem after they started drinking rain-water. Md Zahiruddin of Anupampur has narrated his story how he suffered from chronic gastric and his present feeling about his problem. The users have informed that the knowledge and information about health and hygiene they have received from the Project people are of great importance to them, because this has helped them to take a different look at life and society and keep them free from many diseases. Taiba Sultan (25), a school teacher in Monigram has realized that this Project has helped to improve community health in many ways. She explains that the Project people have advised the beneficiaries to eat more fruits and vegetables because rain-water does not have any mineral content which is very useful for health. So people who drink rain-water, try to take more fruits and leafy vegetable. This food habit has reduced their vitamin and mineral deficiency and thus has improved their health status.

Box-6: Rain-water brings a Miracle for a Gastric Patient

"It is a miracle for me. I have been suffering from severe gastric problem for more than twenty years. I tried to avail every possible treatment for curing, but failed. It is the rain-water – a gift of Almighty Allah, which has saved me from the terrible suffering", said Zahiruddin Biswas a grocer in Charghat, Rajshahi.

He had been suffering from chronic dysentery for more than 20 years. He had taken all available treatment in the locality, but he could not get cured. He could not take a lot of food items two/three years ago.

In the 1990s, many people had their own tube-well and they used tube-well water for every household purposes and all on a sudden, they faced arsenic problem in tube-well water.

People from SWALLOWS came to test tube-well water and found arsenic in their tube-well in late 1990s. They were very much panicked due to the presence of arsenic in tube-well water, because it was the only source of water for drinking and other household work for the villagers. At that time, the NGO Forum and SWALLOWS offered them an easy alternative – RWHS. Since instead of using arsenic contaminated ground water, this technology works storing rain-water through the monsoon which can be used later, he saw the hope of overcoming the curse of arsenic. He finally decided to have a RWHS (Ferro-cement Tank 2500 litres) at his home. Now they use rain-water for both drinking and cooking.

Although preliminary it was the fear of arsenic that led him to build a RWHS at his home, he observed that when he started drinking rain-water he felt better about dysentery and now after two years of drinking rain-water, he feels that he has got cured from his chronic gastric problem. Now he does not have restriction over taking any kind of food. He strongly believes that it is the rain-water, which has done the miracle for him. The very technology at his household premises has offered him the miraculous treatment from his chronic disease, for which he had to look from place to place before.

Gender Role in the Project

It has been learnt from the conduction of FGDs and consultations, that both males and females have great interest about RWHS and they participate in preserving water, operation and maintenance of the systems at their homes. The

users at Miapur and Monigram has opined that women had a greater role in preserving and using as well as maintaining the system. But the male villagers also maintain the practice of helping their female partners in clearing the catchment, tank, jar and also in collecting water for preservation. They have also informed that the male members of the family and society also attach greater value to the work done by the women in relation to collecting, preserving and using water for drinking and cooking. But in the pre-project period, the male members of the community very often did not consider those work important for their family. It has been viewed that Courtyard Meetings, VDC Meetings and the training for the caretakers have brought a positive change in values and practices of the villagers and contributed improving in the gender relation in the Project villages.

Operation and Maintenance

It was learnt from the villagers that a certain number of people from each village have attended caretakers' training and they have acquired the knowledge and skill to operate and maintain the system. In fact effective operation and maintenance is the precondition of sustainability of RWHS and hence people's consciousness in this regard has contributed towards the sustainability.

Fatema Begum of Miapur, Majeda Begum of Anupampur, Rahima and Monoara Begum of Monigram, Rakat Sultana of Bajubagha and Latifa Begum of Kaluhati village have attended caretakers' training. They have the feeling that the training has been very helpful for them and now they can operate and maintain the system very efficiently. Many other users have learnt the basic skills of O&M from the caretakers as well as from the field workers of NGO Forum and the partner NGOs. The women users have mentioned that they know how to clean

the roof, wash the net and tank during the early hours of rain – how to maintain quality of water and how to operate the tap of RWHS. The concerned people of NGO Forum and partner NGOs also help them to operate and maintain the systems. Thus the training of operation and maintenance has been of great benefit for the users.

Social Acceptance

The direct beneficiaries of the Project as well as the other community people have made it a point that they now have a safe source of water for drinking and cooking purposes with the provision of Rain-water Harvesting System as the System has got tremendous popularity among the villagers within a short span of time. But in the initial stage of the Project, majority of villagers were found septic about the safetyness of rain-water, and they suspected whether the System would work and satisfy the need of the targeted groups. People in general had some negative attitude towards the Project implementation. Many of the villagers had negative attitude towards foreign developing agencies, and they showed reluctance to NGO activities. Some people had misconception and they thought that the foreign organizations might have vested interests behind this Project in disguise of providing them arsenic-free safe water for drinking and cooking as well as to promoting better health and sanitation for the community. Finally, the beneficiaries and other community people have accepted the System being mobilized with the conduction of multidimensional promotional activities. Thus the Action Research Project has achieved the goal of social acceptance as well as the improvement of the System adopting through community participation and action.

Rafiqul Islam, Programme Organizer of Samata Naree Kallyan Samity (SNKS) in Bagha has viewed that rain-water has got a

tremendous social acceptance within a short time. In the initial stage, people had many questions about the usefulness and effectiveness of the System, but the facilitation of the promotional activities under the Project and the close link of Project staff and the VDC members with the villagers has changed the villagers' attitude towards rain-water using for drinking and cooking purposes. At the same time the Project has also demonstrated the usefulness and effectiveness of the System in the reality as an alternative source of safe water. This has resulted in great towards social acceptance of the Rain-water Harvesting System among the villagers.

Sarker Helal Uzzaman, Community Organizer of the Swallows feels that the Rain-water Harvesting System has achieved a great success and got the high level of social acceptance in the context of people's long and traditional habit of using tube-well water for drinking, cooking and other household activities. He also mentioned that it was very difficult to change people's attitude and behaviour to a new system and technology from their existing easy source of tube-well water. It was the social mobilization and promotional activities of NGO Forum in association with the partner NGOs which covered VDC Mobilization, Courtyard Meeting, Community Meeting, postering, film-shows, etc., which helped making a significant change in the attitude and behaviour of the people towards rain-water. He further mentioned that the villagers were oriented and made aware on the presence of high concentration of arsenic in the tube-well water and that made them mobilized searching another safe option for getting safe water. Following this, the villagers finally have accepted the Rain-water Harvesting System as the best alternative to arsenic contaminated tube-well water in their community.

Nurul Ameen, the Project Manager of the Action Research Project has expressed himself that the achievement of the

Project in terms of providing rain-water for 8-10 months of a year to the rural community is a remarkable success in terms of providing safe water without depending on ground water. Because the ground water table in the Project areas is very low and the lowering is continuing gradually, which creates a problem to get water installing tube-well and other shallow pump technologies. The presence of arsenic and iron contents in ground water is a striking problem for the people to continue their household works with that. The surface water source is also very limited in this area. Considering all these issues the people have accepted the rain-water as the best option for safe water.

The beneficiaries have expressed themselves that they have willingness to pay certain amount of cost of the System. They hold the view that if they bear cost that will give them ownership over the System. So, they are very positive to pay 10-20% cost of the System as per their economic solvency. People at Miapur viewed that those who are rich - they should bear the cost of the System at a higher rate, while the poor should be given the System at a lesser contribution. The cost-sharing also ensures better use, operation and maintenance of the System.

The beneficiaries at Anupampur and Bajubagha hold the view that the government and the development organizations should encourage private producers in promoting the Rain-water Harvesting System. “If the materials are available in the localities at reasonable cost and if the technical know-how is imparted, people would install RWHS by their own efforts and cost”, expressed a VDC member of Miapur village. The beneficiaries at Monigram, Anupampur, Bajubagha have also suggested to innovate improved low-cost Motka system, so that poor can afford to have their own system. Many villagers have said that people have been greatly benefited by the

System and they would build their own system with their own cost.

The experts of Rain-water Harvesting System and the Project staff have suggested that given the experience and success in Rajshahi the Rain-water Harvesting System could be replicated in other regions of the country.

Local Institution Building

Sustainability of a programme or project largely depends on institutional arrangement and capability of stakeholders and local community. Based on this realization, NGO Forum promotes local institution building process and enhance capacity of local community through formation of Village Development Committee (VDC). The ultimate goal of NGO Forum's Action Research Project would be to make the VDC self-sufficient to guide the villagers and to address WatSan related problem and improve health and sanitation situation with the emphasis on the use of rain-water for drinking and cooking purposes as a safe alternative.

The users in all the villages and the Project have viewed that the VDCs are very active in every village. They are quite aware of their role and responsibilities in relation to promote the Rain-water Harvesting System. They have lot of interest and commitment to interact with the Project people to demonstrate rain-water as an easy and affordable solution to arsenic contamination and other hydrogeological problems.

The users at Monigram, Miapur, Bajubagha, Kaluhati and Anupampur feel that the VDC has contributed a lot in creating interest and enthusiasm among the villagers to work together to address their own problem specially the water supply issues. Now, the villagers feel that with the guidance of VDC, they are

mobilized and empowered as they have unity and common understanding about their own problems and strengths. Many of them have expressed their confidence that they would initiate further actions to improve WatSan and health situation of the villagers. But they also thought that they would need external supports in terms of information and knowledge sharing and to some extent sharing of resources for certain time and hence, the continued efforts of NGO Forum and the partner NGOs would be of great help for them. The villagers have expressed that in the new institutional arrangement, VDCs can play more vital role in promoting their needs and priorities and finding up-takes and implementation through meaningful upwards links with the development agencies like NGO Forum and the partner NGOs. "Thus, we hope to have a better society capable of addressing our own problems and participating in the total development process of the country", a youth expresses himself with great enthusiasm.

The Mobilized Villagers

"The Community Meeting and the good relation of the project staff pulled the villagers to sit and work together and created a new social capital for us. We feel empowered," this was the response of a youth Badsha Alam (20) of Monigram village while asked about his learning from the project.

Badsha Alam was educated in their village school and Bagha College. He travelled many parts of the country including Dhaka, Rajshahi, Rangpur, Bogra for mango-business. He has an open eye and greater understanding about society, people and their problems. Naturally while discussing with him, his consciousness regarding access to water and livelihood has been found very much evident. He thinks, his village is quite well-off, compared to many other villages he visited. Because people of this village are very hardworking and everyone is

employed in multiple activities including agriculture, horticulture (mango) small business and transportation.

Despite this economic and social development, the severe problem of arsenic contamination of tube-well water created lot of panic and suffering among the people of this village and other neighboring villages in the 2000. In this situation NGO Forum came forward with a solution in the name of RWHS. But a few old people were not yet ready to accept rain-water as a good source of water.

Consciousness and concerns about arsenic and its impact on health is quite greater among the younger people, particularly who are educated, compared to other age groups, because they have open eyes and interest about new things. They have become aware not only from the project and NGOs, but also have got information and awareness from mass media like television, radio, newspaper about arsenic contamination.

The adult people are now also aware of the adverse effect of arsenic as well as some alternative technologies. Women are also very much aware of arsenic contamination and they are very interested about RWHS. They participated in NGO Forum's promotional activities which has increased their knowledge and changed their behaviour towards safe WatSan and rain-water for drinking and cooking. The promotional activities also has changed their behaviour towards better health and hygiene habits.

Samata Naree Kallyan Samity (SNKS), a local NGO in the early 2000 came and organized meeting in the village involving all section of people of the society – rich-poor, men-women, and people from different occupation. In these meetings they talked about the danger of drinking arsenic contaminated water and at the same time demonstration of

rain-water as an alternative sources of arsenic-free water. This created a lot of hope among the common people.

SNKS, in association with NGO Forum tested tube-well water in the village and found arsenic in the water of various tube-wells including the one at Badsha Alam's household premises. They organized village level meeting and discussed about alternative source of water i.e. rain-water and assured them to install RWHS in their village. Being inspired by the project activities, they installed a 2500 litre RWHS in their house in July 2001.

In the initial stage, they did not get good taste of rain-water and few of them did not drink rain-water, but after six months in the second cycle of RWHS, they became very much habituated to drink rain-water which they have stuck to. During the lean period, they take green-marked tube-well water. They use RWHS water for cooking, which is very good, arsenic-free, less time consuming and easy to get water. The food cooked with rain-water remain fresh and looks very good. The women community are very happy with the RWHS in their home.

Badsha Alam feels that they are now free of arsenic risk and they suffer less from other water-contaminated diseases.

Badsha Alam opines that people also have positive attitude to share the cost of the system as they are convinced about the utility of the system. He is very conscious and try to operate and maintain the system well and in his opinion this is the common practice among other RWHS owner. The project has imparted the skill of operation and maintenance skill of the system among people. Badsha Alam echoes many of his fellow villagers as he expresses his liking about RWHS and his firm vision about the sustainability of the System.