

# Rain Drops A New Hope



**NGO FORUM**  
FOR DRINKING WATER SUPPLY & SANITATION



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Edited by : Joseph Halder

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## Foreword

Access to safe drinking water is a human right. But ensuring safe, sweet, potable and drinkable water to the community people is a great challenge for Bangladesh. One of the main causes behind this is that, the existing alternate water supply options are not feasible all over the country due to hydro-geological variations. Particularly, in comparison to other parts of the country, the coastal belt and hilly area are hydro-geologically more complex. Therefore most of the water supply options are not feasible in these regions. People in these areas suffer intensely due to lack of safe water sources. The main water source, i.e. the underground water is not drinkable due to excessive salinity. Hence feasible alternate water supply options are must to mitigate the drinking water crisis. In the context of water supply scenario, the Rain-water Harvesting System as an alternate water supply option has been found feasible in most parts of the country, particularly in the coastal belt. Therefore, emphasis is now being given nationally on the promotion of Rain-water Harvesting System as a safe water supply option. The System is getting social acceptability since water from the System is safe, pure, clean, clear and germ-free. Demand for the System is also raising among the community people as it is easy operable and maintainable.

NGO Forum, being the apex networking and service delivery agency of partner NGOs, CBOs and private sector operators who have been engaged in implementation of safe water supply, environmental sanitation and hygiene programmes, promotes different water options to ensure safe water supply for people. The options promoted throughout the country by NGO Forum are Deep-set Pump, Arsenic-iron Removal Plant, Ring-well, Dug-well, Pond Sand Filter, Rain-water Harvesting System, Gravity Flow System, etc. Considering the feasibility of different hydro-geological condition of the country NGO Forum has been giving priority on promoting Rain-water Harvesting System to address drinking water crisis particularly of the disadvantaged poor community. The Forum has been promoting the water supply technologies at the community level through its partner NGOs.

Being experienced and capacitated in operation of water supply programme through partnership with NGO Forum, the partner NGOs have further been scaling up the promotion of Rain-water Harvesting System by replicating the experience in their working areas successfully through mobilization of the cross-section of the community people. NGO Forum documents its programme implementation process, approach, community initiatives and success on a regular basis as well as disseminates those among the relevant stakeholders and sector professionals.

As part of it one of such successful community initiatives has been documented in this publication with a view to sharing and exchanging the experience with the potential stakeholders. We express our thanks to Nakshi Kantha for extending necessary cooperation in conduction of the study. We are also thankful to those concerned who were involved in conducting the study. Finally, we express our heartfelt thanks to the resource sharing partners for making this publication possible.

I hope, the publication a successful one to contribute to the sector promotion.

**S.M.A. Rashid**  
Executive Director

## **Preface**

Millions of people in Bangladesh still do not have access to safe water due to prevalence of many challenges in water supply sector like arsenic contamination in groundwater, saline intrusion both in surface and groundwater in coastal belt, gradual declination of groundwater table, improper waste management, water-logging, surface water pollution, etc. In the face of these reality, being a pioneer organization in the WatSan sector, NGO Forum has been addressing these problems in order to ensure safe water supply particularly for the poor and disadvantaged people. As a part of ensuring safe water facilities NGO Forum through its partner NGOs has been providing hardware supports considering hydro-geological situation all over Bangladesh.

The water supply situation of the coastal belt is more complex than any other part of the country. Considering this reality, NGO Forum has been promoting different water supply options that are affordable, feasible, compatible and appropriate in the coastal belt. The Forum has been emphasizing on promotion of Rain-water Harvesting System as a suitable option for the saline-prone region as the annual rainfall is higher in the coastal belt. Besides, the community people in these regions are accustomed to harvesting rain-water for domestic use since time immemorial, although in a traditional manner. Thus, the Rain-water Harvesting System has been socially accepted to the coastal belt community.

NGO Forum as other parts of the coastal belt has been promoting Rain-water Harvesting System in Shyamnagar upazila under Satkhira district through its partner NGO Nakshi Kantha. From the experience of partnership with NGO Forum, Nakshi Kantha has taken initiative for further promotion of Rain-water Harvesting System under the Shyamnagar upazila with the technical assistance from NGO Forum. A cross-section of people are being benefited through this initiative. Nakshi Kantha has been mobilizing the community people sharing messages and information on the importance of rain-water harvesting in a scientific way rather than collecting and using that in a traditional unhygienic manner. The publication Rain Drops A New Hope upholds people's views about the system while the system has been proven widely acceptable both socially and technically among the respective community.

This publication is an effort of NGO Forum to document the programme implementation process and success of the community initiative with the objective to share and exchange experiences with other relevant stakeholders, sectoral professionals and individuals. It focuses the suffering of the community people due to safe drinking water crisis as well as describes the contributing factors behind the safe drinking water scarcity in the coastal belt. Upholding the vulnerable situation in Shyamnagar under coastal belt and people's initiative to mitigate their sufferings in the field of safe water supply the publication has become a reference document for the professionals to come forward with similar effort.

Hope, the publication would be proved a markable effort to its potential readers.

**Joseph Halder**  
December 2006

## **National Water Supply Scenario**

One of the great challenges of Bangladesh is to ensure safe, sweet, drinkable, potable water supply throughout the country particularly to the disadvantaged and the poor communities. In particular the rural people greatly suffer from unavailability of pure drinking water. The common factors which affect safe water supply are natural calamity, environmental degradation, arsenic invasion in groundwater, saline intrusion both in surface and groundwater in coastal belt, rise of sea level, tidal surge, water-logging, improper solid waste management, declination of groundwater, drought, flood, surface water pollution and so on. The groundwater constitutes the major source of drinking water in the country. But arsenic contamination in groundwater has appeared as the grave threat to the safe water supply. Besides, during the dry season the acute shortage of safe water appears as a major problem due to lowering of groundwater table. During the summer months the groundwater is indiscriminately extracted for irrigation, which makes suction hand pumps inoperable. Thus it appears as an additional problem to the one-third part of the country. Due to appearance of these challenges in the water supply sector the once achieved water supply coverage of 97.5% has been declined to a great extent. Alongside these challenges, unavailability of feasible and affordable water supply technologies has also been a barrier for improving safe water supply situation.

### **Hydro-geological Variation in the Country**

Hydro-geologically Bangladesh varies from region to region. In relation to hydro-geological situation Bangladesh can be divided into 4 hydro-geological areas namely i) shallow-water table area, ii) low-water table area, iii) coastal belt, and iv) hilly area. These 4 hydro-geological areas have different characteristics in relation to natural soil formation, and, therefore, water supply situation differs from area to area.

#### ***Shallow-water Table Area***

A large number of people in Bangladesh depend on tubewell for withdrawal of groundwater for drinking purpose. Arsenic intrusion alongside excessive iron concentration in shallow aquifer of groundwater beyond permissible limit has created a major set back in safe water coverage. This has been creating a crisis in drinking water supply significantly based on exploiting shallow layer of groundwater.

#### ***Low-water Table Area***

In the dry season a considerable area of the country faces scarcity of groundwater within suction limit as because groundwater has been declining alarmingly in the recent years. The main cause of lowering water table is over exploitation of groundwater for irrigation purpose. The manually operated hand pumps become inoperable, and people suffer a lot especially in the dry season.

#### ***Coastal Belt***

The concentration of dissolved minerals in groundwater is higher than that in surface water of coastal area. The coastal belt is identified as problematic area due to complex hydro-geological conditions and adverse water quality. It makes water supply difficult in the area. People of the area, depend on conventional water option-tubewell, which is not operable due to excessive salinity and also arsenic in groundwater. Many other water options also are not feasible in this area. As a consequence, people have been suffering from drinking water crisis.

### ***Hilly Area***

The soil formation and structure is different from any other part of the country. The condition of soil of hilly area is rocky and stony. Drilling of tubewells for water supply is difficult because of presence of hard formation in the subsurface. This situation prevails in some parts of Chittagong, Cox's Bazar, Sylhet, in north part of Mymensingh, Netrakona and Panchagarh districts. Due to this, the water supply situation is very worse since, except few, most of the water supply options are not feasible in hilly areas.

## **Water Supply Scenario in Coastal Belt**

The coastal areas of Bangladesh are spread over to 86 upazilas. As compared to other parts of the country, the coastal belt has been identified as a problem area due to complex hydro-geological conditions and adverse water quality which make safe water supply difficult. The hydro-geological conditions of the coastal area vary greatly even within short distances. Unlike other areas of Bangladesh, groundwater of acceptable quality is not available in most part of the coastal region at relatively shallow depth for easy withdrawal by conventional hand pump tubewells. In general the shallow tubewells are deep from 20m to 75m and deep tubewells are deep from 75m to 350m.

The most popular technology-tubewell is also not feasible in many coastal areas due to excessive salinity intrusion and arsenic contamination in groundwater source. In some places low-saline water has been found in deep aquifers.

Besides tubewell, only few alternate water supply technologies like Pond Sand Filter (PSF), Rain-water Harvesting System (RWHS), etc are feasible in the coastal areas. But these water options are not that much affordable to the most of the community people. The community people also feel the technical aspects of these technologies complicated like installation, proper operation and maintenance, etc. Though Pond Sand Filter has a huge demand among the community, but neat and clean ponds are not available in the area to preserve for drinking water purpose. Alongside, the gradual increase of salinity area, shrimp culture in the adjacent reservoirs, environmental degradation, etc are affecting pond water. Indiscriminate use of pesticides and chemical fertilizers in fish cultivation has been aggravating the deterioration of water quality. The presence of chlorides, and dissolved iron in excess of acceptable limits are also causing the problems in safe drinking water supply. However, based on the satisfactory annual rainfall in the coastal areas, the community people have been using rain-water for drinking purpose. Since time immemorial the community people have been harvesting rain-water as well as



using for domestic purposes as safe water especially in coastal belt. But the way they harvest rain-water, is not scientific. They harvest in a traditional way, which is not hygienic. Harvesting of rain-water by using traditional methods is not safe and bacteria-free. Apart from this the community people can not preserve sufficient water for dry season by using traditional methods. Due to prevalence of these existing realities water supply crisis in coastal areas is still acute.

The presence of arsenic and saline in ground water is the main problems in the coastal belt. Besides, surface water is also polluted with microbiological contaminants. In this situation, the main options to provide safe water are either to remove arsenic and saline from the contaminated sources or to find a new safe source of water supply. Bangladesh is a tropical country. The annual monsoon rainfall is about 2200-2500mm that represents a generous seasonal supply for safe drinking water all over the country. Considering the rainfall pattern, duration, settlement pattern of the people rain-water is feasible for arsenic and saline affected coastal areas.

Like other areas in the coastal belt, Satkhira district is also associated with an acute drinking water crisis. In comparison to other coastal areas water supply situation of Satkhira have different characteristics. In major parts of the district, the groundwater can not be abstracted for drinking purpose due to failure of tubewells to discharge water of satisfactory quality because of excessive salinity in groundwater. The common impediments towards safe water supply in Satkhira are unavailability of neat and clean ponds to be preserved for drinking purpose, unavailability of feasible water technologies, etc. Scattered settlement pattern especially in the southern part of Satkhira also make adequate safe water supply very difficult. On the other side, the common scenario of the area is major portion of agricultural lands are used for shrimp culture, which is contributing to increasing salinity in surface water. Ultimately the shrimp culture nearby a pond affects the pond water and other surface water sources. Gradually surface water is also losing its drinking quality. Due to declination of pond water during the dry season people's sufferings increases naturally to the maximum extent. All these phenomena have been working as the driving force to the people for using contaminated water from unprotected rivers, ponds and shallow wells having a high risk of health problem.

### **NGO Forum's Efforts**

Considering the grim scenario of water supply of the country NGO Forum for Drinking Water Supply & Sanitation since its inception has been operating water supply programme nation-wide with a view to improving the public health situation. NGO Forum, being an apex networking and service delivery agency of partner NGOs, CBOs and private sector operators, has been engaged in implementation of water supply, environmental sanitation and hygiene promotion programmes at the unserved and underserved areas of Bangladesh. Like other parts of the country NGO Forum has been giving its efforts in order to ensure safe water supply in the coastal belt. With a view to promoting the water supply situation the Forum has been rendering an integrated hardware and software services. The Forum facilitates the programme making its partner

NGOs capable regarding WatSan programme operation and management through enhancing capacity providing them with hardware and software supports.

Under the software services, the partner NGO staffs are imparted with technical skill regarding installation of different types of water supply technologies, hygienic latrine, repairing and maintenance of safe water points, arsenic mitigation, etc through conduction of Technical Skill Development Training courses.

Different promotional activities are implemented at community level with a view to sensitizing them towards using safe water, hygienic sanitation and personal hygiene practice. Various type of IEC and BCC materials are used in conduction of promotional activities at the community level to impart knowledge to the community people about advantages of safe WatSan use.

NGO Forum from its long experiences in the WatSan sector realizes that without providing appropriate hardware support to the community people particularly to the poor and disadvantaged section changing of the existing water supply scenario of the country is quite difficult. Like other parts of the country the Forum has been promoting water supply situation of the coastal areas as well as innovating different water supply options that are affordable, compatible and feasible to geophysical conditions of the coastal areas. As a part of it different water supply options are being promoted i.e. Rain-water Harvesting System, Pond Sand Filter, Arsenic-iron Removal Plant, etc in different parts under coastal belt.

Through rendering both hardware and software services the Forum inspires and encourages its partner NGOs to replicate best experiences of WatSan programme to contribute to the improvement of the national WatSan situation. At this end a number of partner NGOs have become capable as well as replicating the best experiences in terms of safe WatSan promotion in their working areas successfully. Nakshi Kantha is one of such capable partner of the Forum which has been replicating its experience in setting up of rain-water harvesting in the southern part of Satkhira and stepping ahead towards sustainability.

### **NGO Forum – Nakshi Kantha Partnership**

In the year 1996, Nakshi Kantha started operating its programme as a development organization in a small scale in Shyamnagar upazila under Satkhira district. By that time Nakshi Kantha came in contact with NGO Forum. As a result of regular collaboration with the Forum Ms. Chandrika Banerjee, Executive Director of Nakshi Kantha attended several meetings as well as participated in NGO Forum's field visits. Taking part in the field visits she observed that the community people of the respective area were being benefited to a great extent through NGO Forum's water supply programme. From her practical observation on the Forum's working approach Ms. Chandrika Banerjee felt encouraged to devote Nakshi Kantha to the promotion of water supply situation in partnership with NGO Forum. Thus the Nakshi Kantha came in partnership with the

Forum in 1997 following a partnership process with the objective to combat mainly the drinking water scarcity in the respective area.

Following the partnership criteria like other development partners, Nakshi Kantha has been capacitated through the Forum's different capacity building services. The staff of Nakshi Kantha have been imparted with different capacity building training courses in order to enhance their knowledge, skill and techniques in relation to WatSan programme implementation. In this regard through conduction of Human Skill Development Training the staff of Nakshi Kantha have been imparted with knowledge about WatSan issues and the expertise and techniques of planning, effective implementation, and management of various WatSan activities. Through imparting Technical Skill Development Training courses technical know-how has been generated in terms of installation of different type of water supply technologies, repairing and maintenance of different safe water points, arsenic mitigation, etc. The staff of the Nakshi Kantha have also been made capable to conduct different promotional activities at the community level with a view to motivating, sensitizing and making people aware of using safe water for all purposes. In this regard different IEC and BCC materials have been provided for using in conduction of promotional activities at the community level.

### **Setting up of Rain-water Harvesting System**

Being capacitated, Nakshi Kantha in partnership with NGO Forum has jointly implemented Community-managed WatSan Programme successfully at the community level. Under the Community-managed WatSan Programme with the technical support from NGO Forum Nakshi Kantha has installed 6 Pond Sand Filters and 12 Rain-water Harvesting Systems in Shyamnagar upazila. A large number of community people have been being benefited through using these water supply technologies. From the experience of joint venture with NGO Forum Nakshi Kantha has taken initiative for further promotion of Rain-water Harvesting Systems under Shyamnagar upazila of Satkhira district with a view to mitigating sufferings of the community people for drinking water scarcity. A cross-section of community people are being benefited significantly getting safe water supply having the Rain-water Harvesting System as a blessing for them.

#### ***In Search of Safe Sources***

*Most of the villagers of West Jelekhali are very enthusiastic about Rain-water Harvesting System as safe water option at the household level. The demand among the community for the System is high. The West Jelekhali village is situated in Munshiganj union, at the extreme south of Shyamnagar upazila under Satkhira district. Around 3,000 people live in this village.*

*For many years the villagers were suffering from safe water crisis due to inadequate water supply sources. At present the water crisis of the villagers has been somewhat relieved due to installation of some water supply technologies by Nakshi Kantha in partnership with NGO Forum. There are now 2 Pond Sand Filters and 4 Rain-water Harvesting Systems in the village. The community people are somehow meeting their needs through those water options. But in comparison to the number of population the existing water sources are not adequate.*

*During the dry season the pond water declines badly. As a result the pond water becomes unhygienic for drinking. In this situation the villagers are reluctant to drink pond water, but they are forced to do that since they have no available water sources. Therefore, to meet the water supply crisis some of the households are installing the Rain-water Harvesting System. Shibani Rani Mondol who has installed a Rain-water Harvesting System reveals, “To get safe water we had been ready to do anything. So, to fulfill our need regarding safe water supply we have installed a Rain-water Harvesting System at our home-yard”.*

*Since time immemorial in a traditional method through using motkas (earthen pots), pitchers, etc the villagers have been harvesting rain-water for drinking purpose. But the way they harvest rain-water is not safe for drinking. Binota Rani Mondol says, “We harvest rain-water through laying plastic sheets on the roof. But in many cases we cannot harvest rain-water in a hygienic manner.” The community people are aware of safe water supply by participating in various promotional activities like courtyard meeting, community meeting, household visit, cultural programmes, etc conducted by Nakshi Kantha. They have been made aware and motivated about the advantages of using safe water for all domestic purposes. Nioti Rani Mondol, one of the villagers expresses, “Participating in different meeting and discussion of Nakshi Kantha the villagers have come to know that rain-water is safer than pond water and it is germ-free”.*

Ms. Chandrika Banerjee, Executive Director of Nakshi Kantha expresses that after completion of the Community-managed WatSan Programme in partnership with NGO Forum Nakshi Kantha observed community people in many areas were still suffering from drinking water crisis. Because according to the population the number of installed water supply technologies were not sufficient to the community people to meet their drinking water need. In this reality community people were raising demand to the Nakshi Kantha for alternative water supply options especially the Rain-water Harvesting System. To address the need of the people Nakshi Kantha felt to initiate further promotion of Rain-water Harvesting System in its working areas. As a part of combating the water problem Nakshi Kantha from its own capacity and technical support of NGO Forum has installed 12 Rain-water Harvesting Systems so far in 7 villages under Shyamnagar sadar, Iswaripur, Koikhali and Atulia unions under Shyamnagar upazila of Satkhira district.

### **RWHS Promoted by Nakshi Kantha**

<b>Sl. No.</b>	<b>Head of Household</b>	<b>Village</b>	<b>Union</b>
1.	Md. Gazi Nazrul Islam	Ismailpur	Shyamnagar
2.	Md. Zahidul Islam	Badghata	Shyamnagar
3.	Md. Younus Ali Sardar	Gumantali	Iswaripur
4.	Jagadish Chandra Karmakar	Iswaripur	Iswaripur
5.	Md. Abdul Goni	Poranpur	Koikhali
6.	Monoronjan Mondol	Poranpur	Koikhali
7.	Abul Majid	Poranpur	Koikhali
8.	Gonesh Chandra Mondol	Poranpur	Koikhali
9.	Rejaul Islam	Dokhin Boro Kupot	Atulia
10.	Shibu Pada Boidya	Dokhin Boro Kupot	Atulia
11.	Subhash Chando Boidya	Dokhin Boro Kupot	Atulia
12.	Satyendra Nath Boidya	Dokhin Boro Kupot	Atulia

Ms. Chandrika states, “We felt encouraged to take initiative for further promotion of Rain-water Harvesting Systems because already we have a mason who had been trained by NGO Forum and involved with Nakshi Kantha in installation of Rain-water Harvesting Systems.” She adds that Nakshi Kantha did not think about the financial involvement on installation of the technology since the demand has been raised from the community people, and the people have been found willing enough to pay against the service.

### ***Community Mobilization***

Nakshi Kantha, in partnership with NGO Forum, has carried out different promotional activities at the community level. The promotional activities i.e. VDC meeting, courtyard meeting, community meeting, school WatSan programme, rally, miking, promotional film-show, etc have been conducted to sensitize the community people about safe water use, environmental sanitation and personal hygiene practice. Different IEC and BCC materials have also been distributed in relation to conduction of the respective promotional activities among the community people to make them aware of safe WatSan promotion. Since the community has already been mobilized and demand has been created the replication of Rain-water Harvesting System has become possible at the community level.

It is widely experienced that Shallow tubewells are not feasible in the area due to excessive salinity in groundwater. The community people are reluctant to install Tubewells. Nakshi Kantha has observed that Deep Tubewell as an alternative option is very costly. The community people are unable to afford Deep Tubewells. The other water option i.e. Pond Sand Filter has huge demand among the community people in the area. But there is a limitation. It is very difficult to get a big, neat, clean and hygienic pond at the community level since ponds are leased and used for fish culture. Thus people have no other alternative options to collect water for drinking purpose in Shyamnagar upazila. In such reality, based on the people’s choice and demand, Nakshi Kantha has felt Rain-water is the better option in comparison to others.

Ms. Chandrika Banerjee, Executive Director of Nakshi Kantha says that water is a part of life of every living being. Getting adequate water is a basic human right. So, Nakshi Kantha has felt that reaching with safe drinking water facilities to the community people is its moral duty. Therefore, with a view to addressing the acute water crisis Nakshi Kantha has been promoting the Rain-water Harvesting System as a feasible option in the area though the people have been getting it against payment.

### ***Process of Publicity***

Nakshi Kantha has been laying an extra effort in publicizing on the technology following an innovative process of promoting Rain-water Harvesting System in the area. In order to make the technology popular among all level of the community people Nakshi Kantha has been disseminating information about the technology at any forum like union level

meeting, upazila level meeting, etc. For the promotion of the technology in a wider range Nakshi Kantha has been distributing leaflet on Rain-water Harvesting System developed in collaboration with NGO Forum as well as publicizing through local print media and satellite channels. Nakshi Kantha has also been taking cooperation from the local elites ranging from the policy-makers to community leaders with a view to motivating the community people in favour of the technology. Member of the Parliament from the constituency of Satkhira 5 Mr. Gazi Nazrul Islam is extending valuable suggestion and cordial cooperation to Nakshi Kantha in relation to publicize about and promote the technology. He announces and shares with the mass people in different meetings and gatherings about the benefits and technical feasibility of the Rain-water Harvesting System.

### **Social Acceptability**

The Rain-water Harvesting System, as an alternative water supply option, is becoming popular among the community people. The community people are being habituated with using water from the system for domestic purposes especially for drinking purpose. There are some reasons behind getting popular of the System. There are very few water options which are feasible in the coastal area for getting safe drinking water. Secondly, the annual rainfall is higher in the coastal areas. In this reality, since time immemorial the community people are accustomed to harvesting rain-water for domestic use.

The social acceptance of the System has been increasing since the user community now know that water from this System is safe, clean, pure and bacteria-free. Apart from this, the Rain-water Harvesting System is constructed at the user's home-yard. So women and girls who are normally involved in collecting water for domestic use need less time and energy. They get water point at their hands.

The user families also share with other people about the benefits of the system. Thus the system is getting popular. As community people know details about the Rain-water Harvesting System now they do not hesitate to invest money to install the System of their own. The Rain-water Harvesting System has demand among all level of the community people ranging from lower to higher class. Among the higher class community people the Member of Parliament of this constituency, and the respective Upazila Nirbahi Officer have installed Rain-water Harvesting System at their home compound. But comparatively people from the middle class are showing more interest to install the technology. The demand among the rich community is increasing. The low-earning people have not yet installed any of the System as they can not afford it. Nakshi Kantha feels that the technology can be reached at all level of people if it is offered on installments of payment.

#### ***Relying on Rain Drops***

*“All the members of our family now get safe water for drinking purpose from our own Rain-water Harvesting System,” says Md. Younus Ali Sarder (50), a resident of Gumantoli village of Iswaripur union under Shyamnagar upazila of Satkhira district. Younus Ali has installed the*

*Rain-water Harvesting System at a corner of his home-yard with the technical support of Nakshi Kantha 8-month back. Md. Younus explains, “For many years we have been suffering from drinking water crisis very seriously. Every moment we need safe water to drink but we do not get it always. We were looking for ways to get rid of this problem at the earliest possible time. We have got this technology as a blessing”.*

*Before installation of the Rain-water Harvesting System Younus Ali’s family members were using water collecting from a Pond Sand Filter which is more than 2 kms away from his house. He expresses, “Due to unavailability of the water sources nearby our house my family members had to walk 5 kms on an average per day and had to spend a lot of time for fetching water for drinking purpose. But now we have the water point at our hands at any time”.*

*Shuprova Karmakar, a 50-year old woman of Iswaripur village in Iswaripur union, states, “The water supply scenario of the area is worse because there are no adequate water supply sources. The mostly used tubewells’ water is highly concentrated with iron and salinity. There are no adequate neat, clean and hygienically protected ponds to be used for drinking purpose.” She adds, “Now we are using drinking water from our own Rain-water Harvesting System that has been installed with the technical help of the Nakshi Kantha”.*

*Shuprova Karmakar says, “Since time immemorial we have been harvesting rain-water for drinking purpose. But the way we harvested rain-water was not scientific and safe, as because traditionally we used to harvest rain-water by using motkas (earthen pots), pitchers, etc. We found water-borne insects, worms in our traditionally harvested rain-water. But we do not find any insect from the technically improved system of Rain-water Harvesting which is being promoted by Nakshi Kantha”.*

*The users of the Systems and the community people now have the positive impression and experience about the water quality of Rain-water Harvesting System. According to the users the water of the System is clear and pure. The water is bacteria-free since the System is air protected. Md. Younus discloses, “For a long time whenever I had opportunity to drink water from this System from my neighbours, I found the water having good taste as well as germ-free. Therefore, I had no doubt about the water quality of the System.” In fact the community people are now aware of the advantages of the System and its water quality as a result of promotional activities implemented at the community level by the Nakshi Kantha.*

*The users of the Rain-water Harvesting System know the process of harvesting and storing rain-water in a hygienic way. The users have been provided with expertise on proper operation and maintenance of the System. “When rainfall starts we wait up to 10 to 15 minutes to let the roof top clean by rain-water. Then we start harvesting,” some of the users explain. They add, “We clean the Rain-water Harvesting System once a year. We do it at the very beginning of rainy season.” Now the users trust that rain-water has become an inseparable part of their life.*

## **Technical Acceptability of RWHS**

Rain-water Harvesting is an option, which has been adopted in many areas of the world where conventional water supply systems are not available or have failed to meet the needs and expectation of the people. It is a technique of water collection, which has been used since antiquity.

Efforts are being made by different agencies to develop technologies for arsenic mitigation, as there is no reliable household level solution available. Beside this, different alternative sources of safe drinking water are being explored. Among them Rain-water Harvesting System is a simple, affordable, technically feasible and socially acceptable safe drinking water supply system in the arsenic affected rural areas. The rain-water is free from arsenic contamination and the physical, chemical and bacteriological characteristics of harvested rain-water represents a suitable and acceptable means of potable water.

Removal of arsenic and saline from the ground water sources is difficult and expensive. Besides, removal of microbiological contaminants is not also easy. All the removal technologies involve high initial cost, laborious & costly operation and maintenance. There are many variables that determine the efficiency of the removal technologies. All these have made the Rain-water Harvesting System a suitable alternative option of the saline-prone and arsenic contaminated underground water. The heavy monsoon rain has made the Rain-water Harvesting System a viable option for drinking water in different unions under Shyamnagar.

Rain-water Harvesting System has different components like catchment for harvesting water, gutter to flow the water in a particular direction, flushing system to flush out the dirty water, storage tank to store harvested water, collection point to collect water and drainage pipe to clean the storage tank. Different types of RWHSs, in terms of size, shape & materials are being developed and installed to make the system affordable to all.

Ferro-cement tank is used to make it low-cost. An easily operated flushing system made of locally available 38mm dia PVC pipe along with GI elbow and end cap is used. The design of flushing system is suitable and adequate to flush the first foul rain-water. Storage tank is kept covered to protect dust and entrance of sunlight directly that causes growth of bacteria (TC/FC) and Alge. A simple drainage pipe is used to clean the storage tank. CI sheet catchment is used in the RWHS because run-off co-efficient of CI sheet is higher than other roof materials. The catchment size is selected considering the rainfall intensity and tank size is made according to the per capita consumption, family size catchment area, etc. The tank size is calculated for the amount of water to be required for a family in dry period. A simple and easily operated tap is used to collect water from the tank.

Considering the above mentioned issues people in the respective area have found the technology friendly in use. They are also getting available water for drinking and cooking in the dry period as because the tank size has been designed considering all possible variables. All the construction works are being done with low-cost and locally available materials and that has made it affordable to the community people. The water quality is reliable as the first foul rain-water is flushed out with adequate flushing system. The dust and dirt are protected with pre-cast ferro-cement cover. Water collection point is so designed to collect water hygienically. All the related water quality parameters are tested and the results have been found within the acceptable limit. The System is designed in such a way that community people especially the women can easily operate and maintain



it. They are now getting water within their house premises. Maintenance cost is less and easy, just they have to flush out the first foul water and have to clean the tank inside once a year. People can now save their time of water collection. Considering the above mentioned issues the respective people have found RWHS technically sound one and become interested to install RWHS with their own cost. They have found the technology very useful one to get safe water.

### **The Mason In-charge of Construction**

Md. Abdus Sobhan Dhali, a 31-year old man lives in Srifalkathi village under Iswaripur union of Shyamnagar upazila at Satkhira district. He is a mason by profession. He has inherited the profession from his father. Being son of a professional mason he used to help his father in masonry works. Such way gradually Dhali has been involved actively in masonry tasks and has become a professional mason. Dhali states, “With my father I started masonry works from 1990 and learned it from him. It was the entry point of starting my mason life”.

At the start of his profession as mason, Dhali was involved in building construction with his father. Later in 1996 Dhali received training course on construction of water supply technology from Department of Public Health Engineering (DPHE). From the training, he gained practical knowledge on construction of different water technologies especially Rain-water Harvesting System (RWHS) and Pond Sand Filter (PSF). After completion of the training course he was provided with tools set and dices for construction of RWHS and PSF. Under the supervision of DPHE, he also constructed some of the RWHSs and PSFs in Satkhira district.

In the meantime, Dhali received a proposal from NGO Forum through Nakshi Kantha to construct some of the Rain-water Harvesting Systems under Shyamnagar upazila. Being associated with the Forum Dhali constructed several Rain-water Harvesting Systems. Dhali’s technical skill was enhanced on construction procedure, drawing, design, specification of required materials, required tank size and capacity, different types of catchment and maintenance of the system through imparting different technical training courses. Gaining technical knowledge and skill from the training course he started constructing RWHSs of different capacity following the design and specification independently and confidently.

Dhali mentions that community people have been suffering from safe water crisis for a long time as well as accustomed to using unsafe water for drinking. In this situation, Nakshi Kantha has made the community people aware of health hazards as a consequence of using unsafe water. As the outcome of awareness raising programme the community people are realizing the good effects of safe water use. Thus they are willing to install RWHS as a safe water option and appealing to Nakshi Kantha for necessary assistance in this regard. Accordingly Nakshi Kantha has been extending necessary support to the community people in collaboration with NGO Forum.

Dhali also feels that dissemination of necessary and relevant information on proper operation and maintenance of the System is his duty. Thus beside construction he briefs the beneficiaries on operation and proper maintenance of the technology. The community people seek necessary technical help from him in terms of purchasing material for constructing RWHS. Dhali reveals that if the technology is provided on installments, many of the community people will be able to afford it. In some cases Nakshi Kantha has been providing that support for the poor families.

According to Dhali the design of RWHS is fine. There is no any problem with design during construction period. Dhali is now more engaged with the RWHS construction works. Dhali by his profession has been contributing to the community people to overcome their safe water crisis as well as benefiting himself through masonry works.

### **Sustainability**

For ensuring sustainable use of the Rain-water Harvesting Systems and ensure proper operation and maintenance Nakshi Kantha has been carrying out follow-up activities on a regular basis. During follow-up visits Nakshi Kantha initiates to ensure water storing and maintenance in a hygienic manner. Besides, through promotion of the Rain-water Harvesting Systems Nakshi Kantha has been contributing significantly to the mitigation of people's sufferings in relation to safe water supply among the disadvantaged people.