

People's Republic of Bangladesh

**STUDY ON THE ENVIRONMENT OF
WATER-RELATED BUSINESSES IN
BANGLADESH**

FINAL REPORT

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Study on the Environment of Water-related Businesses in Bangladesh

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Table of Abbreviations

Abbreviation	English
AAN	Asia Arsenic Network
ABMPDWM	Association of Bangladesh Mineral & Purified Drinking Water Manufacturers
AD	Authorized Dealer
ADB	Asian Development Bank
AFD	Agence Française de Développement
AfrIPANet	Africa Investment Promotion Agency Network
AIRP	Arsenic Iron Removal Plant
AMR	Automatic Meter Reading
AusAID	Australian Agency for International Development
AKKWH	A K Khan WaterHealth Ltd.
BMDA	Barind Multipurpose Development Authority
BCSIR	Bangladesh Council of Scientific and Industrial Research
BCTA	Business Call to Action
BETV-SAM	Bangladesh Environmental Technology Verification - Support to Arsenic Mitigation
BEZA	Bangladesh Economic Zones Authority
BEPZA	Bangladesh Export Processing Zones Authority
BIFF	Bangladesh Infrastructure Finance Fund
BIFFL	Bangladesh Infrastructure Finance Fund Limited
B/L	Bill of Lading
BLCF	Business Linkage Challenge Fund
BOI	Board of Investment
BOO	Build Own Operate
BOP	Base of the Pyramid
BOT	Build, Operate and Transfer
BRAC	Bangladesh Rural Advancement Committee
BRWSSP	Bangladesh Rural Water Supply Sanitation Project
BSTI	Bangladesh Standards and Testing Institution
BUET	Bangladesh University of Engineering and Technology
BWSPP	Bangladesh Water Supply Program Project
CBO	Community Based Organisation
CBA	Collective Bargaining Agent
CCIE	Chief Controller of Imports & Exports of Bangladesh
CCEA	Cabinet Committee on Economic Affairs
CD	Chittagong Division
CETP	Central Effluent Treatment Plant
CIDA	Canadian International Development Agency
CPI	Corruption Perceptions Index
CSR	Corporate Social Responsibility
CV	Curriculum Vitae
CWASA	Chittagong Water Supply and Sewerage Authority
DANIDA	Danish International Development Agency
DBO	Design Build Operate

DCA	Development Credit Authority
DCCI	Dhaka Chambers of Commerce & Industry
DFID	Department for International Development
DMA	District Metered Area
DPHE	Department of Public Health Engineering
DSP	Delivery Service Provider
DIV	Development Innovation Ventures
DWSSDP	Dhaka Water Supply Sector Development Project
DWASA	Dhaka Water Supply and Sewerage Authority
EIB	Europa Investment Bank
ETP	Effluent Treatment Plant
ETV-AM	Environment Technology Verification for Arsenic Mitigation
EPZ	Export Processing Zone
FDI	Foreign Direct Investment
FIRR	Financial Internal Rate of Return
FEDF	Foreign Exchange Declaration Form
F/S	Feasibility Study
GC	Global Compact
GDA	Global Development Alliance
GIM	Growing Inclusive Markets
GoB	Government of Bangladesh
GSB	Growing Sustainable Business
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GVW	Grameen Veolia Water Ltd.
HDPE	High Density Polyethylene
HFSKS	Hilful Fuzul Samaj Kallyan Sangstha
HYSAWA	Hygiene Sanitation and Water Supply
ICB	International Competitive Bidding
ICDDR,B	The International Centre for Diarrheal Disease Research, Bangladesh
IDB	Islamic Development Bank
IDCOL	Infrastructure Development Company Limited
IFC	International Finance Corporation
IIFC	Infrastructure Investment Facilitation Centre
JADE	Japan Association of Drainage and Environment
JBCCI	Japan-Bangladesh Chamber of Commerce and Industry
JCIAD	Japanese Commerce and Industry Association in Dhaka
JETRO	Japan External Trade Organisation
JFC	Japan Finance Corporation
JFGE	Japan Fund for Global Environment
JICA	Japan International Cooperation Agency
JOCV	Japan Overseas Cooperation Volunteers
JV	Joint Venture
KOICA	Korea International Cooperation Agency
KWASA	Khulna Water Supply and Sewerage Authority
L/C	Letter of Credit
LDC	Least Developed Country

LGD	Local Government Division
LGED	Local Government Engineering Department
LGI	Local Government Institution
MEL	Modern Erection Limited
METI	Japan Ministry of Economy, Trade and Industry
MFI	Microfinance Institution
MIS	Management Information System
MLGRD&C	Ministry of Local Government, Rural Development and Cooperatives
MoF	Ministry of Finance
MoU	Memorandum of Understanding
MPL	Milnars Pumps Limited
MRA	Microcredit Regulatory Authority
MSW	Ministry of Social Welfare
NBR	National Board of Revenue
NGO	Non-government Organisation
NGOAB	NGO Affairs Bureau
NGO Forum	NGO Forum for Public Health
NRW	Non-Revenue Water
ODA	Official Development Assistance
O&M	Operation and Maintenance
PDWMAB	Pure Drinking Water Manufacturing Association of Bangladesh
PM	Prime Minister
PPP	Public-Private Partnership
PPPAC	PPP Advisory Council
PPP TAF	PPP Technical Assistance Fund
PSF	Pond Sand Filter
PSIF	Private Sector Investment Finance
PSU	Policy Supporting Unit
PUB	Public Utilities Board
PVC	Polyvinyl Chloride
PWRF	Philippine Water Revolving Fund
PWSS	Pourashava Water Supply and Sanitation
RAJUK	Rajdhani Unnayan Kartripakkha
RDA	Rural Development Academy
RFP	Request for Proposal
RFQ	Request for Qualification
RJSC	Registrar of Joint Stock Companies & Firms
RO	Reverse Osmosis
ROC	Rollout Coordinator
RWASA	Rajshahi WASA
SBDL	Social Business Design Lab
SDC	Swiss Agency for Development and Cooperation
SDP	Sector Development Plan
SEZ	Special Economic Zones
SHEWA-B	Sanitation, Hygiene Education and Water Supply in Bangladesh
SIDA	Swedish International Development Cooperation Agency

SME	Small and Medium Enterprises
SME Support, Japan	Organisation for Small & Medium Enterprises and Regional Innovation, Japan
SME	Small and Medium Enterprises
SWA	Safe Water for Africa
TA	Technical Assistance
TCCAF	The Coca-Cola Africa Foundation
TDS	Total Dissolved Solid
TIN	Tax Identification Number
TPP	Tripartite Partnership
TTPP	Trade Tie-up Promotion Program
UF	Ultra-Filtration
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
UNIDO	United Nations Industrial Development Organisation
UPI	Unit for Policy Implementation
USAID	United States Agency for International Development
UV	Ultraviolet
VGF	Viability Gap Fund
WASA	Water Supply and Sewerage Authority
WB	World Bank
WHI	WaterHealth International
WHC	WaterHealth Centre
WHO	World Health Organisation
WSS	Water Supply and Sanitation
WSSPS	Water Supply and Sanitation Sector Program Project
WTP	Water Treatment Plant

Executive Summary

S1 Overview of this Study

Chapter 1 details the background, objectives, study team members, schedule and flow of this study (see 1-1 to 1-5).

Arsenic contamination of and saltwater intrusion into groundwater are especially significant problems in Bangladesh. Japan International Cooperation Agency (JICA) conducted the “Preparatory survey on cooperation program for the improvement in water supply services in the People’s Republic of Bangladesh” in 2010 to survey the future possibility of water-related businesses in Bangladesh. JICA is currently supporting four surveys on water-related Base of the Pyramid (BOP) business for applying Japanese water supply technologies in Bangladesh (in the framework of preparatory surveys for promoting BOP businesses started in 2010). However, JICA has limited information, experience and mechanisms for supporting the Japanese water-related companies trying to establish their businesses in Bangladesh. In order to overcome these limitations, this additional study on the environment of water-related business in Bangladesh was conducted from March to September 2013. The target areas of this study are Dhaka City, Chittagong Division and Khulna Division in Bangladesh.

The above-mentioned preparatory survey conducted by JICA in 2010 covered the conditions of water supply and potential applications of many water-related Japanese technologies in Bangladesh. JICA’s “Data collection survey on private partnership in water supply sector”, conducted from 2010 to 2011, also covered the commercial applications of Japanese water-related technologies in developing countries. To avoid the duplication of current study contents with these past studies, this additional study does not cover general conditions of water supply in Bangladesh and the applicability of broad Japanese technologies in detail. This additional study focused more on the possible collaborations of Japanese water-related companies with their potential local partners (e.g., Non-governmental Organizations (NGOs), manufacturing companies, associations, government institutions) and JICA. Their collaborations with other Japanese and international institutions are also considered in this study to some extent.

Chapter 1 includes a list of the Japanese, Bangladeshi and international institutions, companies and NGOs that the study team interviewed in Japan and Bangladesh (see 1-6). The total number of interviews conducted is 79. A significant portion of this report is written mainly based on the records of these interviews. More specifically, the following aspects are investigated in this study.

- 1) Bangladeshi organizations and regulations developed to support private sector participation
- 2) Existing menus of Japanese and international institutions for supporting private sector participation that are applicable for Japanese companies trying to establish their water-related businesses in Bangladesh
- 3) Past experiences of private sector participation in the Water Supply and Sanitation (WSS) sector in Bangladesh
- 4) Difficulties for Japanese companies in their development and continuation of water-related businesses in Bangladesh
- 5) Conditions and procedures of permissions required for water-related businesses in Bangladesh
- 6) Competitions with locally available low-cost technologies and previous water-related business models
- 7) Potential local business partners of Japanese companies such as local institutions, companies, NGOs, etc.
- 8) Potential water-related businesses for Japanese companies in Bangladesh

This study followed a similar categorization of water-related businesses to that used in the above-mentioned data collection survey conducted in 2011 when considering various potential water-related businesses in Bangladesh for Japanese companies. The categories of water-related

businesses include provision of water supply services with public private partnership (PPP projects), small-scale water-related businesses targeting mainly the urban poor and villages (BOP businesses) and the provision of technical components (goods and services) to water supply utilities (Provision of Component Technologies). Based on the findings on these aspects, suggestions are made regarding JICA's support for the Japanese companies trying to establish their water-related businesses in Bangladesh.

S2 Government Institutions' Support and Regulations for Private Sector Participation in Bangladesh

Chapter 2 explains the support mechanism and regulations of Bangladeshi government institutions for PPP projects and the regulations, policies and plans related to private sector participation in the WSS sector in Bangladesh. The institutional framework of the Government of Bangladesh (GoB) for promoting and implementing PPP projects has been significantly improved since 2010 (see 2-1). However, the private sector participation in the WSS sector is very limited in urban areas while the private sector is the most active in the energy sector in Bangladesh. One reason is that WASA has been unable to increase their water tariff by more than 5% annually due to the restrictions imposed by the WASA Act of 1996 and political influences, although the inflation rate in Bangladesh has been increasing in recent years by more than 5% annually. In the large urban areas where Water Supply and Sewerage Authorities (WASAs) supply water, the water tariffs need to be increased to an appropriate level for PPP projects. Asian Development Bank (ADB) has been working with the GoB and DWASA to find a way to increase the water tariff to an appropriate level for water supply projects (see 2-2).

S3 Existing Support of Japanese and International Institutions for Private Sector Participation

Chapter 3 explains the existing support menus of five Japanese and six international institutions that can or may be able to support the Japanese companies trying to establish their water-related businesses in Bangladesh. These Japanese institutions include JICA, Japan External Trade Organisation (JETRO), Organisation for Small & Medium Enterprises and Regional Innovation, Japan (SME Support, Japan), Embassy of Japan in Bangladesh and other Japanese financial institutions for SMEs (see 3-1). The international institutions include United Nations Development Programme (UNDP), United Nations Children's Fund (UNICEF), United Nations Industrial Development Organisation (UNIDO), International Finance Corporation (IFC), Asian Development Bank (ADB) and United States Agency for International Development (USAID) (see 3-2).

S4 Previous Water-related PPP Projects and BOP Businesses in Bangladesh

Chapter 4 details ten examples of previous private sector participation in the WSS sector in Bangladesh. As for PPP projects, PPP-type rural piped water supply schemes, in which the Department of Public Health Engineering (DPHE) covers 70% of their initial costs, have been implemented in 21 villages and will be rolled out to 125 areas in the future with the support of the World Bank (WB). In Export Processing Zones (EPZs), several local plant manufacturers and one joint venture between a local plant manufacturer and a Singapore Plant manufacturer provide water supply and effluent treatment services under Build-Operate-Own (BOO) contracts with Bangladesh Export Processing Zones Authority (BEPZA) (see 4-1).

Regarding BOP businesses, some companies from Western countries have been improving the sustainability of their previous social and/or commercial businesses supplying purified water in collaboration with local companies, NGOs and international institutions (e.g., Grameen Veolia Water Ltd. (GVW) and A K Khan WaterHealth (Bangladesh) Ltd. (AKKWH)). Several Japanese companies have also been trying to establish their water-related BOP businesses in Bangladesh with the support of JICA

and other Japanese institutions (see 4-2).

For example, AKKWH has already started the commercial operation of two small modular-type water purification plants called WaterHealth Centres (WHCs) in rural areas in 2012 (for selling purified water with the help of local delivery service providers (DSPs) using customers' unsealed containers such as plastic jerry cans) and one packaged/sealed jar water plant in Chittagong City in 2013 (partly for creating a cross-subsidy for the water sales at HWCs in rural areas). AKKWH is a joint venture between A K Khan Group (a Bangladeshi enterprise group) and WaterHealth International Inc. (WHI), based in the U.S., which was established in 2011 with the financial support of International Finance Corporation (IFC) through its special fund called InfraVentures. AKKWH recently made an agreement on the capital tie-up with a large national NGO called BRAC for establishing 50 new WHCs in 2 to 3 years.

S5 Challenges of Japanese Companies in Conducting Water-related Businesses in Bangladesh

Chapter 5 explains the existing difficulties for Japanese companies in their development and continuation of water-related businesses in Bangladesh. The common issues facing BOP businesses are categorized into four groups in the context of Bangladesh and its WSS sector (see 5-1).

The first group of difficulties is related to the general business environment in Bangladesh, which includes 1) issues on the procedures required to start a business, 2) constraints imposed by financial regulations and 3) difficulties of human resources management (see 5-2).

The second group of difficulties for Japanese companies is related to the marketing of water-related businesses in Bangladesh, which includes 1) competition with existing low-cost technologies and 2) low willingness to pay for and public awareness regarding safe water. The competition with existing low-cost technologies is explained in detail in this chapter. Many local low-cost water-related technologies (such as deep tube well, arsenic iron removal plant (AIRP), pond sand filter and rainwater tank) have been installed by DPHE, NGOs, etc. for small-scale safe water supply in rural areas in Bangladesh. Japanese companies trying to establish their water businesses in Bangladesh with new technologies need to compete against the existing low cost technologies, especially in rural areas (see 5-3).

The third group of difficulties deals with the permissions required for specific types of water-related businesses in Bangladesh, which is related to 1) the necessity of acquiring WASA's permission to use water sources in their areas, 2) Bangladesh Standards and Testing Institution (BSTI)'s procedure of certifying the production and sales of drinking water with sealed containers and 3) Bangladesh Council of Scientific and Industrial Research (BCSIR)'s certification for new arsenic removal technologies (see 5-4). For example, it usually takes more than 6 months (sometimes more than 12 months) to obtain the licence from BSTI for selling drinking water, although the required minimum time officially announced by BSTI is only 60 days. The main reason for this is incompatibility with BSTI requirements. If a defect is pointed out by BSTI in its inspection, the applicant has to improve it and undergo another inspection.

The fourth group of difficulties relates to the necessities and risks of having local partners. Reliable local partners are essential to start water-related businesses that require local information and complicated procedures (see 5-5).

S6 Potential Local Partners of Japanese Companies

Chapter 6 explains potential local partners of Japanese companies, which includes related associations in Bangladesh (see 6-1), water-related local companies (see 6-2), local consultants (see 6-3), NGOs operating in Bangladesh (see 6-4), local institutions for research, water quality tests, etc. (see 6-5) and Bangladeshi organisations related to microfinance, including Grameen Bank (see 6-6). Water-related local companies are explained in detail in this chapter by categorizing them into 1) water treatment plant engineering companies/manufacturers, 2) jar water companies, 3) bottled water companies, 4) water purifier sales companies and 5) other water-related manufacturing companies. Their features and

possible collaborations with Japanese companies are explained for each of these categories. A list of water-related local companies (with basic company information extracted from their web pages and their replies to the email-based questionnaire survey conducted in this study) is offered in this study. The lists of local engineering consultants involved in water-related projects, as well as water-related Japanese, international and national NGOs operating in Bangladesh are also provided in this study.

S7 Opportunities of Water-related Businesses in Bangladesh

Chapter 7 explains opportunities for water-related businesses in Bangladesh for Japanese companies. These opportunities have been identified mainly through the interviews conducted in this study.

Regarding opportunities for PPP projects, this report mainly explains the possibilities of targeting medium-scale PPP projects having special conditions, such as those for newly developed high-standard residential areas, special economic zones (SEZ) and bottled water production, through partnership with the local institutions (the capital city development authority called RAJUK, DWASA, Chittagong WASA (CWASA), BEPZA, etc.) (see 7-1). For example, RAJUK is trying to formulate PPP projects for improving water distribution, sewer collection and rainwater drainage systems in three large high-standard residential areas outside the existing boundary of Dhaka City Corporation and two haphazardly developed areas. This chapter also explains the possibility of Japanese companies' involvement in PPP-type piped water supply projects with partial grant aid targeting small and medium cities in Bangladesh.

Regarding opportunities for BOP businesses, favourable water-related BOP businesses for Japanese companies are analysed based on the various experiences of Japanese and other foreign companies. In this analysis, water-related BOP businesses are categorized into 1) sales of rainwater tanks (household and community use), 2) sales of goods for water purification (chemicals and devices such as water purifiers) and 3) sales of water with containers (sealed and unsealed containers) (see 7-2). This chapter shows some examples of collaboration regarding some specific opportunities for BOP businesses in collaboration with local institutions, companies and NGOs.

Regarding opportunities for providing Japanese component technologies, the needs of various foreign technologies and possible collaborations for manufacturing and marketing in Bangladesh were discussed in the interviews with many local institutions, companies and NGOs. These discussions are organised into different technical categories: 1) pumps, valves and pipes, 2) drilling technologies for deep wells, 3) NRW-related technologies, 4) industrial water treatment technologies, 5) technologies for jar and bottled water plants, 6) unit-type water treatment plants and 7) desalination plants (see 7-3).

S8 Recommendation on JICA's Support for Japanese Companies

Chapter 8 explains suggestions on JICA's support for Japanese companies trying to establish their water-related businesses in Bangladesh, which are categorized into four groups.

The first group is about JICA's provision of information to Japanese companies, which includes three sets of suggestions regarding 1) the use of this report as a guidebook, 2) provision of other related reports and 3) continuous updates of related information (see 8-1). In addition to the full list of the documents collected in this study, the list of the other reports, which are also useful for Japanese companies trying to establish their water-related businesses in Bangladesh, is included in 8-1 (2).

The second group of suggestions is about JICA's indirect support for Japanese companies to encourage better collaboration with local partners, which includes three sets of suggestions regarding 1) collaboration with local government institutions and public companies, 2) collaboration with local private companies and associations and 3) collaboration with NGOs and other international aid agencies (see 8-2).

The third group is about JICA's indirect financial aid for Japanese companies (see 8-3), which includes four sets of suggestions regarding 1) financial aid to the Bangladeshi funds established for PPP projects, 2) financial aid through HYSAWA Fund, 3) formulation of PPP-type water supply projects with a partial grant aid for medium and small urban areas, and 4) establishment of a new fund for Japanese companies' BOP businesses.

The fourth group is about the improvement of JICA's support menus with other institutions, which includes three sets of suggestions regarding 1) disclosure of the product lists of small and medium Japanese companies and diversification of their usages, 2) campaigns for water-related Japanese companies and 3) preparation of overall flowcharts including the support menus of other institutions (see 8-4).

Some of the suggestions described in Chapter 8 may be difficult to realize or require much more discussion to evaluate their effectiveness. However, the study team hopes that some of these suggestions will result in assistance for the Japanese companies trying to establish their water-related businesses in Bangladesh in the future.

Chapter 1 Overview of this Study

1-1 Background

Arsenic contamination of groundwater and saltwater intrusion are significant problems in Bangladesh. The percentage of people having access to safe drinking water is, on average, 74% in Bangladesh (82% in urban areas, 71% in rural areas) as of November 2010. The population that cannot yet access safe water is estimated at about 22.1 million, which is slightly less than 15% of the total population in Bangladesh.

Japan International Cooperation Agency (JICA) has dispatched advisers to Bangladesh for water-related policy improvement and helped the urban water supply and sewerage authorities in Chittagong City and Khulna City in improving their management efficiency, constructing new water supply facilities and reducing non-revenue water. In addition, JICA has supported Local Government Division (LGD) and the Department of Public Health Engineering (DPHE) in providing safe drinking water in rural areas, including development of the capacity for taking measures against arsenic contamination and improving water quality tests.

However, as a result of the following new problems, the promotion of private sector participation, by mutually complementing public funds or ODA and private investments, is required in addition to the conventional support of capacity development to the related public sector.

- Lowering of groundwater level and water quality deterioration in the rivers around urban areas due to rapid industrialization
- Decrease in utilizable water sources due to seawater intrusion and arsenic contamination
- Problems of water resource allocation with other sectors such as agriculture and industry
- Chronic lack of budget, staff and technologies in water utilities and local governments

In Japan, the framework of "Team Water Japan" and "Water Security Council of Japan" was established in January 2009, through a cooperative effort of industry, government and schools, to support Japanese companies in making inroads into the foreign markets of water-related businesses. "PPP Council for Overseas Water Infrastructure", which many water-related Japanese companies attended, has been held regularly since July 2010. The PPP council promotes discussions crossing the borders of Japanese government ministries and agencies.

Japan International Cooperation Agency (JICA) conducted "Preparatory survey on cooperation program for the improvement in water supply services in the People's Republic of Bangladesh" in 2010 to survey the future possibility of water-related businesses in Bangladesh. JICA is currently supporting four surveys on water-related Base of the Pyramid (BOP) business for applying Japanese water supply technologies in Bangladesh (in the framework of preparatory surveys for promoting BOP businesses started in 2010). However, there are limited information, experience and mechanisms for supporting the Japanese water-related companies trying to establish their businesses in Bangladesh. For example, it is necessary to organize the following information systematically.

- Business approval and authorization processes in Bangladesh
- Local companies that can cooperate with Japanese companies in water-related businesses
- Gaps between Japanese technologies and local technologies
- Information necessary for considering effective cooperative frameworks between JICA and Japanese companies

In order to fill the shortage of this kind of information and improve the support mechanisms, this study on the environment of water-related business in Bangladesh was conducted from March to September 2013.

1-2 Study Areas

The target areas of this additional study are Dhaka City and two local regions in Bangladesh (Chittagong Division and Khulna Division), as shown in Figure 1-1.



Figure 1-1: Study Areas

1-3 Objectives

The above-mentioned preparatory survey conducted by JICA in 2010 covered the conditions of water supply and potential applications of many water-related Japanese technologies in Bangladesh. JICA's "Data collection survey on private partnership in water supply sector", conducted from 2010 to 2011, also covered the commercial applications of Japanese water-related technologies in developing countries. To avoid the duplication of study contents with these past studies, this additional study does not cover general conditions of water supply in Bangladesh and the applicability of broad Japanese technologies in detail. This additional study focuses more on the possible collaborations of Japanese water-related companies with their potential local partners (e.g., Non-governmental Organisations (NGOs), manufacturing companies, associations, government institutions) and JICA. Their collaborations with other Japanese and international institutions are also considered in this study to some extent. More specifically, the following aspects are investigated in this study, and many suggestions are made on JICA's support for the Japanese companies trying to establish their water-related businesses in Bangladesh at the end of this study, based on the findings on these aspects:

- 1) Bangladeshi organisations and regulations developed to support private sector participation
- 2) Existing menus of Japanese and international institutions for supporting private sector participation that are applicable for Japanese companies trying to establish their water-related businesses in Bangladesh
- 3) Past experiences of private sector participation in the Water Supply and Sanitation (WSS) sector in Bangladesh

- 4) Difficulties for Japanese companies in their development and continuation of water-related businesses in Bangladesh
- 5) Conditions of and procedures for permissions required for water-related businesses in Bangladesh
- 6) Competitions with locally available low-cost technologies and preceding water-related business models
- 7) Potential local business partners of Japanese companies, such as local institutions, companies, NGOs, etc.
- 8) Potential water-related businesses for Japanese companies in Bangladesh

This report on the study is prepared as one of the guidebooks to which Japanese small and medium enterprises (SMEs) can refer when moving into water-related businesses in Bangladesh. Japanese large companies can also refer to this report as an additional information source. The results from investigating each of the above aspects are described in a separate chapter or section in this report. The detailed information on potential partners such as local companies and NGOs is included in this report, especially for Japanese SMEs, which would need to find their local partners as their first step in Bangladesh.

This study followed a similar categorization of water-related businesses to that used in the above-mentioned data collection survey conducted in 2011 when considering various potential water-related businesses in Bangladesh for Japanese companies. As shown in Table 1-1, the categories of water-related businesses include provision of water supply services with public private partnership (PPP projects), small-scale water-related businesses targeting mainly the urban poor and villages (BOP businesses) and the provision of technical components (goods and services) to water supply utilities (Provision of Component Technologies). PPP projects requiring large-scale investment are usually less relevant to Japanese SMEs. However, this report also includes the information related to PPP projects because there have been many small-scale PPP-type rural piped water projects with the financial support of World Bank (WB) in Bangladesh and the Bangladeshi organisations and regulations related to PPP have been largely developed over the last few years. The businesses related to wastewater treatment are less profitable and more difficult compared to businesses related to the water supply in general. Therefore, this report covers limited aspects regarding sewerage and effluent treatment.

Table 1-1: Types of Water-related Businesses in Developing Companies

Business Type	Business Strategy
Public Private Partnership (PPP) Project	Win a business competition by developing a water supply service package which is most suitable for its target area based on accumulated know-how (e.g., conventional public water supply services and the business development of the water barons such as Veolia Environment and Suez Environment).
Bottom of the Pyramid (BOP) Business	Establish an inexpensive water supply business package and sell many of the packages with the advantages of standardization and scale (e.g., businesses for BOP such as construction and operation of wells for village water supply, sales of chemicals for water purification, water purifier, etc.).
Provision of Component Technology	Win a business competition by specializing in the production and service of a specific part of water utilities. (There are various products, such as membrane and high pressure pump.)

Reference: Final report of the study on the partnership with private entities in water supply sector (2011) JICA

1-4 Study Team Members and Study Schedule

The study team members and the overall schedule of this study are shown in Figure 1-2.

Study Team Members		2013							Contract Man-Months		
Position	Name	March	April	May	June	July	August	September	In BGD	In JPN	Total
Team Leader / Water-related Businesses (Technology Trend)	Shozo MORI								2.00	2.20	4.20
Deputy Team Leader / Support for Private Sector Participation	Chinatsu MAEDA								1.00	2.00	3.00
Water-related Businesses (Finance & Business Management)	Tatsuya TOBE								1.50	0.80	2.30
Reports			△ Inception Report (IC/R)				△ Draft Final Reort (DF/R)	△ Final Report (F/R)	4.50	5.00	9.50

Legend: In Bangladesh (BGD) In Japan (JPN)

Figure 1-2: Study Team Members and Overall Study Schedule

1-5 Flow of the Study

The flow and tasks of this study are shown in Figure 1-3.

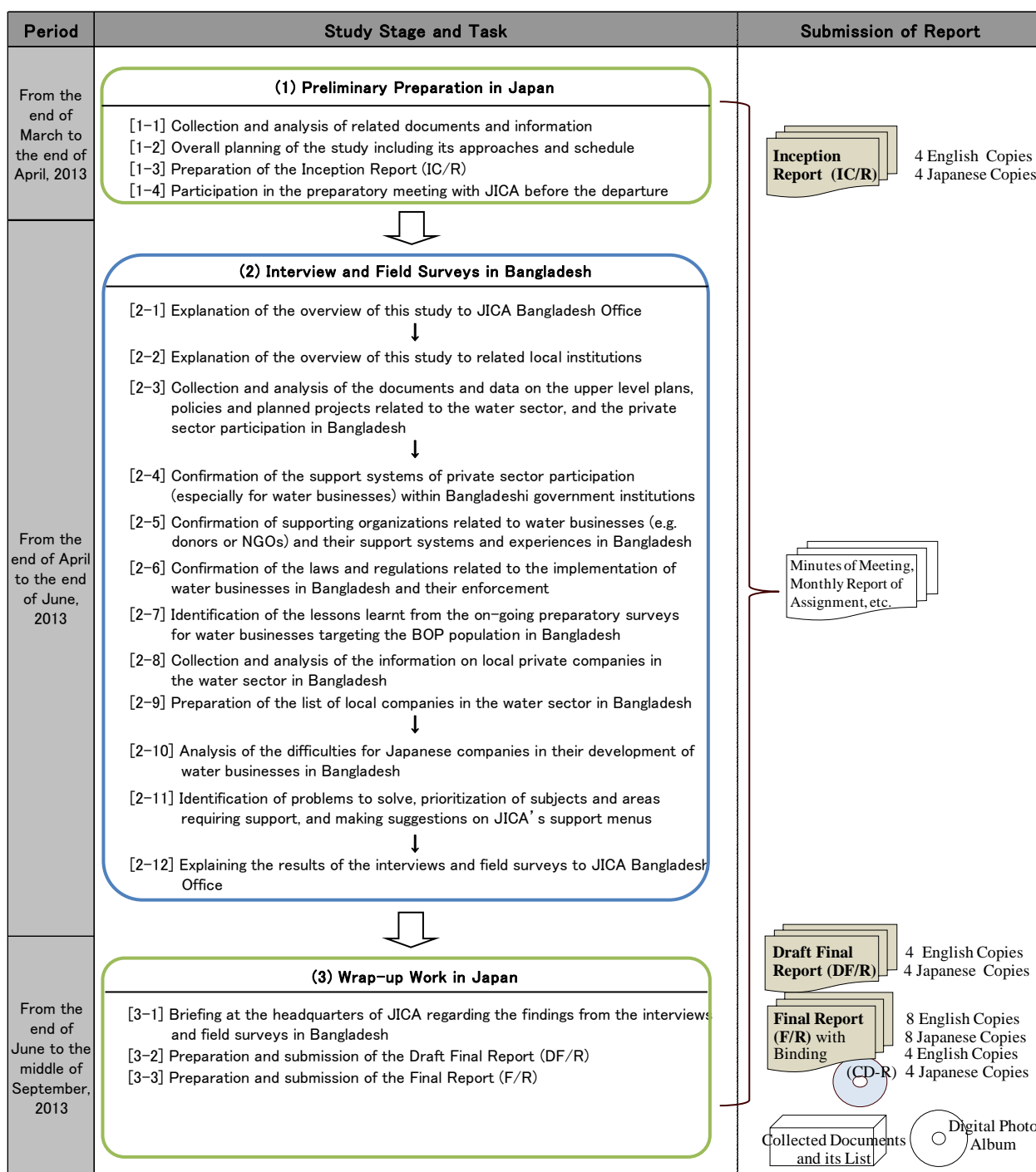


Figure 1-3: Flow and Tasks of the Study

1-6 Interviewed Institutions, Companies and NGOs

The study team has conducted many interviews to related Japanese, Bangladeshi and international institutions, companies and NGOs in Japan and Bangladesh, as shown in Table 1-2. A significant portion of this report is written based on the records of these interviews. It is important to note that the opinions obtained in the interviews are not only from the viewpoint of the institutions/companies but also from personal impressions, and the information obtained might be incorrect if the interviewees misunderstand the facts. Further, there might be insufficient understanding and possible misunderstandings by the study team.

Table 1-2 (1): List of the Interviewed Japanese, Bangladeshi and International Institutions, Companies and NGOs (1/2)

Category	ID	Target of Interview Survey	Date	Location
Bangladesh Government Institution	1	Local Government Division (LGD) in the Ministry of Local Government, Rural Development and Cooperatives (MLGRD&C)	April 29, 2013	Dhaka
	2	Department of Public Health Engineering (DPHE)	April 29, 2013	Dhaka
	3	Dhaka Water Supply and Sewerage Authority (DWASA)	April 29, 2013	Dhaka
	4	Bangladesh Standards and Testing Institution (BSTI), Ministry of Industries	April 30, 2013	Dhaka
	5	One Stop Service Centre, BSTI Dhaka	April 30, 2013	Dhaka
	6	Bangladesh Council of Scientific and Industrial Research (BCSIR), Ministry of Science and Technology	April 30, 2013	Dhaka
	7	Policy Support Unit (PSU), Local Government Division (LGD)	April 30, 2013	Dhaka
	8	Khulna Water Supply and Sewerage Authority (KWASA)	May 5, 2013	Khulna
	9	Department of Public Health Engineering (DPHE) Khulna	May 5, 2013	Khulna
	10	Khulna Water Supply and Sewerage Authority (KWASA) (second interview to KWASA)	May 5, 2013	Khulna
	11	Dhaka Water Supply and Sewerage Authority (DWASA) (Second interview to DWASA)	May 11, 2013	Khulna
	12	Bangladesh Export Processing Zone Authority (BEPZA)	May 13, 2013	Dhaka
	13	Public Private Partnership (PPP) Office, Prime Minister's Office	May 15, 2013	Dhaka
	14	Board of Investment (BOI)	May 15, 2013	Dhaka
	15	Microcredit Regulatory Authority (MRA)	May 15, 2013	Dhaka
	16	Dhaka Water Supply and Sewerage Authority (DWASA)	May 27, 2013	Dhaka
	17	Department of Public Health Engineering (DPHE) (Second time before visiting their project site)	June 5, 2013	Dhaka
	18	Chittagong Water Supply and Sewerage Authority (CWASA)	June 11, 2013	Chittagong
	19	Chittagong Division, Department of Public Health Engineering (CD-DPHE)	June 12, 2013	Chittagong
	International Aid Agency	20	Rajdhani Unnayan Kartripakkha (RAJUK)	June 18, 2013
21		USAID Bangladesh	May 28, 2013	Dhaka
22		International Finance Corporation (IFC)	May 28, 2013	Dhaka
23		The World Bank (WB) & Water and Sanitation Program (WSP)	June 4, 2013	Dhaka
24		United Nations Development Programme (UNDP)	June 16, 2013	Dhaka
Bangladesh Association	25	ADB Bangladesh	June 19, 2013	Dhaka
	26	Japan-Bangladesh Chamber of Commerce and Industry (JBCCI)	May 11, 2013	Dhaka
Bangladesh Government-owned Company	27	Pure Drinking Water Manufacturing Association of Bangladesh (PDWMAB)	June 5, 2013	Dhaka
	28	HYSAWA Fund Management Office in Khulna	May 6, 2013	Khulna
	29	HYSAWA Fund	May 16, 2013	Dhaka
Bangladesh Joint Venture with Foreign Company	30	Maitri Shilpa, Ministry of Social Welfare	June 17, 2013	Dhaka
	31	Grameen Veolia Water Ltd. (GVWLtd)	May 28, 2013	Dhaka
	32	Grameen Veolia Water Ltd. (GVWLtd) (Second interview and site visit)	June 1, 2013	Goalmari
	33	A K Khan WaterHealth (Bangladesh) Ltd.	June 9, 2013	Dhaka
	34	A K Khan WaterHealth (Bangladesh) Ltd. (Second visit, Water Quality Test Laboratory and WaterHealth Centre (WHC) in Chittagong)	June 11, 2013	Chittagong

Table 1-2 (2): List of the Interviewed Japanese, Bangladeshi and International Institutions, Companies and NGOs (2/2)

Category	ID	Target of Interview Survey	Date	Location
Bangladesh Water-related Company	35	Modern Erection Limited (MEL) Group	May 20, 2013	Dhaka
	36	D-Water Tech Ltd.	May 21, 2013	Dhaka
	37	Sigma Group (Sigma Engineers, Ltd. and Sigma Pump Ltd.)	May 21, 2013	Dhaka
	38	Milnars Pumps Limited (MPL)	June 6, 2013	Dhaka
	39	Liberty Tools & Mill Store	June 10, 2013	Chittagong
	40	Intercontinental Technology Limited	June 12, 2013	Chittagong
	41	Chittagong Waste Treatment Plants Ltd.	June 12, 2013	Chittagong
	42	D-Water Tech Ltd. (Second visit to D-Water Tech, Ltd. to see their new WTP in Chittagong EPZ)	June 12, 2013	Chittagong
	43	So-Safe International	June 15, 2013	Dhaka
	44	Rahman Enterprise (RE)	June 15, 2013	Dhaka
	45	Coca-Cola Far East Limited	June 16, 2013	Dhaka
	46	Sonear Laboratories Ltd.	June 17, 2013	Dhaka
	Bangladesh University	47	Khulna University	May 6, 2013
48		Bangladesh University of Engineering and Technology (BUET)	May 27, 2013	Dhaka
Bangladesh Bank	49	Grameen Bank	June 1, 2013	Dhaka
Bangladesh Resource Centre	50	Yunus Centre	June 19, 2013	Dhaka
Bangladesh NGO	51	PR Bangladesh	May 3, 2013	Khulna
	52	NGO Forum	May 20, 2013	Dhaka
	53	iDE Bangladesh	May 22, 2013	Dhaka
	54	BRAC	June 3, 2013	Dhaka
	55	WaterAid in Bangladesh	June 3, 2013	Dhaka
	56	Hilful Fuzul Samaj Kallyan Sangstha (HFSKS)	June 6, 2013	Dhaka
Japanese NGO	57	Japan Association of Drainage and Environment (JADE)	May 4, 2013	Khulna
	58	Asian Arsenic Network (AAN)	June 18, 2013	Dhaka
	59	Alliance Forum Foundation	June 23, 2013	Dhaka
Japanese Government Institution	60	JICA's Private Sector Partnership Division	April 4, 2013	Tokyo
	61	JETRO Dhaka Office	May 2, 2013	Dhaka
	62	Embassy of Japan in Bangladesh	May 2, 2013	Dhaka
	63	JICA Bangladesh Office	June 23, 2013	Dhaka
	64	JETRO	July 2, 2013	Tokyo
	65	JICA Special Office for Supporting Japanese SMEs	July 19, 2013	Tokyo
Japanese Water-related Company	66	Institute on Sky Water Harvesting Co., Ltd., Padeco Co., Ltd.	March 26, 2013	Tokyo
	67	Institute on Sky Water Harvesting Co., Ltd. (Second interview and site visit)	May 3, 2013	Khulna
	68	Yachiyo Engineering Co., Ltd.	March 27, 2013	Tokyo
	69	Nippon Basic Co., Ltd.	April 9, 2013	Tokyo
	70	Nippon Basic Co., Ltd. (Second interview and site visit)	May 22, 2013	Dhaka
	71	Original Engineering Consultants Co., Ltd.	April 2 2013	Tokyo
	72	A-WING International Co., Ltd.	April 5 2013	Fukuoka
	73	Japan Poly-Gul (BD) Ltd.	May 14, 2013	Dhaka
	74	Samurai Trading Company	June 6, 2013	Tokyo
Business Consultant helping Japanese Companies	75	NeXT Business Management Services	May 12, 2013	Dhaka
	76	NewVision Solutions, Ltd.	May 13, 2013	Dhaka
	77	Pleiades Japan Ltd.	May 14, 2013	Dhaka
	78	Tokyo Consulting Firm Limited	May 20, 2013	Dhaka
	79	Prothom Inc.	June 7, 2013	Tokyo

Chapter 2 Government Institutions' Support and Regulations for Private Sector Participation in Bangladesh

This chapter consists of two sections. Section 2-1 describes the recent institutional developments for supporting various PPP projects in Bangladesh since 2010. Section 2-2 primarily describes the past policy level achievement and the current situation regarding the private sector participation in the water supply and sanitation (WSS) sector in Bangladesh.

2-1 Support and Regulations for PPP Projects in Bangladesh

The policies, strategies, guidelines and supporting mechanisms for promoting various PPP projects have been significantly improved in Bangladesh since 2010. Moreover, the draft of PPP Law in Bangladesh has recently been prepared and discussed in an inter-ministerial meeting.

(1) Policy and Strategy for PPP, 2010

The Policy and Strategy for PPP was prepared in English and issued by the GoB in August 2010. It explains the applicability and sector coverage of PPP, eligibility of private sector, classification of PPP project by investment size, types of financial participation of the government, incentives to private investors, institutional framework for PPP, procedure of PPP projects, information disclosure, five-year investment target, etc.

This PPP policy and strategy specifies many priority sectors and sub-sectors, including 1) water supply and distribution, 2) sewerage and drainage, and 3) effluent treatment plans. According to the PPP policy and strategy, any for-profit or not-for-profit entity legally registered in Bangladesh or abroad is eligible for participation in PPP projects. However, at the time of contract awarding, the foreign entity is required to be registered as a legal entity in Bangladesh.

The PPP policy and strategy explain that the line Ministry/implementing agency will consider financing and implementation of linked activities such as acquisition of land, re-settlement, and provision of utility services. It also explains that all PPP projects will receive the applicable incentives, which may include reduced import tax and tax exemption or reduced tax on profit from operating/managing for a specific time period. Special incentives may be extended to PPP projects targeted for rural and/or underprivileged populations.

For appraisal and approval of unsolicited proposals, competitive bidding using the 'Bonus System', 'Swiss Challenge System,' or other appropriate methods shall be followed where the options and competitiveness of the unsolicited proposals could be put to open test by inviting competitive proposals. In the Bonus System, the proponent of the unsolicited proposal is given bonus points in relation to the evaluation. The Swiss Challenge System enables the government to attract counter-proposals to an unsolicited proposal during a designated period. The original proponent then has the right to counter-match the most attractive counter-proposal.

(2) Institutional Framework of PPP

The PPP policy and strategy explains the roles of institutions involved in the strategy development, identification, formulation, appraisal, approval, monitoring, and evaluation of PPP projects. Table 2-1 summarizes the main roles of each involved institution.

Table 2-1: Main Roles of the National Institutions involved in PPP Projects

Institution	Main Roles
PPP Advisory Council (PPPAC)	<ul style="list-style-type: none"> - Providing guidance and advice - Reviewing achievements
Cabinet Committee on Economic Affairs (CCEA)	<ul style="list-style-type: none"> - Approval of regulatory instruments and guidelines - In-principle approval of large and medium projects - Final approval of large projects - Approval of all viability gap financing (VGF) received project - Approval of incentives - Termination of concession contract
PPP Office under PM's Office	<ul style="list-style-type: none"> - Promoting PPP concept - Facilitating PPP projects in various ways
Line Ministry / Implementing Agency	<ul style="list-style-type: none"> - Identification, formulation, procurement and monitoring of PPP projects - In-principal and final approval of small PPP projects
PPP Unit at the Finance Division of Ministry of Finance (MoF)	<ul style="list-style-type: none"> - Financing VGF and technical assistance (TA) - Channelizing long funds for infrastructure financing through specialized financial institutions
Planning Commission	<ul style="list-style-type: none"> - Including link components of PPP project in to the annual development programme (ADP)

In order to ensure quick approval and implementation of all projects, the PPP policy and strategy classifies PPP projects by investment size into three groups: large (above Tk. 2.5 billion), medium (between Tk. 500 million and 2.5 billion), and small (below Tk. 500 million). The threshold investment values may be reviewed, as and when required. The final approval authorities of large, medium and small PPP projects are the CCEA, the finance minister and the minister of relevant line ministry, respectively.

Figure 2-1 shows the overall PPP project development and approval process outlined in the policy and Strategy for PPP issued in 2010.

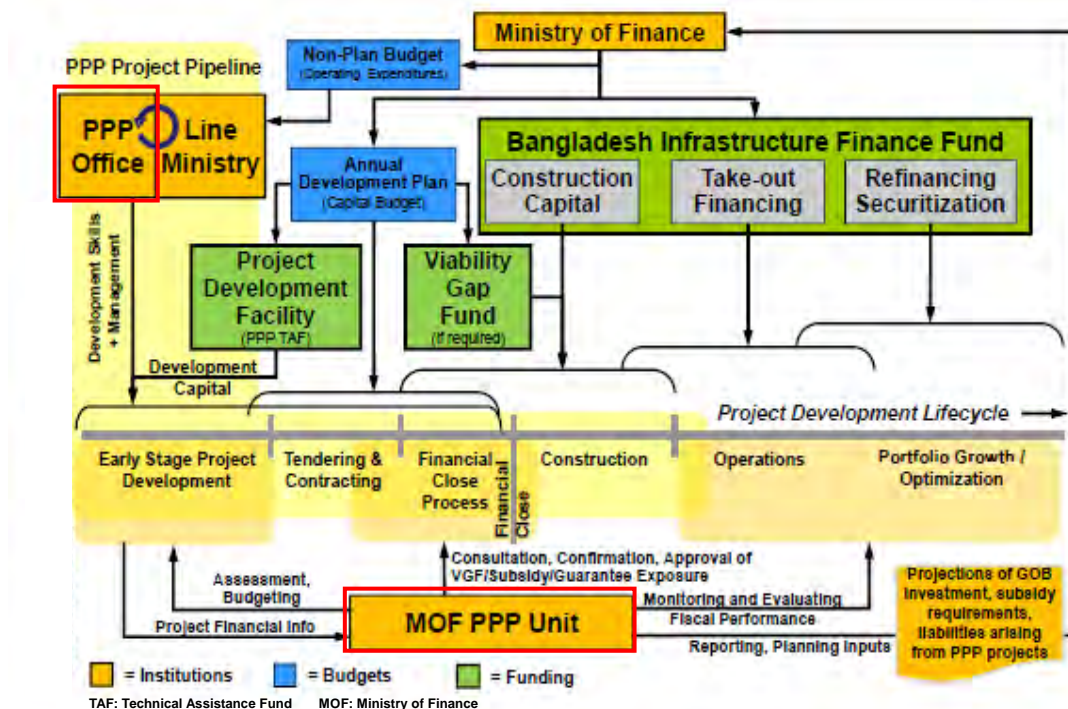


Figure 2-1: Interactions between PPP Institutions through the Project Cycle (Source: PPP Office, 2012)

This process was developed with the support of a technical assistance team of ADB. The PPP Unit of Ministry of Finance (MoF) and the PPP Office, shown in the figure with red frames, are the main organisations supporting PPP projects.

(3) Available Funds of the Ministry of Finance's (MoF) PPP Unit

The MOF's PPP Unit has been established at the Finance Division of the MoF. The PPP Unit has responsibility for overseeing the fiscal viability of PPP projects and sanctioning support funding for their development and financing. The PPP Unit has management responsibility for overseeing three key catalytic funds, the PPP Technical Assistance Fund (PPP TAF), Viability Gap Fund (VGF) and Bangladesh Infrastructure Finance Fund (BIFF).

PPPTAF is used to provide early stage project development funding support to sanctioned PPP projects. The PPPTAF helps defray the cost of professional consultants and advisors needed to assure the government achieves appropriate risk allocation in PPP projects and pre-develops projects to a standard that attracts maximum interest from investors and lenders. More specifically, PPP TAF is designed for pre-feasibility and feasibility study, preparation of Request for Quotation (RFQ) and Request for Proposal (RFP) documents, preparation of concession contracts, PPP-related capacity building in government institutions and PPP-related awareness building such as road shows, exhibitions, etc. The guidelines for PPPTAF were prepared in English and issued in 2012. They include the scheme for PPPTAF to support PPP project development as its Annex-1.

VGF provides supplementary government financing to projects that the PPP Unit deems economically vital to the public interest but that may not be fully financially viable on a commercial basis. VGF could be in the form of capital grants to share the up-front cost of a project, annuity payments to effectively subsidize PPP project costs or in both forms. The guidelines for VGF for PPP projects were prepared in English and issued in 2012. They explain that VGF is applicable to only Build-Operate-Transfer (BOT) projects and that the total VGF monies for a BOP project in the form of capital grant shall not exceed thirty percent (30%) of the total estimated project cost. The guidelines also explain that the amount of VGF shall be equivalent to the lowest offer in the competitive tender for capital subsidy or annuity, subject to the fulfilment of all other parameters of the tender. The Finance Division, through its PPP Unit, will manage and disburse the VGF upon request made by the line Ministry through the office for PPP. A Detailed Feasibility Study (DFS) is the pre-requisite for availing VGF for any BOT project.

BIFF is a specialized financial institution for extending financing facilities for the PPP projects in the form of debt or equity. The Bangladesh Infrastructure Finance Fund Limited (BIFFL) was incorporated by the Ministry of Finance in 2011 to provide the long-term financing of BIFF in local currency to infrastructure projects. Infrastructure Development Company Limited (IDCOL) is another financial institution encouraging private sector investment in renewable energy projects and large and medium infrastructure projects in Bangladesh.

(4) Supporting Activities of the PPP Office

The PPP Office was established in September 2010 under the Prime Minister's Office as a separate, autonomous office staffed with both private sector professional and civil service resources. The PPP Office supports line ministries in identifying, developing, tendering and financing PPP projects, as well as negotiating with private partners and monitoring the implementation of PPP projects as further explained in the following.

Identify: Screen candidate projects to assure that only the most attractive, viable and sustainable opportunities are pursued.

Develop: Work together with sector line ministries and implementing agencies, augmenting their efforts with external professional resources, to pre-develop shortlisted PPP projects for international competitive bidding in a form that creates value for the people of Bangladesh.

Tender: Oversee a robust and transparent tendering, evaluation and award process to assure an expedient and efficient pathway to conclusion.

Finance: Facilitate financing for PPP projects by supporting early stage project development financing and, as needed, capital support to help achieve financial closure of awarded projects.

Negotiate: Oversee the commercial negotiation of PPP contracts to ensure that the balance of risk sharing between the public and private sectors is in line with the overall PPP policy.

Monitor: Support sector line ministries during the implementation phase of PPP projects to assure the projects remain on schedule and perform as agreed.

For interested investors and lenders, the PPP Office provides a professional, transparent, centralized portal to high quality PPP Projects.

(5) Draft PPP Law, 2013

A draft of PPP Law (2013) has been prepared in Bengali and was discussed in an inter-ministerial meeting in March 2013. This draft PPP Law will be further discussed in the parliament for its approval in a few months.

Chapter 1 of the draft law includes basic matters such as introduction, definition and scope of application. Chapter 2 includes the rules for selecting private partners, such as method and purpose of pre-qualification, tender security, evaluation criteria, acceptance of unsolicited offers, and prevention of dishonest practices. Chapter 3 includes the matters related to the partnership agreement of a PPP project, such as property ownership, financial arrangements, service delivery, and indemnification for specific alterations in laws and corrections of partnership agreements. Chapter 4 includes the matters related to the extension and cancellation of partnership agreements. Chapter 5 includes the matters related to dispute resolution, such as procedure of dispute resolution and conflicts related to public service users. Chapter 6 includes the matters related to the establishment of an office, such as employees and expenses, responsibilities of PPP office, and keeping accounts and audits. Chapter 7 includes miscellaneous matters.

2-2 Private Sector Participation in the WSS Sector in Bangladesh

The Policy Support Unit (PSU) of the Local Government Division (LGD), Ministry of Local Government, Rural Development & Cooperatives (MoLGRD&C), supported by mainly DANIDA, has been leading the private sector participation in the WSS sector in Bangladesh in terms of policy development. The main achievement of the PSU regarding the promotion of the private sector participation is the inclusion of the related recommendations in the sector development plan for the fiscal years 2011 to 2025. Regarding the large-scale PPP infrastructure projects in the WSS sector, DWASA is taking a leading role but facing difficulty in increasing its water tariff to a level attractive to private sector participation due to the limitations imposed by the WASA Act issued in 1996. The Water Act issued in 2013 also has some clauses potentially related to the private sector participation in the WSS sector.

(1) Policy Support Unit (PSU) for the WSS Sector

The Policy Support Unit (PSU) for Water and Sanitation Sector (WSS) provides technical assistance for the Local Government Division (LGD), MoLGRD&C, to 1) develop and review sector policy strategies and plans, 2) coordinate and monitor performances, and 3) facilitate the development of institutional capacity.

The PSU was set up initially as Unit for Policy Implementation (UPI) in 1999 under the Institutional Development Component of DANIDA Water and Sanitation Sector Programme Support (WSSPS). The activities of UPI related to PPP and BOP during this phase (1999-2006) included 1) component description of tripartite partnership (TPP), 2) preparation of a blueprint for PPP in the WSS sector, and 3) preparation of a pro-poor strategy for the WSS sector.

DANIDA supported the second phase of the policy improvement as the PSU (2006-2011) under WSSPS-II. The formulation of the Sector Development Plan (FY 2011-2025) for the WSS sector was one of the major achievements during the period. This sector development plan includes the identification of issues and recommendations related to the private sector participation in the WSS sector, as explained in 2-2 (2).

The GoB and DANIDA are continuing their support for the PSU as the third phase (2012-2015). The main functions of PSU in Phase III are 1) to facilitate the development of the Policy Support Unit (PSU) in the revenue setup of the LGD, 2) to assist the LGD in the institutional capacity building of water and sanitation utilities and reviewing and developing policies and strategies for the WSS sector, and 3) to monitor the implementation of the sector development plan. As explained in 2-2 (2), the institutional capacity of water and sanitation utilities needs to be improved to encourage private sector participation in the WSS sector. It is also important to monitor the implementation of the recommendations regarding the private sector participation described in the sector development plan.

(2) Sector Development Plan (FY 2011-2025)

The sector development plan (FY 2011-2025) of the water supply and sanitation sector in Bangladesh was prepared in English and was issued in November 2011 by the LGD, MLGRD&C. This sector development plan categorized the private sector participation in the water supply and sanitation sector in three broad market segments: small-scale hardware market, small-scale service market and large scale urban utilities market. This sector development plan described the issues related to and recommendations for developing the private sector in these three categories, as summarized in the following.

- 1) **Small-scale hardware market** (e.g., selling tube-well pipes and pumps, and latrine manufacture) where the products are sold directly to buyers.
 - The small-scale hardware market of the private sector dominated the supply of rural WSS facilities in Bangladesh. With the rising income levels and growing awareness of higher service facilities, there is an increased demand for technologies with higher levels of sophistication, in contrast to the simple hand pump for tube wells and water-sealed pit latrines. To meet this demand, the technical and business skills of the private sector will need to be further enhanced.
 - It is also important to motivate the consumers to use a higher quality of water and sanitation services through awareness and promotional activities, which may be carried out by the Local Government Institutions (LGIs) in cooperation with the NGOs. As a very competitive market exists, with a large number of producers in the rural WSS sector, there is no immediate need for price regulation.
- 2) **Small-scale service market** (e.g., operating rural piped water supply and water points in slums) where licences or contracts from the public agencies are usually required to deliver the WSS services.
 - The small-scale service market is partially developed but is expected to grow substantially in the future. Several rural piped-water supply models (different projects implemented by the DPHE, Barind Multipurpose Development Authority (BMDA), Rural Development Academy (RDA) and Social Development Fund) with varying degrees of involvement of the private sector, communities and the LGIs are being tried out in this market. The results of these trials vary but there is a growing demand. These different rural piped-water supply models need to be further explored with the objective of scaling up appropriate models.

- There have been successful cases of operation of water points in urban slums by the NGOs or directly by the Community-Based Organisations (CBOs), which buy water from the public utilities and sell the water to the users. In the future, the small-scale providers may be engaged in operating piped sub-networks, serving an area outside the service area of the utility. They may also be contracted to operate and maintain simple, decentralized wastewater treatment plants. The small-scale service providers need capacity support for further development.
 - Sludge emptying from septic tanks and disposal are also done by small-scale service providers. Although there is a good example of using suction machines by some NGOs to empty septic tanks in the urban areas, much improvement is needed for handling sludge in a safe and environmentally-friendly way.
- 3) **Large-scale urban utilities market** (e.g., operating functions of the utilities) where the investments and the associated risks are usually shared between the private and public sectors.
- At present, there is no major large-scale private sector participation in the management of WSS services in the urban areas. In Dhaka, billing and collection contracts awarded by DWASA to private firms for some areas have met with varied success. DWASA is also exploring the potential viability of management contracts for O&M of District Metered Areas (DMAs).
 - Studies have shown that there is a good potential for the PPP in the WSS sector in Bangladesh. However, the country's investment environment is not very conducive to the advanced types of PPP. The transition path for PPP in Bangladesh includes the development of the WSS sector (e.g., making WSS utilities more autonomous, recruiting required staff, rationalizing the water tariff structure, creating public awareness, and creating an independent regulatory body) and the preparation of the utilities (e.g., implement a sound administrative and accounting system, improve billing and collection systems, introduce metering wherever possible, develop an improved register of assets, implement the management information system (MIS), and rationalize staff composition in terms of number and skill mix).
 - Incorporate the concept of the TPP while developing PPP models. This will ensure strong embedding of the social virtues and the voice of the poor will be represented.
 - The underlying principle is to start first with simple types such as service contracts and management contracts.
 - A guideline for the PPP for the WSS sector could be prepared after having some experience in the PPP.
 - A facilitating agency (for example, Infrastructure Investment Facilitation Centre (IIFC) or consultants) needs to be appointed to gradually introduce the PPP.

(3) WASA Act, 1996

There are currently four water supply and sewerage authorities (WASAs) in Bangladesh, which are Dhaka WASA (DWASA), Chittagong WASA (CWASA), Rajshahi WASA (RWASA) and Khulna WASA (KWASA). These WASAs are regulated by the Water Supply and Sewerage Authority Act that was prepared in Bengali and issued in 1996. Chapter IV (Powers and Duties of the Authority) and Chapter VIII (Rules and Regulations) of this act are especially related to private sector participation. The subject matters of the other chapters include establishment and incorporation of WASA, composition of its board, power and functions of the board, employment of its officers and employees, its power to borrow money, annual audit of accounts, land acquisition, offences and penalties.

The subject matters of Chapter IV, which are especially related to the private sector participation, include 1) prohibition of water supply, etc., by persons other than the authority and 2) revision of water, sewer and storm water rates. The optimization of the rates of charges is essential for promoting future PPP

projects of WASAs. The main descriptions of these matters in the act are summarized in the following.

1) Prohibition of water supply, etc., by persons other than the authority:

- Except WASA, no person shall construct or maintain any facilities for collection, purification, pumping, storing and distribution of potable water in any place within an area for which WASA is established.
- Notwithstanding the above point, WASA shall grant permission to any person applying for the construction and maintenance of the facilities, until such time as the authority is able to supply water.

2) Revision of water, sewer and storm water rates:

- The rates of charges for the services maintained by WASA shall be reviewed once each year, or at any time for special reasons.
- The rates of charges may be revised once every five years or earlier, and the revised rates shall not be realized without the prior approval of the GoB.
- Notwithstanding the above two points, WASA may increase the rates or charges up to five percent with the approval of its board, if such increase is necessary to meet increased costs of its operation due to inflation.
- The GoB may, by order in writing, authorize WASA to increase its rates or charges without the approval of the GoB, for any reason.

The other subject matters of Chapter IV include general powers and duties of the authority, transfer of functions from municipalities, etc., to the authority, publication and levy of water, sewer and storm water rates, and cutting off water connections.

Chapter VIII (Rules and Regulations) includes a description of the power of WASA to make regulations, as follows:

- WASA may, with the previous approval of the GoB, make regulations not inconsistent with the provisions of this act or any rules made thereunder, for carrying out the purposes of this act and for implementation of its policy statement.

According to ADB, the current level of DWASA's water tariff is not sufficient to attract private investors for PPP projects. Moreover, the upper limit percentage of WASA's annual increase of its rates of charges to cope with price inflation was set at 5% by this act, although the price inflation ratio has been fluctuating between around 5% and 10% in Bangladesh in recent years. ADB started a project called 'Establishing a Regulatory Framework for Urban Water Supply and Sanitation' in 2013. In this project ADB is going to support the Water Cell established in the PSU of the LGD by developing necessary rules and standards for regulating water utilities and starting performance monitoring of major water utilities. The establishment of a clear procedure to increase the water tariff beyond the upper limit of 5% would be one of the major challenges of ADB, Water Cell and WASAs in this project.

(4) Water Act, 2013

The Water Act was finally issued by the Bangladesh Parliament in May 2013, after prolonged discussion of its draft versions (in Bengali). The purposes of this Water Act include the management, redistribution, use, protection and storage of the water resources and the integrated development of those resources. Chapter 1 includes general matters including water rights. Chapter 2 describes the National Water Resources Council and its functions and powers. Chapter 3 describes the Executive Committee and its functions, duties and powers. Chapter 4 describes regulations on the control of the development of water resources and management activities. Chapter 5 describes the control of water use and protection

of water resources and conservation. Chapter 5 also includes the following matters, which are relatively related to the use of water sources in PPP projects and BOP businesses:

1. Declaration of water-troubled area and its management
2. Use of water resources based on priority and exemption in water-troubled area
3. Setting of the lowest limit of groundwater table and regulations on groundwater extraction
4. Regulations and restrictions for storing water

Chapter 6 includes matters related to crime, punishment and justice in regard to water resource development and uses. Chapter 7 describes miscellaneous matters such as setting the price of water and the use of information technologies.

Chapter 3 Existing Support of Japanese and International Institutions for Private Sector Participation

This chapter mainly describes the schemes and funds of Japanese and international institutions established for supporting private companies planning and implementing their BOP businesses in developing countries and the existence of their offices in Bangladesh. Sections 3-1 and 3-2 cover those of Japanese institutions and international institutions, respectively.

3-1 Japanese Institutions

(1) Japan International Cooperation Agency (JICA)

Japan International Cooperation Agency (JICA) is an implementing agency of Japanese official development aid (ODA) that provides technical cooperation and other forms of aid promoting economic and social development in developing countries. From the perspectives of win-win-win situations for developing countries, private enterprises and ODA, JICA has been making efforts to promote public-private partnerships, which are focused primarily on cooperation aimed at improving the business environment in developing countries and the support infrastructure, development and improvement of public services through PPP in which government and private sectors share responsibilities.

In October 2008, JICA established the Office for Private Sector Partnership, which has consultation with the private sector and seeks to understand its needs, in order to strengthen partnerships with private corporations. Since the launch of the Office for Private Sector Partnership, JICA has been supporting feasibility studies for PPP and BOP projects proposed by Japanese private companies. JICA has received many inquiries and proposals from the private sector concerning potential PPP projects. JICA has also instituted and announced its basic policies on PPP based on the Japanese government's policies for promoting such partnerships. JICA has externally disseminated these policies and good practices through its website and at various occasions.

In April 2013, the Office for Private Sector Partnership was changed to the Private Sector Partnership and Finance Department and the Special Office for Supporting Japanese SMEs was newly established to promote partnerships with SMEs through their participation in Japanese ODA. JICA has specified schemes for promotion of PPP, BOP and SMEs' overseas business expansion as follows.

- **Preparatory Survey for PPP Infrastructure Projects**

Preparatory Survey for PPP Infrastructure projects is a scheme for formulating feasible plans based on proposals from the private sector. The proposals from private companies have been widely called for. JICA commissions a preparatory survey (i.e., feasibility study) to the private company whose proposal has been selected for planning their PPP project. Through these surveys, JICA promotes collaboration between the public and private sectors from the initial planning stage, based on the opinions of various related parties, including project owners and sponsors.

- **Preparatory Survey for promoting BOP Business**

JICA supports Japanese companies' BOP businesses as a new approach to resolve issues in developing countries with business initiatives. Preparatory Survey for promoting BOP Business is a scheme for the preparation of BOP business models. The proposals on BOP businesses from Japanese private companies have also been widely called for. The selected companies collect and analyse information on the actual needs of the BOP population in the target countries and prepare their business plans accordingly. Four surveys related to water businesses are being carried out in Bangladesh under this scheme.

- **Small and Medium-Sized Enterprise Partnership Promotion Basic Survey**

JICA introduced the Small and Medium-Sized Enterprise Partnership Promotion Survey (F/S Assistance) in 2012 as one of its support schemes for Japanese SMEs on a trial basis in order to strengthen its

partnership with the Japanese SMEs whose activities contribute to solving problems in developing countries. This scheme assists SMEs that wish to formulate new projects overseas. The name of this scheme was changed to “Small and Medium-Sized Enterprise Partnership Promotion Basic Survey” in 2013, and the scheme is being continued.

- Pilot Survey on Disseminating Japanese Technologies for Social and Economic Development in Developing Countries

Pilot Survey on Disseminating Japanese Technologies for Social and Economic Development in Developing Countries is a new support scheme introduced in 2013 for Japanese companies. The targets of this scheme are only Japanese companies registered in Japan, while the targets of the above-mentioned basic survey scheme are SMEs. The objective of this scheme is to study the applicability of the products, technologies, know-how, systems, etc. of Japanese private companies and other entities in the social and economic development of developing countries through promoting them among relevant persons in developing countries.

- Private Sector Investment Finance

Private Sector Investment Finance (PSIF), which supports development projects conducted by private enterprises, is one scheme of the Loan Aid provided by JICA. Various private enterprises in developing countries can stimulate the economies and create employment in those countries, thereby generating development impacts such as improvements in people’s living standards. PSIF supports these private enterprises in developing countries through the provision of loans and equity. The operation of PSIF resumed in March 2011 based on the New Growth Strategy released in 2010 and other policies of the government of Japan. PSIF is expected to especially support infrastructure projects, BOP businesses, microfinance projects and other social development projects. There are no projects applying for PSIF in Bangladesh.

- Project Formation for SMEs’ Overseas Business Expansion utilizing ODA (commissioned by the Ministry of Foreign Affairs)

Project Formation for SME’s Overseas Expansion utilizing ODA is a scheme commissioned to JICA by the Ministry of Foreign Affairs. Through the collaboration between SMEs’ overseas business development and the assistance to developing countries with ODA, this scheme simultaneously promotes both the solutions of problems in developing countries and the overseas expansion of Japanese SMEs that have excellent products and technologies but need more information and knowledge on overseas businesses. The scheme has two kinds of surveys, the survey for project formation and the survey for needs assessment. Water-related business is one of the target subjects of the survey for project formation, but it is not a target subject of the survey for needs assessment.

- Pilot Survey for Disseminating SME Technologies

Pilot Survey for Disseminating SME Technologies is a new survey scheme of JICA, started in 2013. It aims to verify the effectiveness of Japanese SME technologies in developing countries and to enhance the development outcomes through dissemination of their products. JICA employs proponents who submitted successful proposals to carry out the proposed surveys as a JICA Survey Team. The products used in the survey can be handed over properly to the recipient country. It is expected that the products and technologies of Japanese SMEs are utilized and/or selected in the projects implemented by the recipient governments and ODA projects and disseminated through markets.

- Volunteer Program for Private Sector Partnership

Volunteer Program for Private Sector Partnership is a special volunteer program in which recipient country, dispatch period, job category, tasks, etc. can be customized based on the request from each private company. It is possible for the company to select a country in which it is interested to promote business. The volunteer, a staff of the private company, can learn the local language, culture, technical levels, business customs and needs, and create human networks.

In addition to the above programs and schemes, the JICA Bangladesh Office supports them in Bangladesh and provides useful local information to Japanese companies.

(2) Japan External Trade Organisation (JETRO)

Japan External Trade Organisation (JETRO) is a government-related organisation that works to promote mutual trade and investment between Japan and the rest of the world. JETRO also helps small to medium Japanese firms maximize their global export potential. JETRO provides the following services to Japanese companies:

- Providing business information on the global economy, trade and investment

JETRO provides business information on the global economy, trade and investment through its websites, library, email-based newsletters, etc. JETRO also provides fee-based spot survey services based on the request from a company.

- Offering expert consultation for overseas business promotion

JETRO provides consultation services at its headquarters in Tokyo, overseas offices and business support centres. JETRO also provides fee-based assistance services including making appointments and attendance in business meetings.

- Expanding business opportunities through organizing exhibitions, trade fairs and business missions, providing procurement information, etc.

JETRO holds exhibitions and trade fairs worldwide, in which Japanese manufacturers exhibit their product samples and the parts and products they wish to procure from local suppliers. JETRO also organises and sends missions consisting of the representatives from Japanese companies and foreign institutions to study local investment environments and market conditions.

- Business Matching Service with Trade Tie-up Promotion Program (TTPP)

TTPP is an online business matching service provided by JETRO. After the user registration, a company can register its proposals and search and check other registered business proposals free of charge. TTPP is used by business people in more than 170 countries.

Regarding promotion of BOP businesses, Inclusive Business Team in Trade and Economic Cooperation Division, Trade and Economic Cooperation Department, is responsible for assisting BOP business activities. It provides the following services for free:

- Dispatching Volume Zone Business Mission for finding business seeds by site visits
- Providing survey results on potential needs in developing countries for reference of new business
- Matching between Japanese companies and related supporting organisations (international organisations, NGOs, local companies, etc.)

After the review and approval of a BOP/inclusive business plan, the Inclusive Business Team provides the following services to the selected company in collaboration with the JETRO overseas office and/or BOP coordinator.

- Field survey on acceptability of products or services on behalf of a Japanese company
- Providing local information including candidates of business partners
- Assisting test marketing and/or pilot projects to improve products or services

The Inclusive Business Team also operates websites of the Japan Inclusive Business Support Centre, established by The Japan Ministry of Economy, Trade, and Industry (METI). The aim of the Japan Inclusive Business Support Centre is to help promote inclusive business activities among Japanese companies and other groups. Its key functions are setup and operation of a portal site as a centralized source of information, matching support (support alliances), and consultation services. The related supporting organisations of Japan Inclusive Business Support Centre are JICA, JETRO, SME Support-Japan, IFC, UNDP, UNIDO, USAID, ADB and UNICEF.

Furthermore, JETRO has its Dhaka Office and a BOP coordinator (a local business consulting company) in Bangladesh. They will provide useful local information to Japanese companies who visit Dhaka and actively support the Japanese companies whose BOP/inclusive business plans are approved by JETRO. Local information reports prepared by the coordinator are available at JETRO websites.

(3) Organisation for Small and Medium Enterprises and Regional Innovation, Japan (SME Support, Japan)

Organisation for Small and Medium Enterprises and Regional Innovation, Japan (SME Support, Japan) is a government-related organisation that provides support for SMEs and regional development. It offers practical support measures for aspects of infrastructure, funding, human resources and information regarding various requests and problems of SMEs. From the viewpoint of the development of SMEs, it supports Japanese SMEs' engagement in overseas business development through the following measures.

- Offering senior expert consultation for overseas business expansion

SME Support, Japan has about 300 senior experts specialising in overseas business and specific countries. They can provide consultation services at its offices in Tokyo, Sapporo, Sendai, Kanazawa, Nagoya, Hiroshima, Okayama, Takamatsu, Matsuyama and Fukuoka.

- Supporting exhibitions in collaboration with JETRO

SME Support, Japan provides related information and consultation before and after the exhibitions in collaboration with JETRO. It also supports the translation of SMEs' leaflets before the exhibition and arranges a translator during the exhibition.

- Support for Feasibility Study (F/S)

SME Support, Japan provides financial support (two-thirds of total cost, upper limit 1.2 million Japanese yen) to SMEs for conducting F/S.

- Fund Investment

SME Support, Japan supports smooth fund procurement and revitalization of SMEs engaged in business turnarounds by investing in the funds set up to support SME turnarounds. There are many funds and SME can find a qualified fund through the website of SME Support, Japan.

(4) Embassy of Japan in Bangladesh

The Ministry of Foreign Affairs of Japan has prepared the "Guidelines for supporting Japanese Companies' Overseas Activities" as unified guidelines for Japanese diplomatic offices to assist Japanese companies. The guidelines, revised in January 2012, express the basic policy that Japanese diplomatic offices shall improve the business environment in the countries where Japanese companies are developing their overseas businesses and support each company in order to increase the competitiveness of Japanese companies and to support their activities overseas. Japanese diplomatic offices have to appoint a "Japanese companies support officer" and to announce the name as the contact person. There are two officers in charge of support for Japanese companies in the Embassy of Japan in Bangladesh.

The Embassy of Japan in Bangladesh provides security information by email to Japanese business persons staying in Bangladesh. Japanese business travellers can also receive the security information if they send an email request to the contact address shown on the website of the Embassy of Japan in Bangladesh. In addition to above supports, the Embassy of Japan in Bangladesh provides an opportunity to introduce Japanese products at the reception on the Emperor's Birthday, where Bangladeshi dignitaries such as politicians and business leaders gather. Japanese companies can exhibit their products and/or distribute samples there as their product promotions.

(5) Other Financial Institutions for SMEs

The Shoko Chukin Bank is a financial institution for SMEs. For SMEs that are planning the development of their businesses through overseas expansion, Shoko Chukin Bank provides information on investment environment, loans for overseas expansion, and other supports concerning export and import. Specifically, it provides loans to SMEs that meet the requirements such as category of business and sales, as its support for overseas business expansion called ‘Overseas 21’. The loan can be used as the funds for equipment and operation required by the local company.

Japan Finance Corporation (JFC) is a public corporation wholly owned by the Japanese government, established in 2008 as the result of the merger of four policy-based financing institutions. JFC is a policy-based financial institution that aims to complement financial activities carried out by private financial institutions. JFC also provides information through its local representative offices, etc., and makes loans of equipment and operation funds for the overseas expansion of Japanese companies. There are two types of loans, which are for Business for People’s Living (the upper loan limit is 72 million yen and the upper limit of operation fund is 48 million yen) and SME Business (the upper loan limit is 720 million yen and the upper limit of operation fund is 250 million yen). Special interest rates (more favourable than ordinary interest rates) can be applied if the business satisfies certain conditions. JFC guarantees SMEs’ debts by standby credit and supports SMEs and their local subsidiaries in borrowing long-term funds in foreign currency from overseas financial institutions. As of June 2013, JFC has no partnership with any bank in Bangladesh. However, it has a plan to increase its partner banks in the future, and there is a possibility to utilize the system for business in Bangladesh.

3-2 International Institutions

This section describes the support schemes and available funds of international institutions (such as multilateral and bilateral aid agencies) that have been established for supporting private companies in planning and implementing their BOP businesses in developing countries. This section does not describe their support schemes and funds established to support large PPP projects in developing countries, which were already described in JICA’s final report of the data collection survey on private partnership in the water supply sector (2011).

(1) United Nations Development Programme (UNDP)

UNDP is a UN world-wide development network whose priority areas are 1) eradication of poverty / achievement of millennium development goals, 2) democratic governance, 3) crisis prevention / restoration, and 4) environment / sustainable development. UNDP calls a certain type of business measure an “inclusive business model”, which cross-links private companies and the BOP population for their mutual benefits. UNDP plays a broker-like role in inclusive businesses. Specifically, UNDP conducts four programs including “Growing Sustainable Business (GSB)”, “Growing Inclusive Markets (GIM)”, “Business Call to Action (BCTA)”, and “Global Compact (GC)” as initiatives for BOP/inclusive businesses.

In the GSB program, UNDP supports the establishment of inclusive business models that improve corporate images by facilitating private sector investment, which can contribute to poverty eradication and sustainable development while being commercially sustainable. In this program, dedicated advisors assigned in local offices of UNDP work as brokers between companies expanding their businesses and local governmental institutions and companies. Since its commencement in 2003, more than 50 projects have been conducted in more than 15 countries under the program.

By utilizing the GSB program, private companies can opt for an approach that involves various partners in multiple fields (e.g., government institutions in the target country, citizens, societies, donor communities and investment partners). By involving various partners, they can increase the credibility

of the project and reduce the risk for investment. In principle, investment needs to be made by companies on the basis that it is going to be recovered with their planned profit gain, because GSB is not a financing mechanism. However, GSB can provide supports for surveys and capacity building activities if these supports are essential for the achievement of the project or the project has more public value than merely profit.

A collaborative work for testing Yamaha Motor's small water purification plant in Indonesia in the "Clean Water Project" is one of the previous examples of partnership with a Japanese company in GSB. In January 2013, Yamaha Motor also agreed with UNDP on its utilisation of GSB for a marketing survey of their water treatment equipment with power generator in Mauritania, Africa. In addition, in January 2013, a Japanese SME called Wellthy Corporation, which sells equipment filtrating ground water to produce drinking water, agreed with UNDP on its utilization of GSB. UNDP, in collaboration with Wellthy Corporation, conducted a marketing survey in local communities in Kenya and supported the company in its selection of communities in which to introduce its water treatment equipment and in its establishment of a fund collection scheme in Kenya. In other business fields, Panasonic donated 1,000 sets of solar-powered torches to the Millennium Village Project of UNDP Tanzania Office. Panasonic, through GSB, measured the socio-economic effects of the donated torches on the recipient households and conducted a survey to identify a suitable supply chain in the local situation. There appear to be no previous or ongoing projects conducted through GSB programs in Bangladesh.

BCTA is a global network consisting of private companies, government institutions and development assistance agencies which aims to solve development problems related to poverty eradication, sanitation, environmental prevention, etc. through core businesses, not by charities. Attending companies have opportunities to learn from each other, exchange opinions with government institutions and present their own cases through the UN. BCTA has approved the participation of four Japanese companies (Sumitomo Chemical / Itochu Corporation / Kurkku / Unicharm Corporation) so far. Among these, Itochu Corporation and Kurkku support the organic cultivation of cotton in India to expand their markets in developed countries.

UNDP does not have a database for matchmaking with private companies in developing countries. It also does not have a system to introduce a certain company from the viewpoint of fairness and neutrality as an international agency.

UNDP Tokyo Office provides advice to Japanese companies expanding their business to developing countries, as well as exchanging opinions, and introduces the UNDP office in the target country. Generally, it is possible for experts of the local UNDP office to provide information on local companies. However, according to our interview with UNDP's Country Office in Bangladesh, they usually do not have an expert who does matching between local and foreign companies. Exceptionally, in times of emergency (e.g., Sidr Super Cyclone in 2007), UNDP Bangladesh helps local and international companies and organisations get engaged in supporting the affected people. They usually consider water supply as part of a package for emergency support because UNDP has its focus on disaster management.

(2) United Nations Children's Fund (UNICEF)

UNICEF works for protecting children's lives and promoting healthy growth in more than 150 countries and regions. UNICEF is a worldwide large procurement agency from the viewpoint of private companies because it spends approximately 2 billion dollars per year for procuring goods for protecting children.

UNICEF is inviting eligible suppliers to send Expressions of Interest (EOIs) for the following categories of supplies:

1. Water Collection (e.g., rigs for wells and well pumps)
2. Water Supply/Distribution (e.g., pipes, pumps and water meters)
3. Water Treatment (e.g., filtration, disinfections and mobile treatment units)
4. Water Storage (e.g., tanks and containers)

5. Water Testing (e.g., products for bacteriological, physical and chlorine tests)
6. Hygiene & Sanitation (e.g., portable and fixed latrines)
7. Reconnaissance (e.g., products for geographical and geophysical surveys)

UNICEF believes that the promotion of BOP businesses among private companies creates new partnerships between UNICEF and private companies which can make UNICEF's activities more efficient and effective. For this reason, UNICEF propels initiatives to stimulate innovative product development by private companies (e.g., Innovate for Children). Regarding water-related business, for example, a foldable drinking water container was developed as a countermeasure in emergencies.

UNICEF Tokyo Office, as an office under direct control of UNICEF's headquarters in New York, serves as contact between UNICEF and its partners (governmental partners including the Japanese government and frontline partners such as Japanese academic groups, NGO and experts) while working closely with the Japan Committee for UNICEF.

UNICEF Bangladesh Office implemented a large-scale project for improving water supply and sanitation sanitary education (SHEWA-B), targeting three million people in Bangladesh with the GoB, from 2007 to 2011.

(3) United Nations Industrial Development Organisation (UNIDO)

UNIDO provides programs such as technical transfer, investment acceleration, human resources development, etc. in order to support the industrial infrastructure improvement of developing countries and the countries in transition to market economies for their economic reinforcement and sustainable prosperity. UNIDO's Investment and Technology Promotion Office (ITPO) in Tokyo introduces local partners to Japanese companies through its Investment and Technology Promotion Program and provides services such as arrangement of site visits, etc. as their initiatives for BOP businesses. In addition, it provides information on Japanese technologies to developing countries and information on investment environment in developing countries to Japanese companies through its environment and energy-related technical information platform, the Africa Investment Promotion Agency Network (AfrIPANet), etc. There is a field office of UNIDO, but no country office, in Bangladesh.

(4) International Finance Corporation (IFC)

IFC, a member of the World Bank group, is one of the largest international organisations for development finance in the world that is specialised to support the private sector. IFC provides services such as loan, investment, structured finance (a method of fund procurement utilising partial guarantee, securitisation, etc. of loan or bond), financial instruments for risk management, advisory services, etc. for the development of the private sector in developing countries. IFC has an office in Tokyo with a contact point for BOP business support. IFC, as well as UNDP, regards the BOP population as customers, producers or circulators and willingly supports the inclusive businesses that promote their participation in the creation process of various added values. IFC provides debt and equity financing services and advisory services for inclusive businesses and makes efforts to create a favourable environment for starting and expanding inclusive businesses in cooperation with various partners.

IFC created a fund called "IFC InfraVentures" in 2008 to support and proactively develop private and public private partnership infrastructure projects in the world's poorest countries. It is expected to address major constraints to private investment in infrastructure projects in those countries, including the limited availability of funds and experienced professionals dedicated to private infrastructure project development. IFC InfraVentures can be used for development activities including 1) organizing and evaluating project and prototype feasibility studies and pilot tests, 2) developing financial models, 3) negotiating financial and legal terms, 4) obtaining required permits, 5) selecting and supervising project advisors and counterparties and 6) equity and debt financing for projects. IFC invests up to \$4 million of

project development expenses through InfraVentures.

InfraVentures has been utilised in Bangladesh for establishing small water purification plants in rural areas. IFC invested USD 5 million in equity in 2010-2011 to support WaterHealth International, Inc.'s (WHI) future expansion in India, Bangladesh and West Africa. In Bangladesh, IFC also partnered with WHI and A K Khan Group to establish A K Khan WaterHealth Ltd. (AKKWH) through IFC InfraVentures in 2011 for developing their rural water supply business in Bangladesh. IFC introduced WHI to A K Khan Group first. IFC also made an equity investment of 15% (USD 2.2 million) to establish AKKWH. According to IFC, AKKWH has a plan to install 20 WaterHealth Centres (WHCs) with part of the investment of USD 5 million from IFC to WHI. According to the office of IFC in Dhaka, more financial support may be given by IF to AKKWH if their business at these 20 WHCs is successfully established.

AKKWH is the first and only company to receive support from IFC through InfraVenture in Bangladesh. The advisory and financial support of InfraVenture can be given to the businesses in their preliminary stages that are expected to have high development impacts or the businesses including research. According to the interview of IFC's office in Dhaka, Japanese water-related companies can also apply for InfraVenture for new water-related businesses in Bangladesh. However, the office of IFC in Bangladesh does not prioritize the water and sanitation sector in Bangladesh in their support program for the country. IFC's Sub-national Finance Program to reduce the off-take risk with local municipalities has not been exploited in Bangladesh. IFC has many experiences with this program in India.

(5) Asian Development Bank (ADB)

ADB concentrates their activities in five fields of expertise (i.e., infrastructure, environment including climate change, regional cooperation and integration, financial sector development and education) in order to reflect the needs of its member developing countries and the advantages of ADB and supplement the activities of its development partners. ADB works on reducing the initial risk and formulation costs of inclusive businesses by establishing partnerships with domestic or foreign companies and special funds required for inclusive businesses. ADB has already proposed two financial institutions for i) Indonesia, Myanmar and Philippines and ii) India and Sri Lanka in order to establish various funds for inclusive businesses. ADB provides information to many Japanese companies and citizen groups interested in inclusive businesses and exchanges opinions with them through its resident office in Japan. ADB also has a field office in Bangladesh. ADB has been assisting the GoB in improving their mechanisms and regulations for supporting PPP projects in Bangladesh. Currently ADB provides institutional support to the WSS sector, which includes the establishment of clear procedures to increase the water tariffs interrupting the formulation of PPP water supply projects in Bangladesh.

(6) United States Agency for International Development (USAID)

USAID conducts overseas economic assistance, which is one of its important diplomatic measures. USAID has an office in Tokyo for promoting cooperation between Japan and the U.S. and providing an inquiry service for BOP businesses.

USAID has initiatives for BOP businesses, which are GDA (Global Development Alliance), DCA (Development Credit Authority) and DIV (Development Innovation Ventures), in order to achieve development goals in its target countries. In GDA, the USA supports projects for socio-economic improvement in developing countries in collaboration with the private sector and has around one thousand experiences of PPP with around three thousand partners. Any companies in any countries can use the support of GDA. GDA can cover a maximum of 50% of the project cost. GDA provides support for one year but it can be renewed annually. USAID's office in Bangladesh is in charge of GDA in Bangladesh. In the case of P&G, which sold water purification powder (PuR) in some countries including Bangladesh, USAID headquarters (but not USAID's office in Bangladesh) supported the

company globally. (The Department for International Development (DFID) in the U.K. also has initiatives for BOP businesses which may be applicable for Japanese companies. DFID had supported P&G for its low price sale of PuR in Haiti through the Business Linkage Challenge Fund (BLCF), started in 2000.)

USAID's office in Bangladesh has not conducted matchmaking between international and local companies yet. But they are interested in organizing matchmaking opportunities. However, according to USAID's Bangladesh Country Development Cooperation Strategy 2011-2016, USAID does not place high priority on supporting the WSS sector in Bangladesh and allocates a small amount of its budget for the sector.

DCA provides credit guarantees to reduce risks of investing private funds in development projects in developing countries. USAID's Office in Bangladesh is in charge of DCA in Bangladesh. DIV established its Development Ventures Fund to collect external ideas and provide subsidies to selected partners in order to create innovative measures for solving development problems. DIV is a global support operated by USAID's headquarters, but USAID's office in Bangladesh is not involved in DIV.

Chapter 4 Previous Water-related PPP Projects and BOP Businesses in Bangladesh

4-1 Previous Water-related PPP Projects in Bangladesh

(1) Dhaka Water Supply & Sewerage Authority (DWASA)

DWASA has a labour union called Collective Bargaining Agent (CBA) that is very powerful and used to oppose PPP projects such as management contracts. The labour union is currently handling service contracts of billing and collection on behalf of DWASA in some slum areas. The labour association is collecting commission fees from the contractors and providing some portion of the commission fees to DWASA. However, according to DWASA, the resistance of the labour union to PPP projects has been softened.

Dhaka Water Supply Sector Development Project (DWSSDP), which has been funded by ADB and the GoB, started in 2008. In this project, 88 District Metered Areas (DMAs) will be established to rehabilitate the existing water supply pipe network in Dhaka City. Currently, 6 contract packages of DWSSDP are under construction. According to DWASA, one Chinese, one German, one Spanish, two Indian and one Bangladeshi company have been selected as primary contractors through international competitive biddings (ICBs). The Indian companies are working as a joint venture with Bangladeshi companies. The Chinese and German companies are working with local agents. The Spanish company is trying to have a local partner. They are currently implementing these packages. According to DWASA, 4 more similar contract packages will soon be open for ICBs. Therefore, Japanese companies may be able to conduct a pilot project for supplying drinkable piped water with DWASA in an isolated DMA.

DWSSDP also includes the procurement of 200,000 water meters. A consulting company from Denmark prepared high specifications for the water meters (C-class). Out of the 7 companies that joined the ICB for procuring the water meters, only two German companies were qualified. These two German companies were awarded for 50,000 water meters. According to DWASA, Japanese companies still have chance to participate in a bid for the remaining 150,000 water meters.

Furthermore, ADB and DWASA are planning a project to construct a WTP in Gangapur in order to improve water supply conditions in Dhaka. After a study on the feasibility of private equity investment for this project, ADB concluded that private investment for this project would be difficult to recover due to the low water tariff of DWASA. Thus, this project is being planned as a public sector investment project to be financed by ADB, Agencie Française de Développement (AFD) of France, the European Investment Bank (EIB) and the GoB. However, according to ADB seeking the possibility of PPP, the WTP in Gangapur may be operated by the contractor that designs and constructs the WTP, based on the performance requirements specified in a management contract. The treated water would be sold to DWASA at the outlet of the WTP based on an off-take agreement. In a management contract of Saidabad WTP (after its first phase construction), the operation of the WTP was handed over to DWASA two years after the commencement of its operation. After the handover, DWASA has been operating the WTP without significant problems. Meanwhile, ADB also considers setting the period of management contract for the WTP in Gangapur at around 15 years because the WTP may be designed by the contractor only to last for a short period if the handing over after a short operation is planned. Management contracts for a short period may be easier for Japanese companies to handle.

As explained in 2-2 (3), the WASA Act of 1996 requires WASA to obtain an approval from the GoB prior to raising its water tariff more than 5% in one year. However, the approval process is not clearly defined and it has not been possible for WASAs to raise their water tariff more than 5% in practice. In addition, the recent price inflation rate is more than 5%, and DWASA needs to shift its water resources to surface water, which costs more for treatment. Thus, the management environment of DWASA will become worse and the cost recovery level will not be sufficient with the current water tariffs. ADB and DWASA have proposed an increase of the maximum annual water tariff from 5% to 10% but the GoB, preparing for the upcoming nationwide election, has not agreed. Consequently ADB has recently started Technical

Assistance (TA) for the policy-related matters in the WSS sector, including the clarification of the approval process for raising WASAs' water tariffs more than 5% in a year.

(2) Department of Public Health Engineering (DPHE)

DPHE started Bangladesh Water Supply Programme Project (BWSPP) in 2004 with the financial support of WB. They initially planned to develop 300 rural piped water supply schemes; however, only 21 rural piped water supply schemes have been implemented under BWSPP. In each of these rural piped water supply schemes, 70% of the initial cost was covered by DPHE as a grant aid and 20% was covered by the sponsor. The remaining 10% was covered by the community. The sponsors of these schemes are mainly local NGOs and include some local companies. Since 70% of the initial cost was covered by DPHE, BWSPP is not a typical PPP project (hereafter called "PPP-type" project). The initial cost of a piped water supply system is around Tk. 20,000,000 for about 8,000 houses on average. About 80% of the served households in the 21 schemes of BWSPP receive water through single-tap house connections. The remaining 20% receive water through multiple-tap house connections and there are a few commercial connections (e.g., factories, etc.). BWSPP ended in 2010, but the operation of the 21 rural piped water schemes established in BWSPP has continued. Each household pays Tk. 150 to 400 per month, depending on the size of the household in these schemes. Since the electricity prices have recently increased some 300%, the price of water in these schemes needs to be revised.

According to DPHE, around 80% of the 21 projects have been successful. However, there are various problems in these 21 schemes. One of the common issues among many schemes is that many customers don't pay water charges in time because, according to them, they are not satisfied with the water supply services. DPHE feels that local administrations also need to take action against the delinquency. The limited number of customers is also a critical problem in the failing schemes. Some of the schemes have a very limited number of customers (e.g., 50 to 70 households) and have difficulty in operating and maintaining their facilities because their revenue from customers is too small. The sponsors of these schemes may need to hand over their operations to the communities (CBOs).

In 2012 DPHE, with the help of WB, started another project called Bangladesh Rural Water Supply Sanitation Project (BRWSSP). This project targets the 383 unions where less than 40% of the population has access to safe water (areas affected by arsenic pollution and salination). The consultants for this project will identify the suitable areas for 125 PPP-type rural piped water supply schemes and 20,000 point sources such as tube well, rainwater harvesting, pond sand filter, etc. The proposals of 15 rural piped-water supply schemes have been drafted out of the 125 rural piped-water supply schemes. A few schemes out of the 15 drafted schemes are going to tendering process soon. The tendering for the remaining schemes will be covered within 4 years. In BRWSSP, the initial investment for each piped water supply scheme will also be covered by DPHE, sponsor and users at 70%, 20% and 10%, respectively.

In BWSPP, the sponsors made project proposals and planned and designed rural piped water supply schemes. However in BRWSSP, consulting firms will select project sites of rural piped water supply schemes and will plan and design the required facilities for better targeting of beneficiaries and facility/service quality control. In BWSPP, technical assistance was not provided to the sponsors of the rural piped water supply schemes and there was no competition among potential sponsors for each piped water supply scheme. These problems have been solved in BRWSSP. The cost recovery period of rural piped water supply schemes will be set at 12 to 15 years, while that of BWSPP was 18 years. Social awareness creation is very important for rural piped water supply schemes, especially for getting sufficient customers to make the operation feasible. DPHE will provide 75% of the salary of a social development officer, who will be in charge of social awareness creation for each of the 125 schemes to be implemented in BRWSSP, from the project costs (while the sponsor must pay the remaining 25%). This will increase the number of connections in each scheme.

(3) Bangladesh Export Processing Zones Authority (BEPZA)

Currently there are eight export processing zones (EPZs) in Bangladesh: EPZ-Chittagong, EPZ-Dhaka, EPZ-Mongla, EPZ-Ishwardi, EPZ-Comilla, EPZ-Uttara, EPZ-Adamjee and EPZ-Karnaphuli. The Bangladesh Export Processing Zones Authority (BEPZA) is the official organ of the government to promote, attract and facilitate foreign investment in the EPZs. The primary objective of an EPZ is to provide special areas where potential investors may find a congenial investment climate, free from cumbersome procedures. BEPZA provides security, utilities and one-stop service for the companies in EPZs. All the lands in Dhaka, Chittagong, Adamjee, Comilla, and Karnaphuli EPZs are already occupied or reserved and there is no land for new industries. Uttara, Ishwardi and Mongla EPZs have lands for new industries. The number of existing companies in Uttara and Mongla EPZs is not high. There are industrial and drinking water treatment plants (WTPs) in five EPZs (except for Uttara, Ishwardi and Mongla EPZs). There are two operating central effluent treatment plants (CETPs) in Chittagong EPZ and Dhaka EPZ. All of these systems are established in PPP as service oriented Build-Own-Operate (BOO) projects.

D-Water Tech (Bangladesh Company) and Flagship Ecosystems (Singapore Company) established a joint venture (JV) company called D-Water CETP EcoSystems (BD) Limited for their PPP business of CETP in Dhaka EPZ. The JV company has constructed and is operating the CETP (43,000 m³/day) in Dhaka EPZ. D-Water Tech Ltd. is currently finishing the construction of a WTP (using a RO system of 600 m³/hour) in Chittagong EPZ. When this WTP begins operation, Chittagong WASA will stop its water supply to Chittagong EPZ so that they can divert the water to other areas. Most of the EPZs including Chittagong EPZ provide water to the companies in their EPZs at the price of Tk. 22.43/m³. The selling price of the treated water from D-Water Tech Ltd. to Chittagong EPZ was set previously at Tk. 14.3/m³, but this price will be revised after starting the operation because of the huge increase in electricity.

Sigma Pumps Ltd. (Bangladeshi company) has constructed and is operating WTPs in Karnaphuli EPZ (using a RO system of 400m³/hour), Adamjee EPZ and Comilla EPZ. Sigma Pumps Ltd. is also constructing a CETP in Comilla EPZ.

Chittagong Waste Treatment Plants Ltd. (CWTP) has constructed the CETP in Chittagong EPZ and started its operation in August, 2012. The capacity of this CETP is 45,000m³/day. Currently this CETP treats around 35,000 m³/day. Fifty-four of the 171 existing operating companies in Chittagong EPZ have already joined in the operation of CETP by paying effluent treatment charge. The effluent treatment charge is Tk. 44.79/m³ for the companies dying and washing textiles (full charge). The companies conducting only washing need to pay 50% of the full charge. The companies neither dying nor washing textiles need to pay 15% of the full charge. IDCOL played the role of arranger in the CETP at Chittagong CEPZ and approved an amount of Tk. 100 million to finance the project.

(4) Water Utilities serving Slums (Partnership with NGOs and CBOs)

There have been successful cases of operation of water points in urban slums by the NGOs or the CBOs, which buy water from the public utilities and sell it to the users. Until recently, most cities did not permit households without legal entitlement to land to access water supplies. In Dhaka, where 35 percent of the city's 14.8 million population lives in slums and squatter settlements, this meant that residents unable to demonstrate ownership of the land on which they resided were not entitled to services by DWASA. In 1992, a NGO called Dushtha Shasthya Kendra (DSK) started to act as an intermediary between DWASA and the slum communities. DSK argued for the separation of access to water supply from ownership of land. It made security deposits to guarantee bill payments by the communities. DSK worked with the communities to improve community capacity to manage water points, ensuring regular bill payments. In 2008, a landmark agreement was secured with DWASA whereby CBOs were allowed to apply for water connections on their own behalf, without an intermediary. NGOs may still help the formulation of CBOs and their application for the connections to the utilities. Slum dwellers usually pay based on the same tariffs used for other domestic customers. Today, the same scheme is being rolled out across the

country. In a pilot project of KWASA, the slum dwellers not having land ownership can apply for yard taps to be shared with neighbouring households through their CBO. KWASA sells piped water to the CBO based on the reading of a buck water meter, and the CBO manages water supply to water users within their area.

According to its citizen charter, DWASA expands its pipe network to reservoirs with group taps in slums if CBOs in the slums apply for water supply connections. The reservoirs usually get filled with water at night. Similar arrangements are made between slum dwellers and other WASAs, including Khulna WASA and Chittagong WASA. Smaller peri-urban slums can be served rather easily by extending small diameter distribution lines to them. However, supplying water to large peri-urban slums is more difficult due to the needs for large distribution lines and a large amount of water. In the future, like the PPP projects of RAJUK in the high-income residential areas outside the existing urban areas of Dhaka, private companies may expand and operate distribution sub-networks outside the existing service areas for the unserved population, including those in large peri-urban slums.

(5) Others

Regarding industrial areas, IFC is carrying out a program called Bangladesh Water PaCT: Partnership for Clear Textile. This program includes the establishment of Textile Technology Centres through which different stakeholders (vendors, policy makers, donors, etc.) can be linked and have dialogues for reducing water foot-printing (consumption), establishing ETP and WTP, recycling and reuse of water, and importing foreign technologies with tax exemptions. A few foreign makers of water treatment facilities are offering their support (e.g., donation of their facilities) as their CSR activities through the dialogues. However, there are no Japanese companies that have participated in the program.

4-2 Previous Water-related BOP Businesses in Bangladesh

(1) JICA's Preparatory Surveys for Water-related BOP Businesses

Table 4-1 shows the four preparatory surveys for applying Japanese water related technologies in Bangladesh. These surveys are currently supported by JICA in its framework of preparatory surveys started in 2010 for promoting BOP businesses

Table 4-1: JICA's On-going and Completed Preparatory Surveys for Water-related BOP Businesses in Bangladesh

Adopted Year	Main Surveying Company	Cooperating Company	Survey Name (not official name)
2010	Institute on Sky Water Harvesting Co., Ltd.	Padeco Co., Ltd.	Feasibility Study on a Rainwater Tank Social Business with Micro Credit Loan
2011	Nippon Basic Co., Ltd.	Yachiyo Engineering Co., Ltd.	Preparatory Survey on a Water Business with Water Purifiers mounted on Bicycles
	Original Engineering Consultants Co., Ltd.	Iwasaki Electric Co., Ltd.	Preparatory Survey on a BOP Business for Safe Water Supply in Bangladesh
2012	A-WING International Co., Ltd.	-	Preparatory Survey for the Market Development and Local Production of Mini-Desalination Apparatus equipped with Wind and Solar Power Generators

The outlines of the preparatory surveys listed in the table are as follows:

Feasibility Study on a Rainwater Tank Social Business with Micro Credit Loan: It is intended to promote rainwater harvesting as an alternative water source for poor people in the coastal areas suffering from salination and arsenic contamination. The dissemination of high-quality and low-cost rainwater tanks has been tried in this survey.

Preparatory Survey on a Water Business with Water Purifiers mounted on Bicycles: Utilizing Water Purifiers mounted on Bicycles, they produce bottle water and jar water at a suburb of Dhaka and try to sell them to poor people at a low price.

Preparatory Survey on a BOP Business for Safe Water Supply in Bangladesh: This survey has been considering the sales of various types of water treatment equipment that can produce safe water at low prices by utilising the sterilizing effects of ultraviolet (UV) lamps.

Preparatory Survey for the Market Development and Local Production of Mini-Desalination Apparatus equipped with Wind and Solar Power Generators: A pilot project is being prepared to introduce small-scale desalination systems utilizing wind and solar power in the non-electrified areas suffering from salinity and arsenic contamination.

Although all of these surveys were ongoing when the survey team visited Bangladesh, lessons learnt from the processes of these surveys are very useful for Japanese companies trying to start their water-related businesses in Bangladesh. The study team reviewed the inception and progress reports of these surveys and interviewed the Japanese manufacturers and consultants carrying out these surveys. The study team also visited some of their project sites. The lessons learnt from these surveys and the suggestions from them are reflected in Chapter 5 of this report.

(2) Water-related Businesses of Other Japanese Companies

Samurai Water

Samurai Water is a Japanese pioneer of water-related business in Bangladesh. It was established by Mr. Nishimura in 1999. When he visited Bangladesh, he found that the quality of bottled water was very bad and decided to start a bottled and jar water business with Japanese water purification technologies. It took around seven months from the registration to the Board of Investment (BOI) in Bangladesh to the sales of his purified water. Avoiding trouble with a Bangladeshi partner, Samurai Water was established as a 100% foreign-owned company.

Samurai Water sold its water to five-star hotels as an opportunity to build its high reputation. After Samurai Water started becoming famous among foreign residents, the company could make business deals with restaurants in the residential areas for foreigners. Although the price of Samurai Water is higher than other bottle and jar water, many Japanese and foreigners prefer Samurai Water with its advanced Japanese Technology.

In addition to the delivery of jar and bottled water to Japanese residences, hotels and restaurants, the rental of water purifiers with Reverse Osmosis (RO) membranes is becoming a main business venture of Samurai Water. There are needs for high quality purifiers in Dhaka, and Samurai Water rents the water purifiers to foreign residents with maintenance services. Currently its customers are not only in Bangladesh, but also in the United Arab Emirates (UAE), Iran, Pakistan, Uzbekistan, Singapore, Indonesia, Laos, etc.

The success of Samurai Water is based on the president's (Mr. Nishimura) perseverance and continuous efforts to educate local staff. When he started Samurai Water, only two out of the fifteen local staff members could speak English and the communication between him and his staff was very difficult. Moreover, his staff had difficulties understanding Japanese customs. Therefore, Mr. Nishimura taught them how to take off their shoes, greet and clean up at the beginning. As a result of his constant efforts, his staff currently report to him even when he is out of Dhaka.

Nippon Poly-Glu Co., Ltd.

Nippon Poly-Glu Co., Ltd. was established in Osaka in 2002. It has developed a new type of water purification agent (PG α 21 series) using polyglutamic acid, which is the sticky component of natto. When Cyclone Sidr struck Bangladesh in November 2007, Nippon Poly-Glu provided 100kg of PG α 21Ca (equivalent to 63,000 yen) to the International Lions Club in Dhaka in response to their request for their disaster management activities. It was their entry point into Bangladesh. The Bangladeshi side recognized the high performance of PG α 21Ca based on its usages at various sites and requested Nippon Poly-Glu to sell them an additional 300kg. This request resulted in the business development of Nippon Poly-Glu in Bangladesh. There were concerns that local people might not buy the water purification agent because they usually use contaminated water for free. However, the sales of the water purification agent were increased gradually by ensuring the safety of its use through the efforts of their women staff called "Poly-Glu Ladies" in face-to-face sales and product demonstration.

Nippon Poly-Glu has established a 100% foreign-owned company, Japan Poly-Glu (BD) Ltd., as its subsidiary in Bangladesh. A Bangladeshi works there as its representative. Currently, they are expanding their water selling business in collaboration with a local water-related company called D-Water Tech. They produce purified water with the water purifying agent (consisting of stainless steel tanks, etc.) in their water treatment plant in Barguna, a southern region of Bangladesh. Their staff, called "Poly-Glu Boys", brings the water to their customers such as households and offices and fills their containers with the purified water at the sites. Poly-Glu Ladies are responsible for collecting payment and public awareness activities.

Nippon Poly-Glu has a plan to expand its water selling business model to other rural areas in Bangladesh. Its proposal, "Feasibility study on simple rural piped water supply business in Bangladesh", was selected as one of the project formation surveys carried out with the commission expenses for overseas economic cooperation projects as part of the ODA in the fiscal year 2012. Nippon Poly-Glu has also begun its market research services with Poly-Glu Ladies for other companies' BOP businesses.

(3) Grameen Veolia Water Ltd. (GVW)

Grameen Veolia Water Ltd. (GVW) was established in 2008 as a Joint Venture between Veolia Water (covering 83% of the capital investment) and Grameen Healthcare Services Ltd. (covering 17%). GVW conducts only social businesses, which is part of the CSR activities of Veolia Water. Veolia Water is currently operating in 92 countries but they have not conducted any commercial projects in Bangladesh. The WTP of GVW (see Photo 4-1) is situated in Goalmari Village (about 50km away from Dhaka) in Daudkandi, Comilla District. This WTP treats the water from Meghna River at the riverside. GVW initially planned the supply of arsenic-free drinking and cooking water for 100,000 people in the areas where 83% of shallow tube-wells are contaminated with arsenic. GVW planned to have five projects, each covering 20,000 people. GVW has already implemented two projects covering about 40,000 rural residents and started a new business of producing jar water at the WTP and selling the jar water in Dhaka in order to create a cross-subsidy for the rural water supply projects. The capacity of the main water treatment process of the plant is 10,000L/hour. Currently, about 145,000L/month is delivered to the tap points and about 200,000L/month is sold as water jars. The capacity of the plant is much more than the current supply amount. GVW is going to implement the remaining three projects in the future.

The total length of the pipes installed in the two rural projects is about 10 km. There are 55 tap points, including 43 stand posts, 11 house connections for relatively high and medium income level households and 1 school connection. One lady dealer stays at each stand post (yard tap) during certain time periods every day (e.g., 8:00 to 10:00 in the morning and 5:00 to 8:00 in the evening). The lady dealers fill the water vessels brought by their customers and collect the payment on site based on the metered volume of provided water (e.g., Tk. 2.5 for a 10L vessel and Tk. 3.0 for a 12L vessel). The lady dealers get Tk. 0.5 out of Tk. 2.5 for 10L as commission. The lady dealers can get more commission if they sell more water.

GVW sells prepaid coupon tickets to make payment at the stand posts easier. The price of water is Tk. 2/10L for the house connections and the school connection (without commission to the lady dealer).



WTP of GVW



Water Intake Tower of the WTP



Filters of the WTP



Bottle Filling Machine for Jar Water

Photo 4-1: Water Purification Plant (WTP) of Grameen Veolia Water Ltd. (GVW)

The number of customers varies seasonally. Most of the people living in the target villages are poor. They have work for 4 to 6 months during the cultivation period. Some villagers have work longer, up to 8 months. When they have work, they can pay for the water; when they don't have work, they cannot buy the water. During the rainy season, their customers often use rainwater. GVW does not recommend the villagers using safe rainwater to use GVW's water during the rainy season and sometimes teaches them how to store rain water safely. The customers without sufficient income often use boiled or alum-treated river water and contaminated tube-wells for drinking. However, in the dry season when rain water and river water are not available, more customers come to the stand posts to buy the water.

The capacity of the plant was designed to supply drinking water and cooking water, but in reality their customers usually buy the water of GVW only for drinking (2 to 3 litres or less per day per person). The other problem is that they use the water of GVW for drinking only at home three times a day (breakfast, lunch and dinner). They don't carry the water outside their houses. When they are working outside, they often drink contaminated water around their workplaces. Therefore, the volume of GVW water that they use for drinking is limited. GVW originally installed each stand post targeting around 60 to 100 households. However it was observed that only around 10 to 15 households around each of the stand post come to buy the water. Therefore, GVW has installed 22 tap points recently, targeting 10 to 15 houses for each.

GVW also has difficulty in attracting customers because many rural people keep using contaminated tube-wells. These people use the contaminated water because arsenic is a tasteless and odourless material and its harm appears only after a long period of ingestion. GVW has 6 social staff (1 supervisor and 5 field staff) to implement awareness-building campaigns required to promote the use of safe water, in addition to 7 technical staff and 6 management staff. Many education materials (banners, posters, leaflets, etc.) and various activities (courtyard meetings, drama, rallies, singing, video shows, etc.) are required to effectively and continuously raise public awareness.

The WTP also produces 20L-jar water (600-650 jars/day) with additional treatment processes (UV, Ozonation and RO) and sells the jar water in Dhaka to make a cross-subsidy for the water supply in the villages. The jar filling machine for the jar water (see Photo 4-1) was brought from India and the RO membranes were brought from the USA. The price of one 20L-jar water is Tk. 70. GVW does not sell bottled water because bottles are not environmentally friendly. The water jars can be used about 10 times and recycled later. Although the transportation of the jar water to Dhaka (50 km) using a special boat is difficult, the distribution of the jar water in Dhaka is not so difficult for GVW. GVW currently sells around 500 jars of water a day but it already has demand for around 2,000 jars. The sales of jar water are expected to increase a lot soon. According to GVW, the price of water (except for the commission of lady dealers) in the villages would be reduced to Tk. 1 for 10L if the cross-subsidy with the sales of jar water in Dhaka goes very well.

(4) A K Khan WaterHealth (Bangladesh) Ltd. (AKKWH)

As already explained in 3-2 (4), AKKWH was established in 2011 as a joint venture between WHI and A K Khan Group through IFC’s special fund called InfraVentures. Initially AKKWH had a plan to establish 20 WHCs (see Photo 4-2) in rural areas in Bangladesh with the financial support from IFC. AKKWH has also recently agreed with a large NGO called BRAC that BRAC provides 60% equity while AKKWH covers the remaining 40% (partly with the equity investment from IFC) for their first 50 facilities in 2 to 3 years. AKKWH spent two years making this agreement with BRAC because BRAC has to check many different aspects carefully. BRAC provides AKKWH with not only financial support but also technical support for building public awareness of safe water in rural areas.



WaterHealth Centre (WHC)



A Jerry Can used at WHCs



Water Treatment Equipment inside a WHC



Washing the inside of a Jerry Can

Photo 4-2: WaterHealth Centre (WHC) of A K Khan WaterHealth (AKKWH)

AKKWH has already started the commercial operation of two WHCs in rural areas (i.e., Shitakunda and Raojan) having iron, arsenic and/or saline problems near Chittagong in 2012 and one package jar water plant (including a water quality test laboratory) in Chittagong City in 2013. AKKWH works with one distributing company to sell 20L packaged/sealed jar water in Chittagong City. The purified water of AKKWH is called Dr. Water, which is the same as the name of WHI's purified water. AKKWH has recently decided to establish 21 new HWCs in rural areas. They are currently conducting a feasibility study on the 21 WHCs and two jar water plants to be established near Dhaka (Tongi and Noakhali).

AKKWH has also sold three WHCs to a NGO called Friendship as desalination plants having RO membranes in south eastern areas of Bangladesh with the help of IFC's investment of USD 5 million. AKKWH will sell two more WHCs to Friendship later. The selling price of a WHC in Bangladesh is around USD 6 million including its land and construction of the modular building. USD 1.5 to 2 million out of the USD 6 million is for the series of treatment equipment having the capacity of 2,000 L/hour. With an additional USD 1 million for the water treatment equipment, the production capacity can be increased to 4,000L/day later without expanding the modular building.

There are 35 on-role staff (director, managers, office staff, etc.) and 30 out-role staff (plant operators, cleaners, security guards, etc.) in AKKWH. Twelve out of the 35 on-role staff are social staff. Two operators and one ROC (off-role social staff) are allocated to each WHC. The ROC of each WHC finds and registers the customers and communicates with them.

Each ROC also sets the service charge of the delivery service provider (DSPs) for each customer requiring delivery service in consideration of the distance from the WHC and the floor level of the customer. The DSPs at each WHC are registered and appointed by AKKWH. Their delivery charges, decided by the ROC, have a price limit (i.e., Tk. 5 to 15 for 20 L covering 15 to 20 km in distance at maximum).

In India, WHI is building around 20 new WHCs a month and has already successfully built around 500 WHCs. However, it is difficult for AKKWH to attract rural customers through the over-the-counter sales at WHCs in Bangladesh, unlike in India and Africa. In India and Africa, rural people usually travel a long distance to come to WHCs and make queues to buy the pure drinking water, but in Bangladesh, rural customers usually don't travel to WHCs to buy the pure drinking water. According to AKKWH, people in many rural areas in Bangladesh seem to have enough money to buy safe drinking water, but their mindset is a problem. They usually don't want to buy safe drinking water because it's not their custom to buy water. In Bangladesh, rural people are very much used to using deep tube-well water. Moreover, the government institutions and NGOs in Bangladesh are very active in providing villagers with access to safe water. These are among the reasons they usually don't travel to buy purified water. Therefore, purified water is currently delivered in unsealed water jars and plastic jerry cans to the majority of their customers with rikisha vans. For example, each of the WHCs in Shitakunda and Raojan currently sells only around 2,000L/day although the capacity of each WHC is 1,000L/hour. In Shitakunda and Raojan, only 30 to 40% and 15 to 20% of the water is sold over the counter, respectively, and the rest is sold by delivery service with rikisha vans.

AKKWH sells the purified water at Tk. 1.0/L at the WHC, excluding delivery charges in rural areas, and at Tk. 1.5/L, including free delivery (i.e., Tk. 30/20L) in the city. These WHCs are currently operating with financial losses. Therefore, Tk. 1 out of the Tk. 30/20L gained from selling water in a sealed jar in Chittagong City is used as the cross-subsidy for the WHCs in rural areas. As already explained, AKKWH has its own social staff to build public awareness of safe water and promote their purified water. However, AKKWH needs financial and technical support from BRAC to further increase the awareness and sell enough water to sustain their business. BRAC may cover Tk. 5 out of Tk. 20/20L for their customers so that AKKWH can sell more water at the reduced price to more customers. BRAC will also conduct activities to increase customers. BRAC is trying to reach the break-even point (no profit, no loss) as a NGO.

WHC is a modular-type water treatment plant, which can be built fast. This aspect is very important to increase the number of decentralized water treatment plants quickly. However, other procedures, such as

applying for a new electricity connection, may take longer in reality. WHC can treat brackish water as long as its TDS is less than 5,000 (recommended quality is less than 3,000 in TDS). The existing WHCs in Bangladesh use groundwater. WHCs can also treat river water and pond water very well. WHCs purify water with advanced technologies (see Photo 4-2) including RO membranes (when necessary) and their original technology, called UV Waterworks (UVW). The water treatment processes are often modified based on the quality of water source.

The WHCs keep the level of TDS from 70 ppm to 80 ppm because BSTI recommends this range as better for human health. The WHCs encourage their customers to buy at least two clean 20L plastic jerry cans (see Photo 4-2) or jars at discounted prices to avoid after-sales water contamination. The operators of the WHCs wash the inside of jerry cans, jars or other types of vessels with chemicals for quality control (see Photo 4-2). If customers come with their own vessels having unknown capacity, the operators measure the amount of water with a water meter.

A.K. Khan is a very famous name in Bangladesh and the price of AKKWH's sealed jar water is only Tk. 30/20L, while the other jar water companies having BSTI approval in Chittagong sell 20L jar water at Tk. 50 to 70/20L. (The jar water companies operating without BSIT approval usually sell 20L jar water at Tk. 15 to 20/20L in Chittagong). So the sealed jar water of AKKWH is expected to sell well in urban areas.

(5) HYSAWA/SIEMENS

HYSAWA is a non-profit company operating with its own funds and financed by multiple donors including DANIDA (main donor), AusAID and Switzerland Development Cooperation (SDC). HYSAWA is also partly financed by GoB. HYSAWA is working in only the following areas having difficulties in accessing safe water.

- Areas having low and declining groundwater tables
- Areas having saline in groundwater
- Areas having a high concentration of arsenic in groundwater
- Hill track areas

The grant aid from AusAID covers their projects in the three coastal districts around Khulna. HYSAWA has implemented 13 pilot projects in Morelgonj Upazila in Khulna Region, where quality ground water is not available and surface water is contaminated. These 13 pilot projects use an upstream filtration apparatus called SkyHydrant, which is made by a German company called SIEMENS, for treating pond water instead of conventional pond sand filters. HYSAWA does not support the use of pond sand filters because pond sand filters are difficult to maintain appropriately and after approximately 6 months many of them will no longer be used. SkyHydrant is promoted by a NGO based in Australia (Sky Juice Foundation). An agent of Sky Juice Foundation established an office in Khulna for HYSAWA's schemes with SkyHydrant in the coastal areas.

The initial cost of one SkyHydrant project, which is around Tk. 1,000,000, is 100% covered by HYSAWA funds. One SkyHydrant project can produce around 5,000L/day and can cover 100 to 150 households. The beneficiary households have to pay Tk. 60 per month for buying around 30L/day/household of the filtered water. According to HYSAWA, the collection of Tk. 60 per month from each household is enough to cover the reasonable O&M costs of SkyHydrant, including electricity bill, operator salary and filter change. SkyHydrant is used with an underground rainwater tank with a capacity of 50,000L. During the dry season (3 to 4 months), SkyHydrant can be operated with the stored rainwater.

HYSAWA planned 54 new projects in Khulna, Satkhira and Bagerhat Districts in Phase 2 of the HYSAWA AusAid Project.

(6) Others

UNDP conducted a pilot project of the rural piped water supply in Rajshahi District around 20 years ago. Barind Multipurpose Development Authority (BMDA), a governmental research institution, has been operating the deep well and the piped water supply system constructed in the project and paying the salaries of its staff from the revenue from supplying irrigation and drinking water.

In this pilot project, they use prepaid smart cards (each farm family has one smart card for irrigation water and each community has one smart card for drinking water) to operate pumps for supplying irrigation water to their lands and drinking water to their community. The CBO of each community decided the types of water supply facilities within the community and the different water charges for different alternatives (e.g., stand posts, house connections, etc.) and different supply amounts (e.g., size of overhead tank) for each household. In this pilot project, one yard water tap was installed for every 5 households to share for those preferring to use yard taps. For example, a community may get water three times a day for drinking using their prepaid smart card in this pilot project.

However, in consideration of the increasing water demand and declining groundwater tables in Bangladesh, it is recommended not to pump up groundwater from the same deep well for both drinking and agricultural purposes.

Chapter 5 Challenges of Japanese Companies in their Development of Water Businesses in Bangladesh

5-1 Common Issues related to BOP Businesses

The following general issues exist when Japanese companies develop their businesses in developing countries according to the lessons learnt from JICA's BOP business support, SMEs' experiences of overseas businesses and Japanese companies' previous water-related businesses in Bangladesh;

- A) Strategy based on local costs, needs and demands
- B) Reliable local partners
- C) Securing of financing
- D) Local regulations and business practices
- E) Quality control
- F) Human resources management
- G) Public awareness building among BOP population (in case of BOP business)

This chapter categorizes the above issues into four groups in the context of water-related BOP businesses in Bangladesh based on the results of this study, as shown in Table 5-1.

Table 5-1: Categorization of the Difficulties of Water-related Businesses in Bangladesh

Categories of Difficulties in Water-related Businesses in Bangladesh explained in Each Section of Chapter 5	Related Common issues	Points to be considered
5-2. Difficulties related to General Business Environment in Bangladesh	C) Securing of financing D) Local regulations and business practices E) Quality control F) Human resources management	<ul style="list-style-type: none"> ▪ Expensive local interest rates ▪ Required procedures for borrowing money from abroad ▪ Complicated, time-consuming procedures to start business ▪ Difficulties of human resources management and quality control ▪ Other disadvantages
5-3. Difficulties in the Marketing of Water Businesses	A) Strategy based on local costs, needs and demands G) Public awareness building among BOP population	<ul style="list-style-type: none"> ▪ Competition with existing low-cost technologies in Bangladesh ▪ Competition and collaboration with previous water-related BOP businesses of other companies from developed countries ▪ Low willingness-to-pay for and public awareness on safe water
5-4. Difficulties regarding the Permissions required especially for Water-related Businesses	D) Local regulations and business practices	<ul style="list-style-type: none"> ▪ Complicated, time-consuming procedures to start water-related business ▪ Uncertain rules on hygiene and quality control in jar and bottled water plants and uncertain restrictions on groundwater uses.
5-5. Necessities and Risks of Local Partners	B) Reliable local partners	<ul style="list-style-type: none"> ▪ Expected roles of local partners ▪ Selection criteria of local partners

JICA conducted another study for supporting Japanese companies' BOP businesses around the same time this study was done. The translated title of the other study is Basic Survey on the Methods for Financing BOP Business Expansion and Evaluating its Development Impacts. The other study covers the identification of the common financial problems many Japanese companies face when they start BOP businesses in developing countries. Therefore, this study report describes mainly the financial problems that require attention in Bangladesh in 5-2 below.

5-2 Difficulties related to the General Business Environment in Bangladesh

Bangladesh is one of the very pro-Japan countries and attractive for Japanese companies trying to establish their businesses in terms of low labour cost, investment incentives, large market with large population (160 million), and future economic growth. Investment in Bangladesh is protected by laws and policies and the government of Bangladesh has been encouraging foreign investments. As a result, many Japanese companies have recently come to Bangladesh in order to create their business opportunities.

However, it is more difficult to start businesses in Bangladesh than most Japanese people would commonly expect. For example, the following issues were pointed out by Japanese-affiliated companies which have developed their businesses in Bangladesh:

1. Insufficient infrastructure; lack of electricity & gas, lack of developed industrial lands, lack of main roads between main cities, heavy traffic jams & bad manners, and problem of Internet Protocol (IP) networks
2. Unstable policies regarding energy, tax, industries and foreign investments
3. Security problems; high frequency of general strikes and security deterioration
4. Social convention; corruption, low quality of public services, lack of basic technical skills of labourers

In Bangladesh electrical power failures occur frequently and there are heavy traffic jams in Dhaka and in Chittagong every day. It is also difficult to find good lands for factory construction in major cities such as Dhaka and Chittagong. Political strikes, called Hartal, have had a negative impact on the national economy. During Hartal, most people do not go out in order to avoid troubles and shops are closed. Corruption in politics and public administration, including administrative procedures, is everywhere in Bangladesh. According to Transparency International, in 2012 Bangladesh was 144th out of 173 countries in Corruption Perceptions Index (CPI) although the current situation is getting better. Bribery is part of the hidden costs for doing business in Bangladesh. Some Japanese entrepreneurs point to the problem of complicated and time-consuming procedures when starting businesses in Bangladesh, as well as other difficulties related to the above issues.

According to IFC's "Bangladesh Doing Business 2013, Smarter Regulations for Small and Medium-Size Enterprises", the business environment in Bangladesh is ranked 129th in a total of 185 economies. The IFC report analyses the business environment in Bangladesh based on the evaluation of ten aspects (starting business, dealing with construction permits, getting electricity, registering property, getting credit, protecting investors, paying taxes, trading across borders, enforcing contracts and resolving insolvency). In addition, Dhaka Chambers of Commerce & Industry (DCCI) pointed out that

Bangladesh should prioritize the reduction of business costs and that immediate measures should be carried out to eliminate the hidden costs to compete with other countries. The cost of investment in Bangladesh is increasing nominally as all the prices of the cost components of business are increasing in Bangladesh. The cost components include wages, plot of industrial estate, office space, telecommunications (both land phone and mobile phone), Internet connectivity, utilities (electricity, water and gas), container transportation, fuel (gasoline and diesel) and tax (personal tax, corporate tax and value-added tax (VAT), and the remittance of interest and dividend to the countries of foreign investors. Investors today are facing a costlier funding for trade, commerce and industries because of double-digit

interest rates on bank loans. In addition to the cost components, it is also necessary for Bangladesh to address and eliminate the impediments that are responsible for the high cost of investment. Hidden costs and loopholes in policies are eating up the future of Bangladesh's foreign direct investment (FDI). Hidden costs are non-figurative but exist in matters related to procedure, policy, law and infrastructure. The hidden costs have high impacts on the high business cost and investment cost in Bangladesh. The existing investors feel that hidden costs still remain as one of the key elements for escalating the cost of investment, which makes Bangladesh less attractive to both existing and prospective foreign investors.

(1) Issues on the Procedures required to Start Business

When starting a business in Bangladesh, a lot of time is required to go through related procedures. The following are required general procedures and documents (and their administrative organisations) when Japanese companies start businesses in Bangladesh.

- Company name clearance (Office of the Registrar of Joint Stock Companies & Firms; RJSC&F)
- Company registration (RJSC&F)
- Using bank accounts (Bank of Bangladesh)
- Tax identification number (TIN) (National Board of Revenue)
- Fire licence (Bangladesh Fire Service and Civil Defence)
- Trade licence (Local government office in where the company locates, such as Dhaka City Corporation)
- BOI registration (Board of Investment; BOI)
- Work permit and work visa (BOI and Department of Immigration & Passport)
- Avoidance of double taxation (National Board of Revenue)
- VAT application (National Board of Revenue)
- Import permit, export permit, import registration certificate, export registration certificate, if necessary (Office of The Chief Controller of Imports & Exports of Bangladesh; CCIE)
- Environmental clearance certificate (Department of Environment)
- Registration with Factories Act, if the company employs ten or more workers (Chief Inspector of Factory and Establishment, Ministry of Labour and Employment)
- Registration of patents and/or trademarks, if necessary (Department of Patents, Designs and Trademarks)

The long time required for these procedures is the major concern in starting a new business. Although most of the above procedures require less than one month each, it takes more than seven months to obtain a work visa. Before obtaining the work visa, the person cannot work officially, which causes difficulties in promoting the business. Furthermore, some of the procedures require other licences and/or registrations and it is very difficult for foreign companies to proceed smoothly because the order in which the above steps have to be taken is not clearly written in available official guidance. For example, it is necessary to transfer capital to a bank in Bangladesh for the company registration, but in some cases, the bank account cannot be opened without a Tax Identification Number (TIN) which can be obtained after the company registration. In addition to this complication, different steps are sometimes required in the other procedures by persons in charge. Therefore, Japanese companies need to confirm the steps with the responsible authorities though a local lawyer or accountant as they proceed in these procedures.

The Government of Bangladesh (GoB) is now trying to promote online applications and registrations in order to secure promptness, transparency and accountability in the above procedures. Applications for some of these procedures can be submitted through the websites of responsible authorities. However, a few online application forms are available only in the Bengali language and it is still difficult for foreign companies to use them.

(2) Constraints of Financial Regulations

There is no Japanese-affiliated bank in Bangladesh and it is recommended for Japanese-affiliated companies to have bank accounts for both foreign currency and local currency in a foreign-affiliated bank registered as an Authorized Dealer (AD) in Bangladesh. Permission from the Bank of Bangladesh is required to use bank accounts. It usually takes a long time to acquire such permission. The application for using bank accounts has to be submitted through the AD to the Bank of Bangladesh with the signature of a certain authorized person, along with the related documents.

The financial regulations and rules related to foreign investment are mainly defined in “Guidelines for Foreign Exchange Transactions” prepared by the Bank of Bangladesh, as well as in “Foreign Exchange Regulation Act, 1947 (Act No. VII of 1947).”

Any amount brought in with declaration to Customs Authorities in the form of FMJ (Foreign Exchange Declaration Form) can be credited to foreign currency accounts and can be transferred and/or brought out to other countries. In case of being brought in without any declaration, only up to US \$5,000 can be credited to foreign currency accounts and transferred and/or brought out to other countries.

The profits (except royalties and technical fees) of foreign companies operating in Bangladesh can be remitted abroad through AD without prior approval from the Bank of Bangladesh. For this purpose, foreign companies need to submit an application with the following documents and information to their AD:

- i) Audited Balance Sheet and Profit and Loss Account for business done in Bangladesh for the relevant period.
- ii) Consolidated audited Balance Sheet and Profit and Loss Account of the company (head office) for the corresponding period.
- iii) Year-wise reconciliation of head office accounts for the period in which profit remittance is applied.
- iv) Documents regarding payment of taxes in Bangladesh:
 - (a) A certificate from the Auditors in Bangladesh that tax provision made in the accounts for the period in question is sufficient to meet all tax liabilities in Bangladesh, or
 - (b) Copies of final assessment orders and forms in respect of all taxes for the period, duly certified and stamped by the Department concerned.
- v) Full particulars about additions to fixed assets of the company in Bangladesh, if any, during the period and source of funds for financing such additions.
- vi) Particulars of outstanding borrowings of the company in Bangladesh.
- vii) Permission letter of the relevant Government Authorities for conducting business in Bangladesh and the terms and conditions thereof.

Regarding the remittance of royalties and technical fees (e.g., technical know-how or technical assistance fees, operational services fees and marketing commission), it is necessary to obtain prior permission from the BOI. However, no prior permission is required if the total fees and other expenses connected with technology transfer do not exceed the following limits:

- (a) For new projects, not exceeding 6% of the cost of imported machineries;
- (b) For ongoing concerns, not exceeding 6% of the previous years' sales as declared in the income tax returns.

When private industrial enterprises in Bangladesh borrow money from abroad, they need prior approval from the BOI and Bank of Bangladesh. The application for this approval needs to be submitted with the analysis results on the following aspects:

- i) The commercial viability of the project;
- ii) The capacity of the project to service the proposed debt with income flows from the project;

- iii) The cost competitiveness of the outputs from the project in the domestic and external markets;
- iv) Existing production capacity in Bangladesh in the industrial sector to which the borrowing proposal relates and the potential demand in the domestic and export markets given the estimated output cost structure;
- v) Existing indebtedness structure of the sponsors of the project, duly certified by report of their bankers and the Central Information Bureau (CIB) of Bank of Bangladesh as to their creditworthiness.

On the other hand, foreign owned/controlled industrial and trading companies operating in Bangladesh can borrow Taka loans for working capital of their operation in due course of business according to prevailing credit norms and on the basis of a normal banker-customer relationship without any approvals from the Bank of Bangladesh. However, when they borrow Taka loans for working capital, (i) the term loan in Taka is not allowed to exceed, as percentage of total term borrowing, the percentage of equity of the firm/company held by Bangladeshi nationals and firms/companies not owned or controlled by foreigners, and (ii) total debt of the company is not allowed to exceed the 50:50 debt equity ratio. Incidentally, the interest rates of commercial banks in Bangladesh are more than 10%, which are much higher than those of Japanese commercial banks.

It is also pointed out by Japanese-affiliated companies that there are other financial issues such as frequent delays of Letters of Credit (L/C) settlement, problems related to Bills of Lading (B/L), and disadvantages of companies outside Export Processing Zones (EPZs).

(3) Difficulties of Human Resources Management

It is very important to employ reliable local management who can speak English and/or Japanese to manage the newly-established company in Bangladesh. One of the main issues, especially for Japanese small and medium companies, is to find reliable Japanese-speaking staff. Although Bengali is the official language in Bangladesh, English is widely spoken and understood as the second language and many people who graduate universities/colleges can speak English. There are few people who can speak Japanese and the salaries of those people are much higher. Those who speak Japanese with experience of Japan Overseas Cooperation Volunteers (JOCV) in Bangladesh will be good candidates for those small and medium companies.

It is also important to establish a management system to prevent embezzlement and delinquency. If a Japanese manager works in the Bangladesh office, he/she can check local staff every day and provide continuous training opportunities for quality control. If a Japanese manager tries to control outside of the Bangladesh office, he/she has to develop a transparent accounting system including inventory control, a periodic reporting system, an effective mutual check system among staff, and training programs. It was pointed out by a Japanese working in Bangladesh that most Bangladeshi staff tend to change, for their own convenience, the working practices originally taught by Japanese workers. Most Japanese workers cannot control the quality of their products/services. Therefore, it is recommended for a Japanese manager to stay in Bangladesh at least one year for the beginning of the business in order to understand the staff. It is noted that most of local people are Muslim and some parts of their thoughts and values are different from Japanese as a matter of course. For example, an idea of "Zakat" would be difficult for many Japanese to understand fully, but the first step to promote the business is to understand their culture and religion.

5-3 Difficulties in the Marketing of Water Businesses in Bangladesh

(1) Competition with Existing Low-Cost Technologies

Japanese companies trying to establish their water businesses in Bangladesh have to compete against the existing low-cost technologies and products, most of which have been locally developed or imported from

other developing countries. Four categories of the existing water-related technologies and their business environment are explained below, based mainly on the results of the interviews and market surveys conducted in Bangladesh.

The low-cost water-related technologies used for small-scale on-site water supply in rural areas in Bangladesh (such as deep tube wells, rain water tanks and pond sand filter) are explained in a) of this sub-section. Several types of previous medium-scale rural water supply schemes implemented in Bangladesh (including rural piped water supply) with various financial support (e.g., grant aid and equity investment from bilateral donors, NGOs, etc.) are explained in b). The bottled water mainly sold by larger local companies and jar water mainly sold by small and medium-sized local companies are explained in c). The household water purifiers available in the market, which are mainly imported from other developing countries such as India, Malaysia and China, are explained in d).

a) Existing Low-cost Water Technologies used in Small-scale On-site Water Supply in Rural Areas

Many local low-cost water-related technologies (such as rainwater tank, pond sand filter and arsenic iron removal plant (AIRP)) have been installed by DPHE, NGOs, etc. for small-scale safe water supply in rural areas in Bangladesh. The beneficiaries of these safe water technologies in rural areas usually have to pay all or part of the construction cost and full maintenance cost. DPHE and many NGOs including NGO Forum and Asian Arsenic Network (AAN) provide financial aid for the installation of these safe water technologies and technical supports for sustainable operation and maintenance. Some local and international companies are also selling arsenic removing devices certified by BCSIR in rural areas. These relatively low-cost small-scale technologies can prevent rural people from using water seriously contaminated with arsenic or salt. The futures and construction costs of these safe water technologies are summarized in Table 5-2 and Table 5-3, respectively, for their community types and household types, based on the interviews and the review of collected documents. Photo 5-1 shows these facilities.

Table 5-2: Existing Safe Water Technologies for Communities in Rural Areas

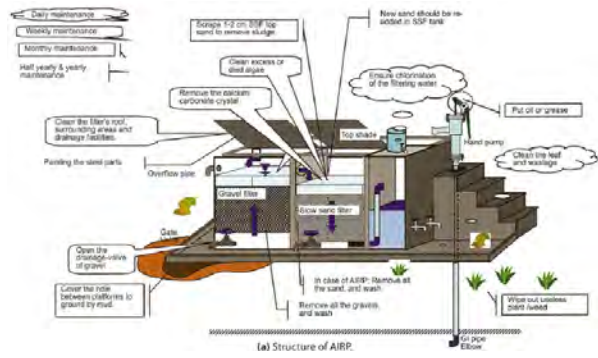
Technology	Feature	Construction Cost
Deep Tube Well	<ul style="list-style-type: none"> - Targeting arsenic contamination areas - Maintenance is very simple - Construction and maintenance costs are low compared with other technologies - Some portions of deep tube wells are contaminated by arsenic 	<ul style="list-style-type: none"> - Tk. 60,000 to 70,000 (DPHE Khulna, collecting only Tk. 4,500 from the beneficiaries) - Tk. 70,000 to 80,000 (NGO Forum, 800 to 1,200 feet in depth) - Tk. 80,000 (AAN)
Arsenic Removal Technology	<p>[Arsenic Iron Removal Plant (AIRP)]</p> <ul style="list-style-type: none"> - Targeting arsenic contamination areas - Simple processes combined with aeration, sedimentation and filtration. - AAN-typed AIRP can be applied to raw water containing arsenic less than 150 ppb and reduce arsenic to less than 50ppb. - The main task of its maintenance is to keep its sand filter clean. 	<ul style="list-style-type: none"> - Tk. 30,000 to 35,000 (NGO Forum) - Tk. 214,000 (AAN)
	<p>[Arsenic Removal Devices]</p> <ul style="list-style-type: none"> - Need approval from BCSIR - Targeting arsenic contamination areas - Not popular due to relatively high installation cost and required periodic media exchange. - Applicable to raw water containing arsenic less than 500 ppb in case of READ-F and SIDKO 	<ul style="list-style-type: none"> - READ-F: Tk. 980,000 (for 50 households, 2,200L/hour, with Japanese technology) - SIDKO: Tk. 350,000 (for 15 to 45 households, 200 to 240 L/hour, German technology)
Pond Sand Filter	<ul style="list-style-type: none"> - Targeting arsenic contamination areas and saltwater intrusion areas - Its performance depends on the pond water quality - The main task of its maintenance is to keep sand filter clean 	<ul style="list-style-type: none"> - Tk. 50,000 (DPHE Khulna, collecting only Tk. 3,000 from the beneficiaries) - Tk. 80,000 (NGO Forum) - Tk. 250,000 (AAN)
Rainwater Tank	<ul style="list-style-type: none"> - Targeting arsenic contamination areas and saltwater intrusion areas, especially - The main task of its maintenance is to remove the sediment settled at the bottom 	<ul style="list-style-type: none"> - Tk. 80,000 (NGO Forum , 5 to 7 households, 10,200L)
Infiltration Gallery	<ul style="list-style-type: none"> - Targeting areas having rivers and streams - Constructed on river bank to treat riverbed water - Underground structure containing sand inside and equipped with a hand pump 	<ul style="list-style-type: none"> - Around Tk. 30,000 (WaterAid, 9x9x6 feet)

Table 5-3: Existing Safe Water Technologies for Households in Rural Areas

Technology	Feature	Construction Cost
Arsenic Removal Technology	[Three Kalshi Filter for Arsenic Removal] <ul style="list-style-type: none"> - Targeting arsenic contamination areas - Simple process combined with aeration and filtration using three pots - Removes about 70% of arsenic in raw water - Installation cost is low - Maintenance is simple - Capacity and applicable raw water quality are limited 	- Tk. 1,000 (AAN)
	[Arsenic Removal Devices] <ul style="list-style-type: none"> - Need approval from BCSIR - Targeting arsenic contamination areas - Not popular due to relatively high installation cost and required periodic media exchange. - Applicable to raw water containing arsenic less than 330 ppb in ALCAN, 500 ppb in READ-F and 750 ppb in SONO. 	<ul style="list-style-type: none"> - ALCAN: Tk. 3,460 (60L/hour, Canadian technology) - READ-F: Tk. 4,960 (70L/hour, Japanese technology) - SONO: Tk. 2,500 (17L/hour, Bangladeshi technology)
Rainwater Tank	<ul style="list-style-type: none"> - Targeting arsenic contamination areas and saltwater intrusion areas, especially - Main task of its maintenance is to remove the sediment settled at the bottom 	<ul style="list-style-type: none"> - Tk. 30,000 (DPHE Khulna, 5,000L, collecting Tk. 1,500 from the beneficiaries) - 4,400L in capacity: Tk. 30,000 (PR Bangladesh) - 3,200L in capacity: Tk. 30,000 (NGO Forum) - 1,000L in capacity: Tk. 11,000 (Gazi Tank)



Deep Tube Well



Arsenic Iron Removal Plant (AIRP)



Pond Sand Filter



Rainwater Tank



Three Kalshi Filter for Arsenic Removal



Arsenic Removal Device approved by BCSIR (READ-F)

Photo 5-1: Existing Safe Water Technologies in Rural Areas
(Source: JICA's documents and photos taken by the study team)

In the areas where groundwater is contaminated with arsenic, applicable safe water technologies differ depending on the level of arsenic contamination, as follows:

- ✓ If confined aquifer for deep tube well is not contaminated by arsenic, deep tube well is usually the most cost effective and applicable safe water technology in rural areas.
- ✓ If available raw groundwater contains arsenic less than 150 ppb, the Arsenic Iron Removal Plants (AIRPs) of AAN using mainly sand and gravel and the AIRPs of DPHE and NGO Forum using sand and brick chips are applicable and cost-effective safe water technologies in rural areas. The concrete structure of AIRPs and their uses of hand pumps and sand filters are usually similar to those of pond sand filters. However, time-consuming maintenance by residents, such as the removal of sludge, is required.
- ✓ Three Kalshi Filter is also an applicable and cost effective conventional technology for household use, but its capacity and applicable raw water quality are limited.
- ✓ If available raw groundwater contains arsenic more than 150 ppb, rain water tanks, pond sand filters and arsenic removal devices approved by BCSIR are effective safe water technologies in rural areas. However, it is difficult to maintain those devices in general.
- ✓ The performance of pond sand filters depends on the quality of pond water and frequency of maintenance.
- ✓ The arsenic removal devices approved by BCSIR are not popular due to their relatively high installation cost and required periodic media exchange. It is difficult for residents to obtain the media.

In the coastal areas suffering from saltwater intrusion, applicable safe water technologies are explained as follows:

- ✓ Deep tube well is not a good option in the areas having saltwater intrusion into groundwater.
- ✓ Pond sand filter, which treats pond water with sand and gravel, is a useful safe water technology in the areas where only groundwater is seriously affected by salinity intrusion and sufficient surface water is available. However, serious saltwater intrusion into ponds often occurs as a result of the rise of sea water levels and floods during cyclones.
- ✓ Rainwater tank is useful and cost effective safe water technology in the areas where groundwater and/or pond water are intruded with saltwater. However, there is little rainfall during the dry season in Bangladesh. Storing rainwater during the dry season is a problem.

NGOs such as WaterAid and NGO Forum also constructed infiltration galleries containing sand to treat riverbed water of rivers and streams. An infiltration gallery is a concrete structure installed at the height of the riverbed and equipped with a vertical pipe and a hand pump.

Japanese companies trying to establish their water businesses in Bangladesh with new safe water technologies need to develop their businesses based on the situation of arsenic contamination and salinity intrusion in target areas. They need to compete against the existing low-cost technologies, especially in rural areas.

b) Previous Water Supply Schemes (Piped Supply and Delivery) in Rural Areas

Several medium-size water supply models with pipe network or delivery mechanisms have been conducted in rural areas in Bangladesh by local NGOs, local companies and joint ventures with international companies and a public company with financial support of different types and levels from international donors, the GoB, etc. Table 5-4 and Photo 5-2 show the business outlines of four water supply businesses being conducted in rural areas based on the results of the interviews.

Table 5-4: Previous Water Supply Businesses in Rural Areas

Project/Technology/ Joint Venture (involved entities)	Business Outlines	Main Services	Future Development
BWSPP and BRWSSP (WB / DPHE / Local NGOs and Companies)	<ul style="list-style-type: none"> - 21 rural piped water supply schemes established by local NGOs and companies in BWSPP. - 70% of the project cost is covered with grant aid from DPHE (loan from WB). - Water source is groundwater mainly. 	<ul style="list-style-type: none"> - Piped water supply to each households - Tk. 210/household/month in the piped water supply scheme in Keraniganj 	<ul style="list-style-type: none"> - 125 more rural piped water supply schemes will be established gradually in BRWSSP.
SkyHydrant (HYSAWA / SIEMENS / CBOs)	<ul style="list-style-type: none"> - The initial investment cost of upstream filtration equipment (SIEMENS' s SkyHydrant) is covered by HYSAWA founded by multiple donors. - CBOs established for operation and maintenance. - 13 water supply projects installed SkyHydrant for filtering pond and rainwater. 	<ul style="list-style-type: none"> - Sell purified water at filtering facilities of SkyHydrant. - Tk. 60/ household/month (30L/day/ household) 	<ul style="list-style-type: none"> - Only the areas having saline in groundwater. - Depend on funds.
Grameen Veolia Water Ltd. (Grameen Healthcare Services Ltd. / Veolia Water)	<ul style="list-style-type: none"> - Rural piped water supply business in Goalmari Village for social business. - Using lady dealers at stand posts - Selling jar water in Dhaka City for cross subsidy - Water source is Meghna River 	<ul style="list-style-type: none"> - Selling purified water mainly at stand posts and partly with individual connections - Tk. 2.5/10L (lady dealers at stand posts get Tk. 0.5/10L) 	<ul style="list-style-type: none"> - Water demand per household is very limited. - Further development of the project is slow.
A K Khan Water Health Ltd. (A.K. Khan / WaterHealth International / IFC / BRAC)	<ul style="list-style-type: none"> - 2 WaterHealth Centres (WHCs) so far - WHC Modular-type Structure uses UV lamp and, if necessary, RO membrane. - Selling jar water in Chittagong City for cross-subsidy - IFC and BRAC support not only financially but also for public awareness building. 	<ul style="list-style-type: none"> - Tk. 20/20L (delivery charge for jar water without seal is Tk. 5 to 15/20L). 	<ul style="list-style-type: none"> - 50 WHCs will be established in 2 to 3 years. - Establish more WHCs if successful



Groundwater Treatment Plant of BWSPP in Keraniganj, Dhaka Division



Model Water Treatment Plant having SkyHydrant, Khulna Division



Stand Posts of Grameen Veolia Water Ltd. in Goalmari Village, Dhaka Division



WaterHealth Centre of A.K. Khan WaterHealth Ltd. in Raojan, Chittagong Division

Photo 5-2: Previous Water Supply Businesses in Rural Areas

The water charge rates in these preceding water supply businesses are calculated to be Tk. 2/1L in SkyHydrant, Tk. 0.25/1L in Grameen Veolia Water, and Tk. 2/1L in A K Khan WaterHealth (AKKWH), respectively. These previous water supply businesses are explained in detail in (3) to (5) of Sub-section 4-2.

A desalination plant is also applicable technology in the areas with saltwater intrusion. Some desalination plants have been installed in the coastal areas affected by seawater intrusion (e.g., BRAC has installed two desalination plants and an Australian company has installed 20 domestic desalination devices in Khulna Division). UNDP is also going to have a project for establishing desalination plants in the coastal areas. However, desalination plants have not become popular yet in Bangladesh due to the following problems:

- ✓ A desalination plant is not easy to operate and its operational cost is usually not affordable for poor people in Bangladesh.
- ✓ A desalination plant requires a lot of electricity in operation and frequent change of RO membranes.

Japanese companies trying to establish their water supply businesses in rural areas need to learn from these previous business models to make their business feasible. The Japanese companies have to consider the following business aspects:

- Financial support from donors, etc.
- Collaboration with NGOs and local companies
- Awareness building campaigns on safe water usage
- Preparing affordable water tariffs which the rural population can pay
- Cross subsidy system between multiple business models in rural and urban areas
- Water supply mechanism (e.g., piped water supply, over-the-counter sales and delivery with rikisha vans)

c) Existing Jar Water and Bottled Water

The study team surveyed the markets for drinking water at some local supermarkets in Dhaka. The market outlines of jar water and bottled water are shown in Table 5-5, based on the results of the market survey and the interviews.

Table 5-5: Jar Water and Bottled Water Sold in Bangladesh (sealed and with BSTI Licences)

Item	Sales System	Example Brand Name	Price
Jar water	- Usually selling purified water contained in reusable plastic jars of about 20L (including free delivery service and free rental of water dispensers)	Dr .Water, Canny, Green Pure Drinking Water	Tk. 30 to 70 / 20L
Bottled water	- Mainly large Bangladeshi companies sell purified water in plastic bottles of different sizes in supermarkets and street stalls.	MUM, FRESH, Spa, ACME, DUNCAN'S, JIBON, IFAD, PRAN	Tk. 15 / 0.5L Tk. 25 / 1.5L (All products are the same prices.)
	- DWASA is selling its own bottled water at low prices, partly to bring the market prices of other bottled water brands down	Shanti	Tk. 10 / 1L
	- Importing mineral water from foreign countries and selling it in supermarkets.	Evian	Tk. 133 / 0.5L Tk. 258 / 1.5L
		Fuji Vanadium	Tk. 150 / 2L
	- Locally manufacturing bottled water with foreign technologies and selling it only in restaurants and hotels.	SAMURAI	Tk. 60 / 1.1
	NEW SAMURAI	Tk. 50 / 1.1L	

Many people in Bangladesh, especially in urban areas, drink jar water mounted on water dispensers in their offices and houses (see Photo 5-3). Jar water is usually delivered to customers by trucks and rikisha vans. There are more than 400 companies selling jar water of 20L in Bangladesh. Many medium and small companies are joining the growing market for jar water. According to AKKWH, they sell high-quality sealed jar water called Dr. Water at Tk.30/20L, including free delivery. They may become the strongest competitor in the jar water market in Bangladesh as a result of expanding their jar water business with the help of BRAC.



Photo 5-3: Types of Jars and Water Dispensers used in Bangladesh

Many illegal local jar companies without BSTI licences put piped water into jars with or without primitive treatment and sell them at Tk. 10 to 30 per jar. This kind of jar water is often sold at street stalls to the local people believing that this kind of jar water is purified water. Those unlicensed companies may become competitors for Japanese jar water companies in Bangladesh in the future. The Japanese companies may need to spend some resources to raise public awareness on safe jar water. In addition to the competition in terms of price and quality, the location for producing jar water may need to be near the target supply areas to win customers, because jar water is usually required early in the morning.

There are more than 50 companies selling water bottles of 0.5 to 5L in Bangladesh. Bottled water is mainly sold in supermarkets and street stalls. The market for bottled water is mainly occupied by larger companies. Some brands of bottled water manufactured by foreign companies are sold in only restaurants serving foreign foods and in hotels. According to DWASA, they sell high quality bottled water called Shanti at around Tk. 10 per 1L in Dhaka in order to break the monopoly of large bottled water companies and make the market price of bottled water more affordable. If the production capacity of Shanti increases significantly, DWASA may become a strong competitor in the bottled water market in Dhaka.



DUNCAN'S, MUM, SAMURAI, NEW SAMURAI and Fuji Vanadium from Left to Right



IFAD, FRESH, Spa and PRAN from Left to Right

Photo 5-4: Bottled Water Sold in Bangladesh

Water Jar and Poly Bag

According to the interviews with the companies selling jar water, transparent jars without handles produced in Bangladesh cost around Tk. 250 to 300 each (can be used around 10 times). AKKWH uses food grade yellow jars imported from Thailand (see Photo 5-3) for its packaged (sealed) jar water, which cost Tk. 350 each (can be used for 20 to 30 times). According to PDWMAB, blue transparent jars with handles, which are imported from Malaysia, have the best quality and cost Tk. 700 each. The use of poly bags was also tried for selling water at cheaper prices in Bangladesh but did not become popular because 1) food grade poly bags suitable to maintain good water quality were expensive, 2) Bangladeshi people experienced psychological resistance to drink water directly from poly bags and 3) used poly bags were thrown away and polluted the environment.

Water Dispenser

The majority of other jar water companies in Bangladesh are also providing a water dispenser to each of their customers. A Chinese or Malaysian water dispenser (with hot and cold water functions) costs Tk. 5,000 to 9,500, while a local dispenser normally costs only Tk. 500 to 650. However, a simple water dispenser for water jars designed by AKKWH costs only Tk. 250. Bangladeshi manufacturers usually make only plastic housings for water dispensers. The dispensers with hot and cool functions are not very hygienic in general because these dispensers often present difficulty in washing the electrical heating or cooling parts.

d) Existing Household Water Purifiers

Many households in Bangladesh, especially in middle and upper classes in urban areas, use household water purifiers mainly because the piped water is usually not drinkable. Filters of household water purifiers need to be changed or washed frequently because of the low quality of tap water.

Most of the household water purifiers available in Bangladesh are imported from other developing countries (e.g., India, Malaysia and China) by import agents and sold at electronics stores and stores specializing in water-related equipment. Unilever's pure it, KENT and Miyako are among the popular brands of household water purifiers in Bangladesh.

The study team surveyed some electronics stores selling household water purifiers in Dhaka. Table 5-6 shows the results of the survey.

Table 5-6: Household Water Purifiers sold in Bangladesh

ID	Purifier Name	Manufacturing Country	Company Name	Capacity (L)	Price (Tk.)	Function
1	Unilever pure it	India	Masud & Brothers	23	4,000	Purified with filter, exchange frequency; Tk.1000 / 1500L
2	KENT	India	SKRP Trade Syndicate	20	4,200	Purified with filter
				20	26,500	Purified by RO, UV, UF
3	Miyako	Malaysia	EXCELLENT	28	2,800	Purified with filter
				20	2,400	
				15	2,000	
4	Nova	China	SDO	37	1,600	Purified with filter
5	Best Quality	Malaysia	unknown	24	2,600	Purified with filter
6	Century	China	unknown	20	1,500	Purified with filter
7	Electro	China, Malaysia	General Electronics	20	1,500	Purified with filter
8	JCL	Malaysia	JCL HOME APPLIANCE INDUSTRY	20	1,500	Purified with filter



Unilever pure it



KENT



Electronics store selling water purifiers

Photo 5-5: Household Water Purifiers Sold in Bangladesh

Local shops specializing in selling water treatment equipment also sell more expensive household water purifiers having higher capacities (often with RO membranes which can remove salinity, arsenic and heavy metals) than those usually available at electronics stores. For example, D-Water Tech sells household water purifiers with RO membranes for around USD 100 to 1000. A Bangladeshi water treatment plant manufacturer called Modern Election Limited (MEL) imports most of the parts for their household water purifiers (including RO membranes and media such as activated carbon, manganese greensand and resin) from China and assembles and sells them in Bangladesh (see Photo 5-6). MEL imports only two types of bacteria-free ceramic filter cartridges from a UK company called Doulton since Chinese ceramic filters are not reliable.



Photo 5-6: Household/Business Water Purifiers sold in Stores specializing in Water Treatment Equipment
(Source: Photographed at a shop of MEL)

As explained in 4-2 (2), Samurai Water, founded by a Japanese person, leases approximately 80 sets of RO purifiers at Tk. 8,000/set/month (including free maintenance and filter exchange services) in Bangladesh, in addition to their business of selling bottled water. Their profit from leasing the purifiers is larger than that of their bottled water business. According to Samurai Water, a Korean company used to lease similar purifiers at Tk. 4,000. Unfortunately, the number of local companies that lease purifiers is not confirmed in this study.

(2) Low Willingness-to-Pay and Public Awareness on Safe Water

According to DPHE Khulna, drinking water of Tk. 1/1L is too expensive for most of the rural population in Bangladesh (if the average number of family members is 5 persons and each person needs 3L of safe water, a family needs Tk. 450 per month). In addition, the difficulties of water supply businesses in urban and rural areas include that collectable water charges from potential customers can be less than the minimum cost required to sustain water businesses due to low willingness to pay of beneficiaries and low public awareness of safe water in Bangladesh. Therefore, educational activities to raise public awareness of safe water and required water purification technologies are often essential for successful water businesses, especially when targeting the BOP population.

The low willingness to pay for and public awareness of safe water have several reasons:

1) Reasons for the Low Willingness to Pay for Safe Water

- ✓ Many people in rural areas do not have a custom of paying money for water.
- ✓ Water from deep and shallow tube wells installed by government institutions, donors and NGOs in the past is usually available for almost free in many villages.
- ✓ They often continue to use water from tube wells even after it is found to be contaminated with arsenic because the symptoms associated with arsenic poisoning do not appear immediately and they spend their money for other things,
- ✓ Many people in rural areas expect government institutions, donors and NGOs to provide access to safe water for free or at heavily subsidized prices.
- ✓ Political influence is very strong in rural areas and politicians often increase the expectations of rural people for free or heavily subsidized safe water.
- ✓ Bangladeshi people are not willing to travel a long distance to drink safe water in case that there are other water sources (contaminated or not) near their houses, especially in the rainy season.
- ✓ It is troublesome for many people in rural areas to carry more safe water in vessels for cooking in addition to that for drinking from water points to their houses.

- ✓ It is especially troublesome for many people in rural areas to carry the safe water bought at water point with them while working outside.

2) Reasons of the Low Public Awareness on Safe Water

- ✓ Many people in rural areas keep using the water contaminated with arsenic because arsenic is a tasteless and odourless material and its health hazard appears after a long period of ingestion.
- ✓ Many people in rural areas may not like the taste of water other than well water which they usually drink.

Water supply businesses in the rural areas of Bangladesh often require collaboration with local NGOs and financial support from donors to raise public awareness of safe water and promote required water purification technologies in target areas.

5-4 Difficulties regarding the Permissions required, Especially for Water-related Businesses in Bangladesh

(1) WASA's Permission required to Use Water Sources in their Responsible Areas

The study team interviewed DWASA, BSTI and the Pure Drinking Water Manufacturing Association of Bangladesh (PDWMAB) regarding the permission required to use water sources for private companies' water selling businesses in Dhaka. The study team also interviewed KWASA, CWASA and Chittagong Division (CD) of DPHE regarding the permission required in other areas in Bangladesh. The records of their related replies in the interviews are listed below for each institution.

1) DWASA

- ✓ DWASA is the owner of groundwater in the responsible areas of DWASA (Dhaka City and Narayanganj City).
- ✓ DWASA restricts the boring of new wells by water selling companies (for mass-scale groundwater use) in its responsible areas, as the ground water level in its responsible areas is lowering more than one meter annually.
- ✓ No organizations including DWASA are authorized to restrict the use of surface water for any use.
- ✓ Although surface water including river water is plentiful around Dhaka, it is heavily polluted with industrial wastewater and requires expensive treatment processes.
- ✓ DWASA is not officially allowing any private water selling company to use the piped water of DWASA as its water source.
- ✓ There are some illegal companies bottling and selling DWASA's piped water without appropriate water treatment process.

2) BSTI

- ✓ Because DWASA has been restricting the boring of new deep wells for commercial purposes, many water selling companies have bored deep wells outside of DWASA's responsible areas and are bringing bottled water to Dhaka to sell.

3) PDWMAB

- ✓ Many medium and small companies belong to PDWMAB. Some portion of the companies belonging to PDWMAB still use DWASA's piped water as the source of their purified drinking water, while the others use their own deep tube wells as their water sources.

- ✓ DWASA made a verbal agreement with PDWMAB in 2009 that the member companies of PDWMAB can use DWASA's piped water as long as the companies pay special annual charges (Tk. 50,000 in the first year and Tk. 25,000 in the following years).
- ✓ However, in 2011 DWASA gave notice that they would ban the use of DWASA's piped water for the production of bottled water and jar water in December 2012.
- ✓ PDWMAB has been trying to negotiate with DWASA regarding this restriction on behalf of the jar water companies that still don't have their own deep tube wells.
- ✓ DWASA still gives permission to private water selling companies for boring deep tube wells as of August 2013.
- ✓ So-Safe International (the local company selling jar water) has recently obtained permission from DWASA to bore a deep tube well in Dhaka.
- ✓ According to DWASA, they can allow private bottled or jar water companies to bore new deep tube wells if their location is more than 300m away from any of the existing tube wells of DWASA.
- ✓ However, even in the event that the location of new tube well is more than 300m away, some member companies of PDWMAB have not been successful in obtaining permission from DWASA for more than one year.
- ✓ There is no restriction on the boring of deep tube wells outside of Dhaka City.
- ✓ Deep tube-wells can be bored in Keranigonj, Hazaribagh, Mirpur and Madertek, where DWASA's water supply pipe network has not reached yet.

4) KWASA

- ✓ In accordance with the WASA Act of 1996, households can apply to KWASA for boring new wells if the pipe network of KWASA does not cover their areas.
- ✓ KWASA is restricting and controlling private companies' boring of new wells within KWASA's responsible areas. When a private company applies for permission to bore a new well for a commercial purpose, KWASA conducts site inspections and checks whether the groundwater table at the site is going down or not. If the water table is sound, the private company can get the permission to bore a new well. However, KWASA usually discourages private companies from boring wells in its responsible areas.
- ✓ There is no regulation for KWASA to restrict surface water uses of private companies.
- ✓ KWASA does not allow private companies to use KWASA's piped water for their water selling businesses.
- ✓ The WASA Act does not have any provision to allow private water selling companies to use WASA's piped water. This means that it is not allowed.

5) CWASA

- ✓ Private companies need permission from CWASA to use groundwater and surface water within the responsible areas of CWASA.

6) Chittagong Division (CD) of DPHE

- ✓ Private companies do not need to have permission from CD of DPHE to use groundwater and surface water as the source of their water selling business because CD of DPHE thinks that the depreciation of the aquifer table is not significant in the rural areas for which CD of DPHE is responsible.

There are a few inconsistencies and vague points in the above records of interviews of this study. Therefore it is necessary to confirm updated information when considering the formulation of water selling businesses in Bangladesh. The described difficulties in acquiring the permission (for boring a new deep well to use groundwater for water selling business) can be a major obstacle for the Japanese companies planning to produce and sell bottled water or jar water in the urban areas of Bangladesh. Especially, confirming the updated conditions and the time required for acquiring the permission needs to be taken into account in the early stages of their business formulation. The Japanese companies may bore deep tube wells outside of the responsible areas of WASAs or use existing deep tube wells in WASAs' responsible areas as alternatives.

(2) BSTI's Procedure of the Licence for the Production and Sales of Drinking Water

Bangladesh Standards and Testing Institution (BSTI) is the only national standards body of Bangladesh and is entrusted with the responsibility of formulating national standards for industrial, food and chemical products. BSTI is also responsible for supervising the quality control of these products. Each company trying to produce and sell drinking water contained in sealed packages (e.g., plastic bottles and jars) needs to meet corresponding natural water quality standards of BSTI and other requirements and receive a licence from BSTI. The following two water quality standards of BSTI are related to the production and sales of drinking water and mineral water. BSTI's official documents on these standards are sold at their one-stop service centres at the below prices.

- BSTI BDS 1240, 2001 Specification for Drinking Water (First Revision): Tk. 200
- BSTI BDS 1414, 2000 Specification for Natural Mineral Water (First Revision): Tk. 350

The main difference between drinking water and mineral water defined by the BSTI's standards is water quality requirements. Natural mineral water requires a higher concentration of minerals. Furthermore, the mineral water is obtained directly from natural or drilled sources with the original bacteriological purity. According to BSTI's standards for drinking water, it is acceptable to use surface water, in addition to groundwater and spring water, as a source of drinking water. However, BSTI does not recommend the use of surface water because of the possibilities of pollution. Most of the bottled water and jar water sold in Bangladesh with BSTI licences is not natural mineral water, but drinking water, in accordance with the BSTI standards. The water quality parameters and quality requirements of BSTI's water quality standards for drinking water and natural water (BSTI BDS 1240 and Natural Mineral Water of BDS 1414) are shown in Table 5-7. It is noted that BSTI's drinking water standard (BSTI BDS 1240) is not applicable for piped water and well water used in communities, etc.

BSTI also sells the following natural standards of pipes and fittings related to water supply at its one-stop service centres.

- BSTI BDS 1031, 2006 Specification Mild Steel (MS) Pipe and Galvanised Iron (GI) Pipes (First Revision)
- BSTI BDS ISO 4422-1, 2008 Pipes and fittings made of unplasticised poly for water supply - Part 1 General
- BSTI BDS ISO 4422-2, 2008 Pipes and fittings made of unplasticised poly for water supply - Part 2 Pipes
- BSTI BDS ISO 4422-3, 2007 Pipes and fittings made of unplasticised poly for water supply - Part 3 Fittings and Joints

Table 5-7: Water Quality Standard of Drinking Water and Natural Mineral Water

BDS 1240 Drinking Water		BDS 1414 Natural Mineral Water	
Characteristic	Requirements	Characteristic	Requirements
Chemical			
Colour	5 Hazen units	Colour	5 Hazen units
Odour	Unobjectionable	Odour	Unobjectionable
Taste	Agreeable	Taste	Agreeable
Turbidity	5.0 NTU	Turbidity	5.0 NTU
pH	6.4-7.4	pH	6.4-7.4
		Free carbon dioxide (CO ₂)	250 mg/l
Total Hardness	300 mg/l	Total Hardness	300 mg/l
Iron (Fe)	0.3 mg/l	Iron (Fe)	0.5 mg/l
Chlorides (Cl)	250 mg/l	Chlorides (Cl)	250 mg/l
Total dissolved solids (TDS)	500 mg/l	Total dissolved solids (TDS)	1000 mg/l
Calcium (Ca)	75 mg/l		
Sodium (Na)	200 mg/l		
Copper (Cu)	1.0 mg/l	Copper (Cu)	1.0 mg/l
Manganese (Mn)	0.5 mg/l	Manganese (Mn)	2.0 mg/l
Nitrate (NO ₃)	4.5 mg/l	Nitrate (NO ₃)	45.0 mg/l
Nitrite (NO ₂)	Nil	Nitrite (NO ₂)	0.005 mg/l
Fluoride (F)	1.0 mg/l	Fluoride (F)	1.0 mg/l
Mercury (Hg)	0.001 mg/l	Mercury (Hg)	0.001 mg/l
Cadmium (Cd)	0.003 mg/l	Cadmium (Cd)	0.003 mg/l
Selenium (Se)	0.01 mg/l	Selenium (Se)	0.01 mg/l
Arsenic (As)	0.01 mg/l	Arsenic (As)	0.05 mg/l
Cyanide (CN)	0.01 mg/l	Cyanide (CN)	0.01 mg/l
Lead (Pb)	0.01 mg/l	Lead (Pb)	0.05 mg/l
Zinc (Zn)	3.0 mg/l	Zinc (Zn)	5.0 mg/l
Chromium (Cr)	0.05 mg/l	Chromium (Cr)	0.05 mg/l
Barium	1.0 mg/l	Barium	1.0 mg/l
Borate	5.0 mg/l	Borate	30.0 mg/l
Nickel	0.02 mg/l		
Hydrogen sulfide	0.05 mg/l	Sulfide	0.05 mg/l
		Organic matter	3.0 mg/l
Microbiological			
Total Coliform Bacteria	Absent in 100ml	Total Coliform Bacteria	Absent in 100ml
Standard Plate Count	1000 in 1 ml	Fecal Coliform Bacteria	Absent in 100ml
		Standard Plate Count	1000 in 1 ml

Figure 5-1 shows the application process for a BSTI licence and the use of the BSTI Mark, which are announced on their webpage. The application processes of BSTI for drinking water and natural mineral water are the same; the only difference is the standard to apply.



Figure 5-1: Procedure of Acquiring Licence from BSTI

(Source: BSTI Webpage: http://www.bsti.gov.bd/cert_mark_grantLicense.html)

For the production and sales of drinking water or mineral water (bottled water or jar water) in Bangladesh, a company needs to apply for the BSTI licence by submitting the designated application form of BSTI, along with the following attachments:

- Updated Trade Licence
- Updated TIN (Tax Identification Number) Certificate
- Premises Licence
- Trade Mark licence
- Certificate from BOI
- Calibration Certificate of weight machine
- Factory layout
- Process flow chart
- List of machinery to be used in factory
- List of equipment and chemicals that will be used in laboratory
- CVs of the people who will work as chemists and microbiologists in laboratory
- Product label

After receiving the application, BSTI arranges the inspection and prepares the inspection report. BSTI checks the total system control of hygiene and safety in the factory, including the following points, during the one-day inspection.

- Automatic process of water production (manufacturing, packing and marking)
- Hygienic conditions and procedures in the factory (Shading in the factory, blocking of ventilation, installation of air conditioning, and disinfection)
- Capability for water quality tests in the laboratory (facilities of the laboratory, inspection procedure, testing personnel, etc.)

Two sets of water samples are also randomly collected at the inspection. Those are jointly signed and sealed by the BSTI Officer and the applicant. One water sample is tested in the BSTI Laboratory or any other water quality laboratory approved by BSTI and the other water sample is kept by the applicant as a reference sample. If the result of the water quality test is successful, found to be in conformity with the relevant standard, a licence is granted. Normally the validated period of BSTI licence is three years and the licence has to be renewed by going through the same procedure again for the next three years.

The application fee for the licence is Tk. 1,000 for the first year and Tk. 500 for renewal. The licence fee is Tk. 200 per year. The marking fee is 0.01% of existing factory price (Tk. 1,850 at minimum to Tk. 1,500,000 at maximum).

BSTI conducts monitoring of licenced companies at industries (factory) and markets time to time. If a licenced company is not maintaining the quality of water or meeting the requirements, BSTI may order the company to improve or may cancel the licence.

According to BSTI, the required minimum time for getting the licence is 60 days after the submission of the application. However, it seems to take around 3 months, even when all the required papers are prepared beforehand and there is no particular problem with the factory because the application has to go through an internal committee held only once a month. According to the jar water companies that have recently obtained a licence from BSTI, it often takes more than 6 months to obtain the licence for drinking water. Some of them spent more than 12 months. The reasons for taking a long time include their incompatibility with BSTI requirements and the ambiguity of some of BSTI's requirements. If any defect is pointed out by the inspector from BSTI, the applicant has to improve it and undergo another inspection. In some cases, the second inspection requested additional improvements that were different from the improvements requested in the first inspection. Furthermore, in the case of applying new water purification technologies, the applicant needs to spend more time to make BSTI's inspectors understand the technologies.

(3) BCSIR's Certification for New Arsenic Removal Technologies

If a company wants to sell a new arsenic removal device in Bangladesh, it must acquire permission from BCSIR. The study team collected documents related to the permission from BCSIR and acquired additional information through discussions with BCSIR and NGOs (BRAC, iDE Bangladesh and Asian Arsenic Network) and the Internet. The approval process by BCSIR and the approved arsenic removal devices are explained below.

1) Approval Process by BCSIR

- ✓ BCSIR has only the authorization to approve arsenic removal devices in Bangladesh regarding water treatment.
- ✓ BCSIR has its Analytical Research Division (ARD) to verify the performance claims of arsenic removal technologies for producing safe drinking water from arsenic-contaminated ground water.
- ✓ If a Japanese company wants to sell a new arsenic removal device in Bangladesh, it must apply for approval from BCSIR using an application form containing more than 100 pages.
- ✓ BCSIR usually takes a long time to approve an arsenic removal device and does not have much budget to evaluate its performance.

- ✓ BCSIR takes 6 months to 2 years to check the product through field tests and the company has to cover the cost of the approval.
- ✓ If a Japanese company applying for approval from BCSIR comes with a partner having an independent laboratory (e.g., Universities, etc.), they may be able to reduce the time required for getting the permission by around 6 months.
- ✓ If any companies sell unapproved arsenic removal devices in Bangladesh, they may get sued by the companies selling approved arsenic removal devices in Bangladesh, as has happened before.
- ✓ Any private companies looking for quick profit would not be patient enough to get through their complicated and long approval process.

2) Approved Arsenic Removal Devices

- ✓ BCSIR provisionally approved 4 arsenic removal devices in a project funded by Canadian International Development Agency (CIDA) from 2000 to 2003. This project was called Environment Technology Verification for Arsenic Mitigation (ETV-AM).
- ✓ The arsenic removal devices provisionally approved for sale in Bangladesh in this project are MAGC/ALCAN, READ-F and SONO 45-25 for household use and SIDKO for community use. (The specifications of these devices are shown in Section 5.3.).
- ✓ READ-F is a product of Japanese company called Nihonkaisui Co., Ltd. Only the resin media (cerium oxide) of this device is imported from Japan; the other parts are produced locally. MAGC/ALCAN uses Canadian media (activated alumina). SIDKO uses German technology (granular ferric hydroxide). SONO 45-25 uses a Bangladesh technology (zero valent iron).
- ✓ As the second phase, CIDA funded another project called Bangladesh Environment Technology Verification for Sustainable Arsenic Mitigation (BETV-SAM). In this project, BCSIR screened 46 arsenic removal devices and field tested 17 devices, including the performance monitoring of the 4 devices provisionally approved in the previous project.
- ✓ Based on the results of BETV-SAM, 6 arsenic removal devices, including the 4 provisional devices (MAGC/ALCAN, READ-F, SONO 45-25 and SIDKO) and 2 new devices for household use (Nelima and Shawdesh), were formally certified in 2009. Nelima uses a Bangladesh technology (proprietary media). Shawdesh, which was developed by BCSIR, also uses local technologies of oxidation, coagulation and filtration.
- ✓ Three of the six certified devices use foreign technologies from Japan, Canada and Germany.
- ✓ There have been no new arsenic removal devices certified by BCSIR since the certification of the six devices in 2009.

In summary, the approval process for a new arsenic removal device by BCSIR is not easy to get through and takes a long time. Moreover, there are some vague points in the approval process, which need to be confirmed with updated information when considering the business formulation for selling a new arsenic removal device in Bangladesh.

5-5 Necessities and Risks of Local Partners

For Japanese companies trying to start businesses in Bangladesh, it is better to find a local partner. The expected roles of local partners are explained below.

- ✓ A local partner can provide useful information related to the business.
- ✓ The procedures required to start the business may be smoothly completed in collaboration with a local company (in the form of Joint Venture (JV)) and/or by assistance of a business consulting company, etc. It is said that a JV with a Bangladeshi company can obtain

permissions faster than a 100% foreign-owned company.

- ✓ A local partner, especially a local company for JV, may support a start-up business by providing finance, facilities and distributing channels.
- ✓ A local partner may introduce reliable human resources as their staff.
- ✓ Operation of the business can be supported by specialized skills of local partners (e.g., public awareness building and promotion by NGOs, accounting and legal services by business consulting companies, technical advice of universities and technical support of engineering consulting companies, etc.)

On the other hand, it should be recognized that there are risks in collaboration with a local partner. In case of JV, the differences in management styles and strategies and troubles related to profit allocation and initiatives may make the partnership difficult. A JV may be dissolved after the local partner has obtained the know-how and/or technologies from the Japanese company. Regarding the collaboration with NGOs, a Japanese company explained that their money was taken by a NGO more than necessary. Therefore, the following points of potential local partners such as NGOs need to be checked first, especially when money is paid in exchange for services.

- Valid registration
- Financial statement/financial capability regarding tax payment and funding sources
- Human resources/skilled staff (especially the names and size of the companies and organizations they used to belong to in the past)
- Offices, facilities and equipment
- Experiences related to the services (especially similar experiences in collaborating with international organizations and/or private companies)
- Reputation among stakeholders and other NGOs

In addition to the above points, the compatibility of the management styles and strategies of a potential local partner needs to be confirmed carefully when forming a JV.

Chapter 6 Potential Local Partners of Japanese Companies

6-1 Associations in Bangladesh

(1) Commerce and Industry Associations

There are three associations related to Japanese companies in Bangladesh: the Japan-Bangladesh Chamber of Commerce and Industry (JBCCI), the Japanese Commerce and Industry Association in Dhaka (JCIAD) and the Japanese Association in Chittagong, which also operates as a Japanese commerce and industry association in Chittagong. JBCCI is an authorized official organisation, while JCIAD and the Japanese Association in Chittagong are unofficial organisations for amity of Japanese companies in Dhaka and Chittagong.

JBCCI provides the advisory services to Japanese and Bangladeshi companies looking for business opportunities and discusses with the government institutions the removal of any obstacles to promoting businesses. One hundred thirteen companies belong to JBCCI and the ratios of Japanese companies, Bengali companies and Japanese-Bengali joint ventures are around one third each.

It is expected that Japanese companies can get information on the business environment and possible local partners through JBCCI's support. JBCCI can also support initial promotion for Japanese companies, such as introduction of government institutions, key personnel and reliable translators (Japanese-Bengali).

(2) Associations for Bottled Water and Jar Water

There are two water-related associations for bottled water and jar water companies, the Association of Bangladesh Mineral & Purified Drinking Water Manufacturers (ABMPDWM) and the Pure Drinking Water Manufacturing Association of Bangladesh (PDWMAB).

1) Association of Bangladesh Mineral & Purified Drinking Water Manufacturers (ABMPDWM)

The study team repeatedly contacted ABMPDWM via telephone and letter during the field survey in Bangladesh. However, they denied our requests to interview them and didn't provide any information regarding the functions of the association. The following information on ABMPDWM was provided by PDWMAB in the interview with them.

- ✓ Large companies selling jar water and bottled water mainly belong to ABMPDWM.
- ✓ ABMPDWM has more restrictions regarding eligibility for membership.
- ✓ Small and medium-sized jar water companies face difficulties joining ABMPDWM.
- ✓ ABMPDWM may consider Japanese water-related companies as their member companies' competitors.

2) Pure Drinking Water Manufacturing Association of Bangladesh (PDWMAB)

More than 100 companies selling jar water belong to PDWMAB. The member companies are mainly medium-sized. PDWMAB liaises with the government institutions for its member companies and helps new or existing member companies to get or renew licences from BSTI. PDWMAB has also organised three workshops to raise awareness on required water quality among the member companies. PDWMAB has also been working on raising public awareness on safe water use, targeting the people buying jar water containing unpurified tap water at very low prices. The improvement of public awareness has a large impact on the jar water businesses.

According to PDWMAB, they can help Japanese companies trying to contribute to society get information on the water-related business environment and find possible local partners for selling jar water and bottled water. PDWMAB can also help Japanese companies construct their model plant and

organise meetings between Bangladesh member companies and Japanese companies.

6-2 Water-related Local Companies

(1) List of Water-related Local Companies as Potential Partners

The study team extensively conducted 1) interviews at 8 relatively well-known water-related local companies and 2) a questionnaire survey to 37 other local water-related companies, mainly to discover potential local partners with good prospects. The basic information on their businesses and their interests in collaboration with Japanese companies are summarized in subsections (2) to (6) for each business type. Moreover, 5-3 partly explains their potential as competitors, while 7-2 and 7-3 further elaborate the possibilities of collaborating with them for water-related BOP businesses and Japanese component technologies in Bangladesh.

Regarding the questionnaire survey, the study team sent emails with the questionnaire to 37 water-related companies listed in the Bangladesh Yellow Pages 2012 and those having their own homepage with their contact numbers. The study team also contacted them via telephone several times to get their replies. As a result, 8 of the 37 companies sent back their answers with their business outlines and expressed interest in collaborating with Japanese companies. The business outlines of the remaining 28 companies were collected from their homepages.

Based on the results of the interviews and the questionnaire survey, a list of 49 water-related local companies was prepared for each business type. This list of water-related local companies includes the following information:

- ✓ Interest in collaborating with Japanese companies and applying Japanese technologies
- ✓ Basic company information (e.g., office address, URL, contact number, year of establishment, number of employees, capital and source)
- ✓ Business outline (e.g., products and target customers, annual sales, strengths in their businesses, experiences of collaborating and possible collaborations)

(2) Water Treatment Plant Engineering Companies/Manufacturers

Several Bangladeshi engineering companies providing made-to-order industrial water treatment solutions seem to have the capabilities to work with Japanese companies on large projects. Other local companies are only selling certain ready-made products (mainly domestic purifiers) and cannot provide optimum solutions like engineering companies. The study team interviewed three well-known water treatment plant engineering companies/manufacturers in Bangladesh, which are Modern Erection Limited (MEL) Group, D-Water Tech Ltd. and Sigma Group. They mainly provide services related to water purification plants and effluent treatment plants. Their business outlines and possible collaboration with Japanese companies are explained below, based on the results of the interviews at these three companies.

1) Business Outlines

- ✓ They provide services of consulting, design, installation and O&M for water-related facilities (e.g., bottled water manufacturing factories, industrial water treatment plants and effluent treatment plants).
- ✓ The parts of their water treatment apparatus and facilities are mostly imported from foreign countries, except for the parts they can manufacture in Bangladesh (e.g., vessels and piping).
- ✓ They also sell industrial and household water purifiers imported from foreign countries (mainly China).
- ✓ D-Water Tech and Sigma Group have been involved in PPP businesses in EPZs (i.e., design, construction and operation of water treatment plant and effluent treatment plant).

- ✓ They are skilled in designing and installing water treatment plants with imported RO membranes.

2) Possible Collaboration with Japanese Companies

- ✓ Technical and financial supports for sewage and effluent treatment plants are required in Bangladesh. Japanese companies may have good opportunities to work with Bangladeshi companies, especially in regard to effluent treatment plants.
- ✓ Daily partnership with Japanese companies is difficult. For example, their industrial customers usually need the results within two weeks. Bangladeshi designers of industrial water-related facilities have to be close to the customers to discuss and revise their proposals again and again within this short period. But partners in Japan are difficult for the designers to work with smoothly when they are off-site. Japanese manpower cost is too expensive to stay and work with the designers in Bangladesh.
- ✓ Bangladeshi customers pay after 6 to 9 months while Japanese companies need advance payment, which would cause problems with cash flow to Japanese companies.
- ✓ The collaboration with Japanese companies for large projects seems more feasible. However, because the Bangladeshi government looks for economical solutions, it would be very difficult for Japanese companies to compete with Chinese and Indian companies.

(3) Jar Water Companies

There are more than 400 companies selling jar water of around 20L in Bangladesh. Many medium and small companies are joining in the jar water market. The study team interviewed So-Safe International and Rahman Enterprises, both producing and selling jar water. Their business outlines and possible collaborations with Japanese companies are explained in the following, based on the results of the interviews. The further possibility of collaboration between local jar water companies and Japanese companies is explained in 7-2 (4).

1) Business Outlines

- ✓ Most jar water companies use RO membranes. In addition, they also use other technologies such as resin, sand filter, carbon filter, chlorine for jar washing, and UV rays for sterilizing water.
- ✓ Their water treatment equipment and materials are mostly imported from foreign countries, especially China.
- ✓ Jar water is usually delivered to their customers by trucks and rikisha vans.
- ✓ Most of the jar water companies in Bangladesh also provide a water dispenser to each of their customers. They include the prorated cost of a water dispenser in their jar water price.

2) Possible Collaboration with Japanese Companies

- ✓ They are interested in working with Japanese companies because it will be a good opportunity for them to learn and to install high-quality Japanese technologies.
- ✓ The price of Japanese products has to be cost effective in Bangladesh.

(4) Bottled Water Companies

There are more than 50 companies producing and selling bottled water of 0.5 to 5L in Bangladesh. Bottled water is mainly sold in supermarkets and street stalls. The bottled water market is mainly occupied by larger companies because the sales of bottled water need to cover a large area to capture the market. In addition, the production of bottled water needs a large investment, including a large space and fully-automated bottling machinery.

The study team interviewed the bottled water and plastic factory called Maitri Shilpa, managed by the

Ministry of Social Welfare. The possibility of collaboration between Maitri Shilpa and Japanese companies is explained in 7-2 (2) and 8-2 (1). The study team also sent emails with the questionnaire to 8 large bottled water companies. Akij Food & Beverage Ltd. (selling the bottled water “Spa”) and The Acme Agrovet & Beverage Ltd. (selling bottled water “ACME”) sent back their answers with their business outlines and expressed interest in collaborating with Japanese companies to improve their current operation of water purifying and bottling.

(5) Water Purifier Sales Companies

There are many water purifier sales companies selling household and industrial water purifiers in Bangladesh. Their business outlines and possible collaborations with Japanese companies are explained in the following, based on the results of the questionnaire survey and the interview with So-Safe International. A possible collaboration between the bottled water and plastic factories managed by the Ministry of Social Welfare and Japanese companies is explained in 7-2 (2).

1) Business Outlines

- ✓ Water purifier sales companies mainly sell household industrial water purifiers with RO membranes.
- ✓ They import ready-made products from foreign countries (e.g., China, Malaysia, Taiwan, South Korea, India, U.S.A., U.K. and Germany) and assemble them as needed.
- ✓ So-Safe International has 6 service persons who visit the customers to change the filters of sold purifiers periodically. However, many other companies wash the filters of their sold products instead of changing them.

2) Possible Collaborations with Japanese Companies

- ✓ They are interested in manufacturing water purifiers, filtering media and water meters in collaboration with Japanese companies.
- ✓ General Electronics are jointly manufacturing water purifiers with a Chinese company in Bangladesh.
- ✓ If Bangladeshi companies can produce the parts of water purifiers in collaboration with Japanese companies, they would benefit, especially in maintenance of sold purifiers, because it is difficult for them to send back the broken parts to the countries producing them.

(6) Other Water-related Manufacturing Companies

There are many water-related companies manufacturing HDPE pipes and PVC pipes in Bangladesh. However, other water-related products (e.g., water meters, leakage detection equipment and ductile pipes) are not manufactured in Bangladesh but imported from foreign countries. Only one Bangladeshi company manufactures large pumps and valves domestically.

The market and business outlines of other water-related manufacturing companies and their possible collaborations with Japanese companies are explained below, based on the results of the questionnaire survey and the interviews at MPL and CWASA. Possible collaborations between these local water-related manufacturing companies and Japanese companies to manufacture products locally with Japanese component technologies are further explained in 7-3.

1) Business Outlines of Other Water-related Manufacturing Companies

- ✓ Many Bangladeshi companies manufacture High Density Polyethylene (HDPE) pipes and Polyvinyl Chloride (PVC) pipes (but not more than 12 inches in diameter). They import raw materials from foreign countries.

- ✓ There is no Bangladeshi company producing ductile cast iron pipes.
- ✓ There is no Bangladeshi company producing leakage detection equipment.
- ✓ There is no water meter manufacturer in Bangladesh. Currently most of the water meters used in Bangladesh come from India and China. High-quality water meters are being procured from Germany for the ongoing distribution network improvement in Dhaka.
- ✓ TV cameras specialized for checking the inside condition of water pipes have not been used yet in CWASA, where JICA has been helping with NRW reduction.
- ✓ Only Milners Pumps Limited (MPL) manufactures large pumps and large valves in Bangladesh. There is no association for pump manufacturers in Bangladesh.
- ✓ MPL has good technologies for metal casting.
- ✓ The sales and market share of the pumps manufactured by MPL are limited in comparison to the size of its market because many pumps come from foreign countries, especially China.
- ✓ MPL imports motors for pumps from abroad because there are no companies manufacturing motors for pumps in Bangladesh.
- ✓ Pedrollo NK Limited sells domestic and industrial pumps imported from Italy, Taiwan, China and Thailand.

2) Possible Collaborations with Japanese Companies

- ✓ Pipe manufacturing companies are interested in new cost-effective technologies related to HDPE pipes and PVC pipes.
- ✓ MPL are interested in manufacturing butterfly valves and water meters based on their casting technologies in collaboration with Japanese companies.
- ✓ The production of large pumps, which requires high manufacturing skills, in collaboration with Japanese companies is a big business opportunity in Bangladesh.
- ✓ The local manufacturing of pumps provides good solutions for making pump operation more sustainable in Bangladesh, including the easy supply of spare parts. Many large pumps initially come to Bangladesh as parts of total water treatment systems, which often have problems in changing to spare parts.

6-3 Local Consultants

(1) Business Consulting Companies

As shown in Table 6-1, there are several business consulting companies that support a Japanese company's business development in Bangladesh. Those consulting companies have been working mainly in Bangladesh and have Japanese-speaking staff.

Three of the five business consultants shown in this table also have offices in Japan and provide their services in Japan. Although they unfortunately do not have experience in matchmaking regarding water-related business, they have broad local networks and rich experiences of matchmaking in garments and leathers.

These business consultants can provide the following services:

- Information collection, market research and various surveys
- Arrangement of site visits (arrangement of appointments, an interpreter, transportation, etc.)
- Business planning and financial analysis
- Matchmaking between a Japanese company and a Bengali company, and assisting the preparation of Joint Venture Agreements

- Assisting in setting up a local company and liaison /branch /representative office
- Legal and accounting services
- Support regarding human resources (personnel dispatching, recruiting, training, etc.)
- Support for business operation

Table 6-1: List of Business Consulting Companies

Name	Contact No. and Address	URL
Next Business Management Service	Tel :+880-1944884444, 880-01677896020, +880-1718559418 Address: House#37, Flat #B6, Road#4, Block#F, Banani, Dhaka-1213, Bangladesh	http://nextbusiness.com.bd/
New Vision Solutions, Ltd.	Tel: +88 02 9889687, +88 01775-165557 +88 01752-028743 Fax : +88 02 9889687 Address: House# 456 (1st Floor), Road#31, Mohakhali DOHS, Dhaka 1206 Bangladesh	http://www.newvision-bd.com/
Prothom Inc.	Address: House No.30 (3rd Floor B), Road No.18, Block-A, Banani, Dhaka-1213, Bangladesh	http://banbiz.jp/
Pleiades Japan, Pleiades Bangladesh (Pleiades Group)	Tel/Fax: +880-2-9862097 Address: Flat-4B, House #8, Road#2/E, Block-J, Baridhara, Gulshan-1212, Dhaka, Bangladesh	http://www.pleiades-group.com/
Tokyo Consulting Group	Tel: +88-017-7440-2807 Address: House No.30, Road No.20, Flat No.6/A, Block-K, Banani, Dhaka-1213, Bangladesh	http://www.kuno-cpa.co.jp/tcf/bangladesh/

(2) Engineering Consulting Companies

Local engineering consulting companies are also useful for Japanese companies planning to establish large-scale water supply and sewerage PPP projects. Local engineering consulting companies know local standards well and can help the Japanese companies in designing facilities and in dealing with matters related to Environmental Impact Assessment (EIA). Table 6-2 shows some local engineering companies interested in large scale water-related projects in Bangladesh.

Table 6-2: List of Engineering Consulting Companies

Name	Contact No. and Address	URL
BETS Consulting Service Ltd.	Tel: + 880-2-9889923-24, 9861529-32 Address: House 10, Road 135, Gulshan-1, Dhaka-1212, Bangladesh	http://www.betsbd.com .
Aqua Consultant & Associates Ltd.	Tel: +880-2-8859861 , 8856411 Address: 43, Mohakhali C/A (14th & 15th Level) . Dhaka – 1212, Bangladesh	https://www.aquacon.com.bd/
ACE Consultants Ltd.	Tel: +880-2-8413571, +880-2-8415330, +880-2-8416917 Address: House 374, Lane 6, DOHS Baridhara, Dhaka, Bangladesh	http://www.acebd.com/
Sodev Consult	Tel: +88 02 8813945, Fax: + 88 02 8823604 Address: House 218, Lake Road, Road 14, DOHS Mohakhali, Dhaka-1206, Bangladesh	http://sodevconsult.org/

6-4 NGOs operating in Bangladesh

There are many Non-Governmental Organisations (NGOs) in Bangladesh, and it might be difficult for Japanese companies to select a suitable NGO as their business partner.

The NGOs operating in Bangladesh with any foreign donations need registration with the NGO Affairs Bureau (NGOAB) under the Prime Minister's Office. Some 2,245 NGOs are registered with NGOAB as of July 4, 2013. NGOs that have extensive work experience with international organisations and/or private companies would be good business partners for the Japanese companies requiring assistance from NGOs for public awareness building on safe drinking water, promotion of water-related products, support for operation and maintenance of small community water supply facilities, etc. For collaboration with NGOs, it is necessary to understand that NGOs are non-profit voluntary organisations and they have their own missions.

It should also be noted that there are many NGOs incapable of working smoothly with foreign companies and who tend to use others' money without producing sufficient results. The Japanese companies trying to find their partner NGOs need to check the records and evaluation reports of NGO activities in addition to the checkpoints described in "5-5 Necessities and Risks of Local Partners". The NGOs registered with NGOAB are audited biannually and submit an accounting report every six months and an activity report annually.

(1) Japanese NGOs

Nineteen NGOs originally founded in Japan are operating in Bangladesh. The following three NGOs work mainly in the water-related fields in Bangladesh.

Asia Arsenic Network (AAN) is a citizens' association established in Miyazaki City, Japan. AAN traces its origins to the support of victims of chronic arsenic poisoning near the old Toroku mine in Miyazaki Prefecture. AAN is working solely on arsenic issues with its vast experience, accumulated knowledge and expertise, a large human network and dedication for victims of arsenic contamination. In Bangladesh, AAN undertook three projects for arsenic mitigation from 2001 to 2012 under JICA's program. AAN has been also conducting smaller-scale arsenic mitigation projects for promoting alternative water sources and giving medical support for the victims of arsenic contamination since 1997.

Japan Association of Drainage and Environment (JADE) is a Japanese NGO that originated from a research group on sanitation. JADE was first funded by Japan Fund for Global Environment (JFGE). Since 2004 it has been implementing JICA's grassroots technical cooperation project to improve sanitation in rural areas in Bangladesh. Currently, JADE is engaged in the third phase of the JICA's grassroots technical cooperation project to establish model villages with EcoSan toilets and other eco-friendly technologies. JADE conducts various activities including capacity development for appropriate management of EcoSan toilets in rural areas, public awareness building and research on safe water use and sanitation and improvement of water supply and sanitation facilities in slums.

People for Rainwater (PR) Bangladesh was established in 2008 as a local partner NGO of the Japanese NPO called PR Japan as its base in Bangladesh. PR Japan was established by Dr. Makoto Murase who is an authority of rainwater harvesting in the world. PR Bangladesh has also been the local partner NGO of a Japanese private company called Institute on Skywater Harvesting Co., Ltd. and has been assisting the ongoing preparatory survey for promoting BOP business "Feasibility Study on a Rainwater Tank Social Business with Micro Credit Loans". In the pilot project of selling low-price rainwater tanks, which is conducted in the preparatory survey, PR Bangladesh is responsible for training masons who produce special rainwater tanks, building public awareness on safe water use and promoting the rainwater tanks.

(2) International NGOs

International NGOs originate in foreign countries and are also registered in Bangladesh. Most large international NGOs have long histories and solid financial bases and have been working worldwide. The following NGOs are among major international NGOs engaged in water-related fields in Bangladesh.

International Development Enterprises (iDE) is a USA-based NGO designing and delivering market-based anti-poverty programs in 13 countries over 25 years. Its mission is to create income and livelihood opportunities for poor rural households. For the last few years, iDE Bangladesh has been working on the improvement of hygienic coverage with private sector low cost latrine production in Rajshahi District of Bangladesh (through a 6-month project with HYSAWA and a 2-year project with Water and Sanitation Program (WSP) of WB and Swiss Agency for Development and Cooperation (SDC)). Currently, iDE Bangladesh is engaged in a market study on different safe water options in Bangladesh and will issue the final report soon.

WaterAid is also an international non-governmental organisation with a mission to transform lives by improving access to safe water, improved hygiene and sanitation in the world's poorest communities. It works in 27 countries worldwide. WaterAid Bangladesh has an integrated approach of water, sanitation and hygiene in both urban and rural areas. In urban areas, WaterAid targets slum dwellers and works as mediator between slum dwellers and urban utilities. WaterAid helps the formulation of CBOs and their application for the water connections. In rural areas, WaterAid has established around 25,000 water points (tube wells and pond sand filters) over the last 7 to 8 years. It also established one piped water supply system targeting rural markets and a school and financially contributed to the establishment of a few rural piped water supply schemes.

(3) National NGOs

There are many water-related NGOs in Bangladesh. Most of them are local NGOs working in certain areas in Bangladesh. National NGOs are those established in Bangladesh and operating nation-wide.

NGO Forum for Public Health (NGO Forum) is a National NGO that has been working for three decades in the fields of water, sanitation and environment. NGO Forum is dedicated to contributing to the improvement of public health conditions, especially for the poor, marginalized and excluded segment of society in Bangladesh. NGO Forum utilizes various appropriate technologies suitable for different situations, which include rainwater harvesting, filtration, tube-wells, arsenic removal, Eco-San latrines, a plastic latrine part, etc. It also provides training to their partner NGOs (e.g., small NGOs operating in limited areas) and CBOs. NGO Forum has a huge network with other NGOs, CBOs, government institutions and private companies. NGO Forum can introduce their partner NGOs to Japanese companies looking for specialized NGOs or localized NGOs to collaborate with, based on the expected roles of collaborating NGOs and target areas. Potential roles of NGOs in collaboration with Japanese companies include manufacturing and production, raising public awareness, commercial marketing service, service delivery, operation and maintenance of the facilities, trainings, microcredit, research, etc. According to NGO Forum, NGOs may also be able to provide lands and infrastructure to Japanese companies as their collaboration.

BRAC is a famous NGO dedicated to alleviating poverty by empowering the poor and helping them to have opportunities that can bring about positive changes in their lives. They have been helping the poor for 40 years. The "Water, sanitation and hygiene (WASH) program" is one of its activities. BRAC has been conducting WASH projects in 248 Upazilas. It provides house connections, hand pumps and pond sand filters. It also previously carried out a sanitation project with financial support from the government of the Netherlands. BRAC's WASH projects ensure sustainability of these interventions by encouraging community ownership, developing linkages with local governments, and encouraging local entrepreneurs to supply low-cost hardware. BRAC has recently started supporting the water business of AK Khan WaterHealth (AKKWAH) financially and technically, as explained in 4-2 (2). BRAC is also interested in partnerships with other private companies for carrying out other water businesses in

Bangladesh.

Hilful Fuzul Samaj Kallyan Sangstha (HFSKS) is a national NGO that works with poor and vulnerable people to eliminate poverty and reduce inequality. HFSKS has been operating three rural piped water supply schemes established in BWSPP. It is also engaged in renewable energy projects such as Dissemination of Biogas Technology under GTZ support and Solar Electrification under the support of Infrastructure Development Company Limited (IDCL) under Finance Ministry of the GoB.

6-5 Local Institutions for Researches, Resources and Water Quality Tests

(1) Bangladesh University of Engineering and Technology (BUET)

Bangladesh University of Engineering and Technology (BUET) is located in Dhaka. Many water-related subjects have been researched in its Department of Civil Engineering, including water resources, river and lake water environment, water quality, water sanitation, desalination and adaptation to climate change. BUET has a laboratory for water quality tests and can provide water testing services. According to Prof. Md. Mujibur Rahman, head of the Department of Civil Engineering, the following cooperation may be possible:

- ✓ Large projects like Hatir Jheel Lake Project are required to improve the environment around the rivers in Dhaka (e.g., Buriganga River). The projects should include not only measures to improve the water quality but also the development of riverside roads, fishing industries, amenities and protections from cyclones and floods.
- ✓ BUET can support Japanese companies in various water-related areas when they start businesses in Bangladesh (e.g., water quality testing services, demonstration of their water-related technologies and finding students who can work as survey assistants).
- ✓ BUET can provide necessary technical support to Japanese companies based on its understanding of the problems in Bangladesh.

(2) Khulna University

Khulna University is located in Khulna City, around which there are many areas suffering from salinity intrusion and arsenic contamination of groundwater. There is no engineering department in the university. However, water-related matters are researched with an interdisciplinary approach among the Rural and Urban Development, Architecture, Fishery and Environmental Science Departments of the university. The water-related research subjects of the university include water contamination affecting fisheries, salinity intrusion and arsenic contamination. According to the professor of the university who has been collaborating with a Japanese NGO, the following cooperation may be possible:

- ✓ Khulna University has two laboratories for water quality tests for basic items, heavy metals and microbiological items in its Fishery and Environmental Science Departments. They may be able to analyse samples from individuals, companies and other organisations on a personal favour basis.
- ✓ Khulna University has intensive two to three month Japanese language courses under its modern language centre. Some of these programs are supported by the Japanese Embassy. Khulna University may be able to provide students who can speak limited Japanese as survey assistants to Japanese companies.
- ✓ Khulna University can also cooperate with Japanese companies for water-related researches.

(3) Yunus Centre

Yunus Centre was established in Dhaka in 2008 by Professor Yunus, who is the founder of Grameen Bank,

in order to promote and disseminate various social businesses. Yunus Centre has been the one-stop resource centre and a hub for existing and potential social businesses both globally and in Bangladesh. Yunus Centre organises Social Business Day every year and a half-day long Social Business Design Lab every month to promote and design new social businesses. Yunus Centre can introduce social business funds, including those of Grameen Bank. It is better for Japanese companies to consult Yunus Centre first, if they plan to establish their social businesses in Bangladesh.

(4) Institutions providing Water Quality Test Services

There are several institutions (government institutions, university and NGOs) having their own water quality test laboratories and providing water testing services to private companies. Their water quality testing performances are explained below, based on the interview results.

- 1) BCSIR
 - ✓ BCSIR is the best-equipped for water quality tests and its prices are cheaper than those of other institutions conducting water quality tests in Bangladesh.
 - ✓ BCSIR's tests of 26 water quality parameters have been accredited by the Indian accreditation authority and its tests of 11 parameters have been accredited by the Bangladesh Accreditation Board.
- 2) The International Centre for Diarrheal Disease Research, Bangladesh (ICDDR,B)
 - ✓ Grameen Veolia Water Ltd. is sending water samples to ICDDR,B every month for external water quality tests to improve the reliability of water quality tests at the plant.
 - ✓ Maitri Shilpa (plastic and bottled water factory), managed by the Ministry of Social Welfare, is also sending water samples to ICDDR,B every three months.
- 3) BSTI
 - ✓ BSTI is well equipped and can conduct water quality tests for private companies.
 - ✓ BSTI's tests of 30 water quality parameters have been accredited by the Indian accreditation authority.
 - ✓ Grameen Veolia Water Ltd. is sending water samples to BSTI every few months for external water quality tests to improve the reliability of water quality tests at the plant.
- 4) DPHE
 - ✓ DPHE established its laboratory in Dhaka with assistance of Japan and it can conduct water quality tests. Currently 20 water quality parameters are accredited.
- 5) BUET
 - ✓ BUET has a water quality test laboratory and can provide water testing services to private companies.
 - ✓ Grameen Veolia Water is sending water samples to BUET every few months for external water quality tests to improve the reliability of water quality tests at the plant.
- 6) NGO Forum
 - ✓ NGO Forum has a water quality test laboratory accredited by an international organisation.
 - ✓ NGO Forum provides water testing services to outsiders.

These institutions can provide water testing services to Japanese companies trying to establish their water-related businesses in Bangladesh. There are also business opportunities for Japanese companies having water quality testing technologies to work with or for these institutions.

6-6 Organisations related to Microfinance

Microcredit is very popular in Bangladesh. Microcredit programs are implemented by NGOs, Grameen Bank, state-owned commercial banks, private commercial banks and specialized programs of some ministries of the GoB. In the microfinance sector, the total outstanding loan amount is around Tk. 248 billion (including Tk. 72 billion of Grameen Bank) and the total savings are around Tk. 168 billion. The total clients of the microfinance are worth Tk. 35 million (including 8.4 million clients of Grameen Bank), which accelerates the overall economic development process of the country.

(1) Microcredit Regulatory Authority (MRA) and Microfinance Institutions (MFIs)

The roles of the Microcredit Regulatory Authority (MRA) are to ensure transparency and accountability of microfinance operations of the many NGOs registered as microfinance institutions (MFI) (hereinafter called NGO-MFIs) and to foster sustainable growth of the microfinance sector. MRA is responsible for the following three primary functions:

1. Licensing of NGO-MFIs with explicit legal powers
2. Supervision of NGO-MFIs to ensure that they continue to comply with the licensing requirements
3. Enforcement of sanctions in the event of any NGO-MFI failing to meet the licensing and ongoing supervisory requirements

According to MRA, credit services of MFIs can be categorized into six groups: i) general microcredit for small-scale self-employment-based activities, ii) microenterprise loans, iii) loans for the ultra-poor, iv) agricultural loans, v) seasonal loans, and vi) loans for disaster management. Loan amounts up to Tk. 50,000 are generally considered microcredit. Loans above this amount are considered microenterprise loans. Although microenterprise loans vary from minimum Tk. 50,000 to maximum Tk. 1,000,000, commonly they are not more than Tk. 300,000 or 400,000.

As of June 6, 2013, there are 719 MFIs are registered with the Microcredit Regulatory Authority (MRA). BRAC, ASA, Buro Bangladesh, Padakkhep Manobik Unnayan Kendra, and Jagoroni Chakra Foundation are the largest NGO-MFIs in Bangladesh. The top three MFIs (BRAC, ASA, Buro Bangladesh) contribute 54 percent of the total outstanding loans of the microfinance sector. BRAC provides the largest amount of microenterprise loans among NGO-MFIs. BRAC provides microenterprise loans ranging from Tk. 5,000 to Tk. 1 million, while BRAC Bank provides SME loans of more than Tk. 1 million, which require more paperwork. BRAC's interest rate for a microenterprise loan is around 27%. The interest rate of the microenterprise loans of Grameen Bank is lower than that of BRAC because Grameen Bank's enterprise loans use the savings from its customers as their sources, while BRAC borrows from commercial markets. According to a common regulation for MFIs, microenterprise loans cannot exceed 50% of the total lending of a MFI.

MRA has been regulating the maximum interest rate for MFIs and monitoring the interest rates of the NGO-MFIs. The maximum effective interest rate of MFIs is set at 27%. A few newer NGO-MFIs may provide microcredit loans at this maximum rate, but most of the NGO-MFIs' interest rates are between 22% and 25%. The interest rate of NGO-MFIs is higher than those of commercial banks because NGO-MFIs usually borrow money from commercial banks and donations are only around 3% of their financial sources. Moreover, MFIs need to recover their management costs. MFIs are visiting houses of poor people and advising businesses with microcredit loans while commercial banks are waiting for their customers at their offices. However, the rate for consumer loans that do not require collateral is maximum 35% in commercial banks and it is much higher than the MFIs' interest rates. MFIs do not require guarantees or collateral; they lend the money based on trust. MFIs are the last resort for the poor people without credit who cannot borrow money from other financial institutions.

Other common regulations for MFIs include 1) no foreign company can borrow or invest in any MFI of Bangladesh and 2) no MFI can distribute its profit. A foreign company or a JV with a foreign company not registered in Bangladesh cannot borrow money from MFIs. A local company borrowing a microenterprise loan cannot share its profit with a foreign company. This means that the microenterprise loan cannot be used by franchisees to establish their factories or shops if their franchiser is a foreign company. Japanese companies need to borrow money from other financial institutions.

On the other hand, MFIs can lend money to persons who try to sell (at retail) the purified water or water-related equipment (e.g., rainwater tanks and water purifiers) produced and sold at wholesale by a Japanese company. However, MFIs may not lend money to people who want to buy water for their household uses, because the loan cannot make profit. MFIs make loans to the people who can pay back the loans using the profit from their invested businesses.

(2) Grameen Bank

Grameen Bank is not under the control of MRA, because it is not a NGO-MFI but a special bank. The origin of Grameen Bank can be traced back to 1976 when Professor Muhammad Yunus at the University of Chittagong launched an action research project to examine the possibility of providing banking services (i.e., microcredit) to the rural poor around the university. With the success of microcredit in the action research project, microcredit was extended to other districts in Bangladesh. In October 1983, Grameen Bank was transformed into an independent bank specializing in poverty alleviation. Currently, 90% of Grameen Bank is owned by the rural poor whom it serves, while the remaining 10% is owned by the government. Grameen Bank promotes its activities using the savings of its customers as its own funds. It has not received any foreign grants since 1995.

Grameen Bank has 16 decisions as its principles, which include the following decisions related to water supply and sanitation:

- We shall build and use pit-latrines
- We shall drink water from tube wells. If it is not available, we shall boil water or use alum.

The staff of Grameen Bank has been helping rural populations to follow these decisions in the field.

The loan products of Grameen Bank are basic loan, microenterprise loan, housing loan, higher educational loan and beggar's loan. While the maximum interest rate of microcredit loans in Bangladesh is 27% as restricted by the government, the interest rate of Grameen Bank's basic microcredit loan is 20%. The interest of Grameen Bank is simple interest and never becomes more than the loan amount. As a bottom-up system, Grameen Bank's board of directors consists of 9 elected borrowers (their term is three years), 3 government nominees and 1 previous managing director of Grameen Bank. The involvement of the elected borrowers ensures that Grameen Bank's financial products are borrower friendly.

The interest rate of Grameen Bank's microenterprise loan is 20%. The experienced borrowers of Grameen Bank (more than 3 to 5 years) can get microenterprise loans relatively easily. Although Grameen Bank's microenterprise loan is usually Tk. 10,000 to 12,000, the amount does not have any fixed upper limit, unlike NGO-MFIs. The upper limit is set based on the activities, previous repayments, financial ability, saving capacity, etc. of each individual borrower. Although the repayment period of the microenterprise loan is usually 1 to 2 years, this period can be set longer based on discussions between the bank and the borrower. A longer repayment period makes each instalment lower but total interest higher.

Grameen Bank is prohibited by the Grameen Bank Ordinance from lending money to foreign companies, JVs with foreign companies and local companies or people who have to pay commissions to the foreign company managing the franchise business.

Chapter 7 Opportunities of Water-related Businesses for Japanese Companies in Bangladesh

In 2010 and 2011, JICA studied Japanese water-related technologies and water business models in developing countries such as Bangladesh through “Preparatory survey on cooperation program for the improvement in water supply services in the People’s Republic of Bangladesh” and “Data collection survey on private partnership in water supply sector”. Building upon these past studies, this report focuses on possibilities of Japanese companies becoming involved in three types of water-related businesses, explained in Table 1-1, with local partners in Bangladesh. The three types of water-related businesses are PPP projects, BOP businesses and the provision of component technologies. The opportunities of each type of businesses are separately explained in 7-1 to 7-3. Although many of the component technologies like RO membranes can be used for all three business types, they are explained in 7-3.

7-1 Opportunities of PPP Projects

(1) Targeting Medium-scale PPP Projects having Special Conditions

The provision of water supply services through PPP projects has a much higher risk than that through Japanese ODA loan projects, especially in the least developed countries (LDC), due to the inexpensive water charge and the high risk in investment. Even Japanese major companies have not successfully implemented any large-scale PPP water supply projects in LDCs, including in Bangladesh. It is more difficult to establish PPP water supply businesses without special financial aid in regional towns and villages than in large cities, due to the lack in advantage of scale. Regarding villages, WB and DPHE have been supporting PPP-type rural piped water supply schemes of local NGOs and companies by covering 70% of required initial costs, as already explained. But it has not been easy to raise villagers’ willingness to pay for the piped water, partly because the water from the wells built by DPHE and NGOs in the past is available for free in many villages. This study investigated the possibility of Japanese companies’ involvement in medium-scale PPP projects. The medium-scale PPP projects may target 1) newly developed high-standard residential areas, 2) established DMAs and special economic zones (SEZ), 3) areas for selling bottled water or jar water, and 4) regional towns having financial assistance from donors (like the WB and DPHE’s rural piped water supply schemes). Different types of medium-scale PPP projects in which Japanese companies may be able to participate are explained in more detail below.

(2) With RAJUK

The capital development authority of Bangladesh, called RAJUK (Rajdhani Unnayan Kartipakkha), carries out town planning and development control in Dhaka. RAJUK has been developing three large residential areas outside the existing boundary of Dhaka City Corporation (Uttara 3rd Phase Area, Jhilimili Housing Project Area and Purbachal Housing Project Area), but these areas still do not have water, sewerage and/or drainage systems. RAJUK has tried to hand over the responsibilities of developing water supply, sewerage and drainage systems in these areas to DWASA. However, DWASA and the GoB lack sufficient financial resources for developing those systems in these large areas and RAJUK needs PPP projects to establish those utilities there.

RAJUK may engage in joint venture collaboration with foreign companies for the implementation of several PPP projects. RAJUK has already sent a proposal/pre-feasibility study report on a Bridge Project (covering 10km from the centre to the south of Dhaka City) to the PPP Office under the Prime Minister’s Office. Regarding water supply and sewerage-related PPP projects, RAJUK puts its top priority on the above-mentioned PPP projects in the three housing areas and the second priority on the improvement of water distribution, sewer collection and rainwater drainage systems in two haphazardly

developed areas (Kamrangirchar fringe area and Dhaka-Narayangaji- Demra).

The development of water supply, sewerage and drainage systems in the three new housing areas can be separate contract packages for each new town. According to RAJUK, they are trying to start implementing some of the PPP project packages in these new housing areas within 6 months. The in-house consultants of RAJUK have already started preparing the proposals (pre-feasibility study reports) of these PPP projects. In each of the three new towns, water supply, sewerage and drainage systems need to be developed simultaneously and in an integrated way. A new WTP and a new STP are also required in each new town. The lakes in these areas, especially those in Purbachol, are still in good condition and can be good water sources of the WTPs to be built in these areas. In these PPP project packages, the private companies must provide water supply and sewerage services based on DWASA's standards and have to collect water charges directly from the customers for 20 to 40 years. A special water tariff can probably be set for these new housing areas to make the PPP projects feasible. According to DWASA, the proponents of the PPP projects can easily collect water and sewerage charges from investors and/or plot owners because most of the plots in these areas are already sold out and those expensive plots need water supply, sewerage and drainage utilities. According to DWASA, VGF of 15% to 20% of the project cost may be provided for the PPP project packages in these housing areas.

(3) With DWASA

As already explained in 4.1 (1), four more contract packages for distribution network improvement in Dhaka (including establishment of DMAs) will be open for next ICBs in DWSSDP, in addition to the six ongoing contract packages. The target areas of these contract packages are as follows:

- Zone 1 – Saidabad Area
- Zone 2 – Old Dhaka
- Zone 6 – Secretariat Area
- Zone 9 – Uttara

Japanese companies may need to establish JVs with Malaysian or Chinese contractors having trenchless pipe rehabilitation technologies to win the ICBs of the upcoming four packages. After gaining some experience, they can expand their businesses in Bangladesh more easily. According to DWASA, Japanese companies may be able to conduct a pilot PPP project of supplying drinkable piped water at higher price in one of the DMAs to be established. DWASA is looking for the latest technologies to improve its services. DWASA has a plan for automating the operation of the facilities with SCADA and is especially interested in automatic meter reading (AMR). Currently water meters are read manually by DWASA-appointed persons. Japanese companies may be able to have a PPP-type pilot project with SCADA in one of the DMAs.

DWASA already has its own bottled water plant. DWASA sells bottled water called Shanti Water at 10 Tk. for 1 L to reduce the monopoly in and the market price of bottled water (most of the other bottled waters available in Dhaka are sold at around Tk. 15 for 1 L). The O&M of this existing bottled water factory might be outsourced to a private company. Japanese companies may work with DWASA for another bottled water plant as a PPP project.

As already explained in 4-1 (1), there is a possibility that the O&M of the new planned WTP in Gangapur, Dhaka will be carried out under a management contract similar to the existing Saidabad WTP in Dhaka. Japanese companies may be able to join the tendering of this management contract.

(4) With CWASA

Mohana WTP, having a capacity of 90 million L/day, was constructed in Chittagong in 1981-84. CWASA has been waiting for financial support to expand the WTP (an additional 90 million L/day).

According to CWASA, this expansion can be done as a PPP project. A private company may construct the intake facilities and the WTP and may sell the treated water in bulk to CWASA. This kind of off-take contract is better for Japanese companies because it would be too difficult for the private company to collect water charges directly from the customers. At the same location, a large bottled water plant (jar water and cup water are options to consider) can be established as a part of the PPP project, according to CWASA. By operating the bottled water plant as well as the WTP, the private company would be able to have sufficient revenue to sustain their operation of the WTP.

(5) With BEPZA and BEZA

As already explained in 4-1 (3), there are no WTPs in Mongla EPZ, Ishwardi EPZ and Uttara EPZ. The numbers of factories in these three EPZs are lower than in the other five EPZs. The factories in the three EPZs use municipal water supply systems or their own wells. Although boring of wells is basically prohibited in the EPZs, BEPZA shall give approval under certain conditions and monitor the uses of wells. The fee for groundwater usage, based on the amount used, is paid to BEPZA. The construction of a WTP in Mongla EPZ has the highest priority, because the area suffers from salination and it is expected that many factories will be established in this EPZ when the transportation between Dhaka and Mongla becomes easier with a new bridge over Padma River. BEPZA gives the second priority to the establishment of WTPs in Ishwardi EPZ and Uttara EPZ. Then BEPZA hopes to invite water supply companies to those EPZs.

BEPZA also has a plan to set up CETPs in every EPZ because the installation of effluent treatment facilities at each factory costs too much for the companies in EPZs. BEPZA's next two targets for constructing CETPs are Karnaphuli EPZ and Ishwardi EPZ, respectively. According to BEPZA, when these CETPs are established in the future, all factories have to connect the systems and stop using their own effluent treatment facilities. To construct a CETP or a WTP within these EPZs, BEPZA will provide land and other utilities to the contractor (the sponsor). There are plots allocated by BEPZA for CETPs and WTPs at all the EPZs. BEPZA selects the company to build and operate them through its tendering system.

As already explained, the remaining plots in the existing 8 EPZs under EPZA are limited. Therefore, the Bangladeshi government has a plan to set up seven special economic zones (SEZs) under the newly-created Bangladesh Economic Zones Authority (BEZA) and get three SEZs in Sylhet, Feni and Khulna into operation in its first phase. The SEZs will be in Mirsarai and Anwara in Chittagong Division, Sirajganj in Rajshahi Division, Moulvibazar in Shylhet Division, Sherpur and Mongla under Khulna Division. Foreign and local companies would also be allowed to set up WTPs and CETPs as well as power plants at the SEZs through public-private partnership.

(6) With DPHE

According to DPHE, the PPP-type rural piped water supply schemes of BRWSSP, which are explained in 4-1 (2), would all be small in size and not very profitable. These schemes are basically designed for local sponsors (local NGOs and local companies) although foreign companies can join in if they have the required licences, such as a trade licence. Moreover, private companies have a higher risk of failing in rural piped water supply projects (e.g., difficulty collecting water charges) after installing water supply facilities. NGOs usually have less risk because they have stronger connections with communities through other activities such as microcredit loans. It would be also difficult for foreign companies to continue the operation of rural piped water supplies for 15 years.

DPHE is trying to include the development of a new PPP-type piped water supply model for 30 municipalities having populations of less than 30,000 in BRWSSP (i.e., paurashavas). DPHE is waiting for WB's approval on this inclusion into BRWSSP. It would be more beneficial for foreign companies to be involved in the PPP-type piped water supply schemes for 30 paurashavas in comparison to the 125

schemes for villages. One of the usual preconditions of PPP is that the utilities should be well developed and should have full autonomy for decision making, like WASAs. However, in the case of paurashavas, the water utilities section is within the administrative control of the paurashava, which in itself lacks adequate autonomy. In most cases, the Paurashava Water Supply Section (PWSS) accounts are not separately maintained and the paurashavas cannot recruit new staff without the approval of the Ministry. Therefore, it is necessary to develop a clear path toward increased private sector involvement. A great deal of preparatory work for PPP projects remains to be done at the public sector level.

7-2 Opportunities of BOP Businesses

(1) Different Models of Water-related BOP Businesses

Favourable models of water-related BOP businesses for Japanese companies have been considered in this study based on the various experiences of Japanese and foreign companies, explained in 4-2. Based on the current water business situation in Bangladesh, the water-related BOP businesses can be categorized as follows:

- 1) **Sales of Rainwater Tanks** (household and community use)
- 2) **Sales of Goods for Water Purification** (chemicals and devices such as water purifiers)
- 3) **Sales of Water with Containers** (sealed and unsealed containers)

1) Sales of Rainwater Tanks (household and community use)

In Bangladesh, rainwater can be collected and used for many purposes during the rainy season and used only for drinking during the dry season. Rainwater can be drunk without treatment if it is properly stored and handled. For example, Institute on Skywater Harvesting Co., Ltd. (a Japanese company) established a local company called Skywater Bangladesh Co., Ltd. to sell household rainwater tanks for the BOP population without affordable safe water access as the next step after the preparatory survey for BOP business. Although the local company is not expected to generate sufficient profit to support the salary of a Japanese staff due to the low profitability of selling household rainwater tanks, it is expected that sales of community rainwater tanks (especially those targeting institutions such as schools, hospitals, cyclone shelters, etc.) will generate profit for expansion of its business over other regions in Bangladesh. More investigation is required to evaluate the profitability of producing and selling community rainwater tanks in Bangladesh and the ease of copying Japanese technologies for community rainwater tanks. Since the operation and maintenance of community rainwater tanks is relatively easy, the provision of community rainwater tanks in the coastal areas affected by sea water intrusion may be suitable, especially for a JICA grant aid project, as they usually target the construction of facilities having a long lifetime.

2) Sales of Goods for Water Purification (chemicals and devices such as water purifiers)

Disasters occur every year in Bangladesh and more products for treating water in emergency situations are needed. There are some products for this purpose, including water purifying tablets and alum for treating surface water. Water purification tablets are often needed in cyclone shelters because it is difficult to install water purification equipment during a disaster. Alum precipitates impurities and reduces microorganisms in water from ponds and makes the water usable in 8 to 10 hours. There are huge demands for alum for water treatment. The NGO Forum considers the production and low-price sales of water purifying tablets and other items (e.g., aluminium hydroxide (alum)) at its production centres. U.S.-based P&G sold small packs of water-purifying powder called PUR (containing powdered ferric sulphate (a flocculent) and calcium hypochlorite (a disinfectant)) in emergency situations after the cyclone hit Bangladesh in 2007. A Bangladesh company, Sonar Laboratories, Ltd. has sold

water-purifying tablets called HALOTAB (containing a chlorine-based formula called Halazone) in many past disasters caused by cyclones in Bangladesh. One tablet of HALOTAB can be used for purifying 1.5 to 3 L of natural water. Its wholesale price is only Tk. 87.97 for 100 tablets, while its market price is Tk. 100. A few more local companies, including Essential Drug Company Ltd. (a government owned pharmaceutical company) and BIO PHARMA, used to produce this kind of chlorine-based tablet. However, they stopped their production of chlorine-based tablets partly because they are highly corrosive and often destroy the equipment and machineries used for the production. Nippon Poly-Glu Co., Ltd. used to sell their purifying agent using bacillus subtilis natto to villagers in Bangladesh for daily use. However they have stopped selling the purifying agent and started selling drinkable water purified with the agent in 20L jars instead.

Based on the existence of these competitors and their past experiences, the sales of new water-purifying chemicals at low price as a BOP business does not seem to be very promising for Japanese companies. However, according to iDE Bangladesh (U.S.-based international NGO), which has been conducting a market study on safe water access in Bangladesh, Japanese companies would fare better by targeting the sales of 1) water treatment tablets (like Al-Amin, a pharmaceutical company) and 2) domestic water purifiers in rural areas (especially where salinity and arsenic cause problems with their water sources) and 3) the sale of bottled water in urban areas.

The sale of household water purifiers seems to have more potential for Japanese companies. As explained in 5-3 (1), the majority of the household water purifiers available in the markets in Bangladesh are imported from India, China and Malaysia. If a Japanese company can produce high-quality water purifiers at low cost in Bangladesh with the support of a local manufacturing company, the product may sell well in the rural areas without access to safe water, as well as in the urban areas like Dhaka, where piped water is not drinkable without treatment. iDE Bangladesh and some Japanese companies including Nippon Poly-Glu Co., Ltd. are currently trying to explore the possibilities in this field. Other Japanese companies also have the possibility of establishing their household water purifier businesses with local manufacturing companies; (2) of this sub-section describes the potential collaborations with a specific public company for the production of household water purifiers.

As explained in 5-4 (3), the sale of water purifiers designed for arsenic removal requires permission from BCSIR. The acquisition of such permission is not easy and will probably take a long time (e.g., two years). However, according to NGO Forum, if any Japanese company develops a small arsenic removal device attachable to the hand pumps of arsenic-contaminated tube wells, it could be a big business in Bangladesh. Other potential collaborations with NGO Forum are explained in (7) of this sub-section and in 6-4 (3).

3) Sales of Water with Containers (sealed and unsealed containers)

There are two sub-categories of water sales with containers. One of them is without sealing the caps of containers and the other is with sealing. The water sales with sealed containers (such as jar water, bottled water and cup water) require permission from BSTI, as already explained in 5-4 (2). The sale of sealed bottled water or jar water usually targets middle and high income groups and may not be a BOP business (Since most of the middle-income people in Bangladesh are classified as the BOP population (their annual income is less than USD 3,000) and it can be said that businesses targeting the middle-income people is so-called BOP businesses). However, it can create a cross-subsidy for the water-related business targeting the BOP population and can be part of BOP business like the examples of foreign companies explained in 4-2 (3) and (4). A new BOP business model creating a cross-subsidy by selling water with sealed containers is explained in (3) of this sub-section. Since jar water is also consumed by the BOP population at certain locations like tea stands, the collaboration with a local jar water company can also be a BOP business. This possibility is further explained in (4) of this sub-section.

A.K. Khan WaterHealth and Nippon Poly-Glu Co., Ltd. have been selling purified water without sealed containers. This sub-category of water selling businesses does not need BSTI's permission necessary for sealed bottled and jar water, a machine for bottling and sealing and a silver tape on each jar or bottle showing proof of VAT payment. In the case of A.K. Khan WaterHealth, they fill customers' containers with the purified water at their WaterHealth Centre after cleaning the containers and deliver most of the filled containers door-to-door with rikisha vans. In case of Nippon Poly-Glu Co., Ltd., they bring their purified water in tanks to customers and fill customers' containers door-to-door. The social business model of Grameen Veolia Water also sells water without sealed containers in rural areas. They distribute their purified water with pipes to their water selling points and their lady dealers fill customers' containers there. In these businesses, the awareness of customers concerning safe water and the demand for their purified water needs to be raised through campaigns. A.K. Khan WaterHealth is going to expand their water selling business over Bangladesh to a great extent with the support of BRAC within a few years. The results of this expansion would show the actual potential of these sub-categories of business in Bangladesh. The potential partnership with iDE Bangladesh, which may support the expansion of this kind of water selling business without sealed containers, is explained in (6) of this sub-section.

The difficulties of rural piped water supply schemes distributing water to each household are already discussed in 4-1 (2). This type of water business seems to be feasible only when it is carried out in PPP-type projects with financial assistance from donors.

(2) With the Bottled Water Factory for Handicapped People

There is a government-owned industry (welfare trust) called Maitri Shilpa in Tongi, Dhaka, which produces plastic goods and bottled water. The total number of its workers is 75 and most of them are handicapped. The management officers are on deputation from the Ministry of Social Welfare. According to them, Japanese companies have a chance to work with this industry to produce and sell purified water with sealed plastic containers (e.g., bottle and jar) and household water purifiers made of plastic. As already explained, jar water can be sold to certain shops, like tea stands, targeting the BOP population. Moreover, the profit from increased bottled water sales with the collaboration of Japanese companies can be used as a cross-subsidy to support social business such as piped water supplies in rural areas. Since most of the household water purifiers available in the market are imported, the local production of household water purifiers with the help of Japanese companies may capture wide attention from customers.

Maitri Shilpa was established in 1981 with help of the Swedish International Development Agency (SIDA) as a plastic factory and training centre for the physically handicapped. In the plastic factory, they produce 70 types of household plastic products and the water bottles for their own bottled water. They also produce bottle caps for other bottled water companies. They have 12 newly installed machines for plastic manufacturing but these machines are currently not operating due to an insufficient labour force and lack of funds. Most of the other machines in the plastic factory are not in good condition and the moulds and dies of some machines need to be changed. They also have a workshop where they can make moulds and repair their machines. Household water purifiers can be produced in this plastic factory if the required moulds and dies are provided by Japanese companies.

The bottled water plant of Maitri Shilpa started operation in 2004. Currently they are producing five types of bottled water (300 ml, 600 ml, 1 L, 1.5 L and 2 L). Their water purification equipment is imported from the USA and has a much higher capacity in comparison to the capacity of their bottle filling machineries, which are imported from China and are not working very well. The treatment capacity of this plant is 3,000 L/ hour, but currently they are producing only 4,000 L/day. This bottled water is sold to governmental agencies and the honourable prime minister's office. The factory staff is expected to expand their business with foreign companies, including Japanese companies. There is a high demand for 5 L bottled water in the market in Bangladesh and they can produce 5 L water bottles and 20 L water jars if they get the proper financial support, dies and moulding machines from Japanese

companies. They can also produce sparkling water and other beverages if the required equipment is provided. They have sufficient land and deep tube well capacity for the expansion.

(3) With Yunus Centre

Yunus Centre works as a hub of social businesses. It was formerly a personal office in Grameen Bank for Prof. Muhamad Yunus, who won the Nobel Peace Prize in 2006 (i.e., Yunus Secretariat). It became Yunus Centre in 2008 and has been chaired by Prof. Yunus. Yunus Centre has about 20 permanent staff and interns from various countries. Yunus Centre organises a half-day workshop called Social Business Design Lab every month to support the formulation of good social businesses. About 100 entrepreneurs and business persons and the staff of Yunus Centre, including Prof. Yunus, who has a strong interest in rainwater harvesting and arsenic removal, join in each Social Design Lab. Investors (mainly local investors and some international organisations like UNDP) also join in the design labs to find the businesses in which they can invest. Although Yunus Centre does not have its own funds, it can introduce available funding for social business, including that of Grameen Bank, if a social business is well planned. As of June 2013, 12 social businesses were under process of Social Business Design Labs and 5 social businesses had already been established through the design labs. Yunus Centre also carries out social business campaigns, such as an international event called Social Business Day, every year, and around 1,000 people join the event.

The goal of a social business is to provide solutions to real-world problems and to improve people's lives. Social businesses use market mechanisms to pursue social goals. Although owners of and investors in social businesses gradually recoup the money they have invested, there is no dividend and their profits are reinvested to expand and widen social benefits according to the definition of social businesses used by the Yunus Centre. As already explained in 4-2 (3), Grameen Veolia Water was established as a joint venture between Grameen Healthcare Services Ltd. (one of the social business initiatives of Grameen Family) and Veolia Water (a major water company providing water and wastewater services and related technologies in the world) in 2008. The Joint Venture is a 'No Loss, No Dividend' company with the social goal of providing access to clean, safe drinking water for 100,000 people. Grameen Veolia Water currently sells a limited amount of water in the rural areas and sells jar water in Dhaka for setting a cross-subsidy between rural and urban customers. Their main target customers have been the rural poor, and this will not change. Yunus Centre is one of the project partners of Grameen Veolia Water.

Unlike larger companies such as Veolia Water, which can invest in establishing a 'No Dividend' company, small and medium-sized Japanese companies need more incentives to join in social businesses because they usually don't have much extra money to invest in the poor in Bangladesh without expecting profits. Therefore, in the meeting with Yunus Centre, the study team proposed a new social business model which may be better suited to a joint venture between the Grameen Family and a small or medium-sized Japanese company. This business model consists of three components: [1] an independent piped water supply system for peri-urban (fringe) slums or rural areas, [2] jar water sales and [3] bottled water sales. Two of them (e.g., [1] and [2] or [1] and [3]) are paired as a social business with cross-subsidy and the remaining one component ([2] or [3]) is defined as commercial business. These business components share the same facilities. Commercial businesses can use the same facilities until the water demand of the social business reaches the design capacity. Owing to this advantage of collaboration with the Grameen Family, Japanese water-related SMEs trying to promote social business in Bangladesh can save their capital investment.

UNIQLO's combination between social business and commercial business may be a good reference for Japanese companies that would like to collaborate with the Grameen Family. Grameen UNIQLO (UNIQ's joint venture with Grameen Healthcare Trust) is planning to produce and sell female sanitary napkins for poor people. UNIQLO has a big factory building in Gazipur and two floors in the building are allocated to Grameen UNIQLO's social businesses. In this model, the same building is shared for the social business of Grameen UNIQLO and the commercial business of UNIQLO. The shared use of the same water purification facilities between the social business and the commercial business may refer to

this preceding example. With the support of experienced Grameen Veolia Water, discussions between Japanese water-related companies and Yunus Centre on joint ventures with Grameen Family may go more smoothly.

(4) With Jar Water Companies

As already explained in 6-1 (2), Japanese companies may find local partners for selling jar water and/or bottled water through PDWMAB. PDWMAB would help Japanese companies having social purposes since this association promotes not only commercial business but also social business. Companies from Netherland, Switzerland and Sweden have visited this association to find local partners through the international aid agencies of their countries. The association expects that Japanese companies do social businesses with the assistance of JICA and others.

The market for bottled water is mainly occupied by large companies that can produce plastic water bottles and have automated machines for labelling, bottling and packing. Medium and small companies, including those belonging to PDWMAB, usually sell jar water in purchased recyclable plastic jars and have difficulty producing bottled water due to the large investment required to produce plastic bottles and bottled water. Therefore, a Japanese company may be able to partner with a medium-sized local jar water company willing to produce high quality bottled water in addition to their jar water.

In the partnership, the Japanese company may install the machines required for producing plastic bottles and bottled water on the land of the local jar water factory and may use the existing deep well of the local company as their source of bottled water. Some parts of the profit from selling bottled water may be used as a cross-subsidy to 1) sell jar water at low prices to the places like tea stalls targeting the BOP population and/or 2) provide jar water for free or at a low price to the organisations helping poor people and/or the people affected by disasters. A jar water company may sell jar water at a discounted price (e.g., Tk. 30/jar) to small shops where the low income households can fill their own 1 L or 2 L containers with the jar water at discounted price (e.g., Tk. 2 / L).

Among the member companies of the association, 4 or 5 medium-sized companies are interested in working with Japanese companies. So-Safe International, selling more than 1 thousand jars of water per day, is one of them. So-Safe International has a plan to sell bottled water in the future. Although they don't need any distributor or dealership for their jar water, they need distributors for selling many bottles of water in a large area in order to capture the market. To expand their business to bottled water, So-Safe International needs more land and their filling system needs to be fully automated. The plastic bottles need to be manufactured, too, because buying bottles from outside costs too much to make a profit. The initial investment required to produce bottled water in this company is around Tk. 50 to 100 million. If a Japanese company can produce plastic bottles with a local company and sell the bottles at discounted prices, local jar water companies interested in the bottled water business would buy the plastic bottles. A Japanese company may also produce good-quality water dispensers in collaboration with a local plastic manufacturing company and sell them to jar water companies in Bangladesh.

(5) With iDE Bangladesh

iDE Bangladesh is a NGO specializing in market development in Bangladesh. iDE Bangladesh supports social and aspirational marketing. For the last few years, iDE Bangladesh has been promoting an innovative and upgradable low-cost latrine in Rajshahi District. About 10 years ago iDE Bangladesh developed a household water purifier called Shapla with a special ceramic filter containing iron to remove arsenic. iDE Bangladesh became active again in the fields of water and sanitation. iDE Bangladesh is about to issue the final report on the market study on different safe water options in Bangladesh. They are going to get Shapla certified by BCSIR as a commercial arsenic removing device so that they can mass-produce and market the product with the help of a major local company.

According to iDE Bangladesh, if Japanese companies sell their products to government agencies and NGOs for their pilot projects, the number of product sales will probably not increase very much over the years. Japanese companies need the help of a broker who can quickly match them with local manufacturers and distributors in order to avoid their ideas being copied and successfully commercialized first by local companies. iDE Bangladesh would be able to work as a broker because it has strong networks for marketing in rural areas. It has connections with both small and medium Bangladeshi companies and large Bangladeshi companies (e.g., PRAN-RFL, GAZI, Partex and Acme) that may be potential partners of Japanese water-related companies. iDE Bangladesh would be able to access conglomerates having many dealers to sell Japanese products and can also mobilize NGOs to catalyse the dealings between Bangladeshi companies and customers.

(6) With BRAC

BRAC is another NGO with which Japanese companies may be able to collaborate for their water businesses. According to BRAC, small pilot projects are required first before going for larger business trials. BRAC is not looking for a high profit ratio in water supply businesses; however, it expects that its FIRR has to be 20% to 30% (e.g., 14% return is not sound) to expand a water business successfully, and the capital cost has to be recovered in 3 to 5 years. According to BRAC, the management of franchise businesses is quite difficult in Bangladesh. For example, if the commission/royalty is supposed to be paid based on the number of sold rainwater tanks, the number of sold tanks may not be reported with honesty.

If the business model proposed by a Japanese company is good, BRAC may provide about 50% equity at first to share the profit of the business. If the business becomes successful, BRAC can even take 100% equity for its expansion. BRAC is looking for effective and sustainable technologies but not for fancy technologies. It would take time for Japanese companies to understand rural areas. BRAC can also help Japanese companies technically in many ways. For example, BRAC can test out Japanese technology in the community for one month (e.g., sending a surveyor to the site every two days) and give feedback to the company. BRAC can also provide information on the seasonal fluctuation of salinity levels in well water to consider the adaptability of a desalination plant.

(7) With NGO Forum

NGO Forum has a plan to establish a jar and/or bottled water factory and tries to provide low-price jar or bottled water without subsidizing the products. For example, DPHE produces one latrine at a cost of Tk. 1,200 and sells it at Tk. 520 with a subsidy while NGO Forum as a nongovernmental organisation has been selling many more latrines without subsidising than those sold by DPHE. This is because government institutions usually have their factories near Upazila headquarters, around which relatively rich people live. Although governmental products are subsidized, poorer people living far from the Upazila headquarters have difficulty travelling a long distance to buy the subsidized products. On the other hand, poor people can often buy unsubsidized products more easily because NGO Forum has established many production centres in their surrounding areas for better product distribution using its network of NGOs. Also, NGO Forum has a water quality test laboratory accredited by international organisations. Based on these facilities and experiences, NGO Forum may be able to start its purified water production easily at its production centres. Japanese companies can discuss the possibility of their collaboration in the purified water production with NGO Forum.

7-3 Provision of Competitive Component Technologies

Regarding component technologies, the competitiveness of many water-related Japanese technologies in Bangladesh was studied few years ago in JICA's preparatory survey on cooperation program for the

improvement in water supply services in the People's Republic of Bangladesh (2010). This study focused on the potential local partners required for manufacturing Japanese products in Bangladesh to make the prices of Japanese products affordable for the customers. This study also focused on the potential customers of Japanese component technologies, which include not only large water utilities but also local companies, NGOs, international aid agencies, funds and small water utilities.

(1) Pumps, Valves and Pipes

According to the Modern Erection Limited (MEL) Group, almost 98% of the water pumps used in Bangladesh are imported from China, Singapore and Germany. A Chinese company produces a large amount of small pumps with fully automated facilities. As already explained in 6-2 (6), Milners Pumps Limited (MPL) is the only Bangladeshi company manufacturing large pumps in Bangladesh, while some other Bangladeshi companies produce small pumps. Although it would be difficult for most Bangladeshi companies to produce small pumps in the same way, it would be not too tough for MPL to compete with Chinese companies in collaboration with a Japanese company. The local manufacturing of pumps is a good solution to make pump operation more sustainable, including the easy supply of spare parts. MPL also has machines and skilled workers to maintain pumps. The motors for large pumps are also not manufactured in Bangladesh because Chinese motors are too cheap. MPL is interested in working with water-related Japanese companies as their local manufacturing company and waiting for the proposals from Japanese companies to consider for what price the proposed pumps can be sold in Bangladesh.

According to CWASA, only MPL manufactures large valves in Bangladesh. MPL produces large valves for their large pumps and shipbuilding, but does not produce hand pumps for tube wells. According to MPL, they would also be able to manufacture butterfly valves if the technology/design is brought from Japan.

Regarding pipes, many Bangladeshi companies produce HDPE pipes as well as PVC pipes (but not more than 12 inches in diameter). However, there is no Bangladeshi company producing ductile cast iron pipes at present. Some of the local manufacturers of HDPE pipes targeted in the questionnaire survey of this study showed their interest in collaborating with Japanese companies.

(2) Drilling Technologies for Deep Wells

The depth of deep wells sometimes has to be more than 1000 feet (around 300m) to avoid arsenic pollution. Foreign technologies may be required to dig deeper, especially when rock and gravel layers exist. The installation of larger production deep wells for municipalities may also require foreign technologies.

However, local technologies which can bore around 1000 feet are basically sufficient for installing deep tube and production wells in most of the areas where hard gravel layers do not exist above a confined aquifer or the location of the uncontaminated aquifer is not very deep. In Bangladesh, where the soil is predominantly alluvial, both direct water jet and reverse water circulation methods can be used for boring deep tube-wells. Sigma & Associates of Sigma Group is one of the leading deep tube-well contractors in the country. They have five rigs and are currently working with DWASA. Three of the rigs have capacities to bore 1000 feet in depth. According to Sigma & Associates, the first sand layer (confined aquifer) usually exists at a depth of around 400-450 feet in Bangladesh. The second sand layer exists at a depth of around 500-950 feet. Clay layers usually continue without sand layers below 1000 feet; therefore, there is usually no reason to bore more than 1000 feet in Bangladesh.

According to KWASA, local technology can be applied not only to tube wells but also to production wells of more than 300m in depth in the areas without gravel layers and 38mm-diameter wells can be drilled up to around 1200 feet in depth with low-cost local technologies. In terms of depth, KWASA has a plan to dig prototype tube wells of 600m with local technologies. If this plan fails, foreign technologies will be

required. In contrast, CD-DPHE is looking for the latest technologies that can mainly reduce the cost of boring deep wells.

DPHE will receive two new deep excavator rigs through a grant aid from Japan to supply safe water to the areas where people cannot obtain safe water due to the arsenic contamination and the presence of gravel layers (E/N was concluded in February 2013). One of the rigs is of small diameter and the other is of large diameter. Since it is difficult to obtain safe groundwater due to the arsenic contamination and gravel layers in large areas of western and south-western part of Bangladesh, DPHE feels that these deep excavator rigs will contribute to achieving the goal of providing safe water access to all the population in Bangladesh.

(3) NRW-related Technologies

The NRW ration in Bangladesh is around 30% to 50%, including that of DWASA. According to DWASA, trenchless pipe rehabilitation technologies are required in DWSSDP, funded by ADB, to improve the existing water distribution network without paralysing the heavy traffic in Dhaka. In Chittagong, JICA has been continuing a technical cooperation project for advancing the NRW reduction initiative (PANI) with CWASA. CWASA is going to plan and implement the rehabilitation of their old distribution network soon through JICA's loan project (Karnaphuli Water Supply Project - Phase 2). Curvilinear/ long-distance pipe jacking methods can be adopted to reduce the land occupation of pipeline rehabilitation at traffic intersections. These methods can mitigate the impacts of the traffic congestion that frequently occurs in pipeline rehabilitation projects. Thus, the demand of the methods seems to be high, especially in large cities such as Dhaka, Chittagong, etc. Although both Japanese curvilinear/ long-distance (over 1km) pipe jacking methods and corresponding German methods are the highest in the world, the Japanese technologies have more advantages than the German technologies in Asia, where sedimentary layers are major geological strata.

There is no water meter manufacture in Bangladesh. Most water meters used in Bangladesh have been imported from India and China. Currently DWASA is procuring high accuracy water meters of C-class from Germany in DWSSDP. DWASA is also interested in automatic meter reading (AMR). Although large meters often come from Europe, Japanese companies may have a good opportunity to sell their high quality water meters in Bangladesh if they are produced in-country with their Bangladeshi partners. MPL has basic technologies to cast the casings of water meters. MPL expressed interest in reading proposals from Japanese companies for manufacturing water meters in Bangladesh.

There is no manufacturer for leakage detection equipment in Bangladesh. KWSA expressed their need for equipment for water leak detection as well as hardware and software required for GIS development and TV cameras to check internal conditions of pipes regarding NRW-related Japanese technologies in the interview. (KWSA also expressed the need for water quality test kits and more distribution pipes.) Japanese companies seem to have technological superiority in video cameras for recording intratubular conditions without water stoppage, as well as equipment for water leakage detection. The demand for the intratubular video cameras may increase in cities with old pipelines because the intratubular video cameras would help the water utilities in Bangladesh reduce the cost for pipe rehabilitation considerably by identifying and replacing the pipes having especially bad conditions instead of replacing all the pipes within a target area.

(4) Industrial Water Treatment Technologies

Groundwater from deep wells is commonly used in the industrial water treatment plants. Only around 10% of the industrial water treatment plants use river water as a source. High concentrations of iron, hardness, silica and salinity are the common problems in the industrial use of ground water.

According to D-Water Tech Ltd, low-cost water treatment apparatuses are usually imported from other developing countries (such as RO membranes from China) for industrial purposes. D-Water Tech has

been importing many water treatment items from Chinese agents. The Chinese agents sent not only Chinese products but also Japanese and other foreign products (e.g., from Korea and the US) as packages to D-Water Tech. D-Water Tech has been constructing a WTP in Chittagong EPZ and using Japanese RO membranes (Toray Industries, Inc.) to remove saline and high pressure pumps (1.5 M Pa) from SIEMENS for the RO process. Sigma Engineering Ltd. imports RO membranes from the USA, high-pressure DP pumps for RO from Holland and dosing pumps from the USA. According to Sigma Group, the USA is a reliable source of RO membranes and they do not want to take extra risks by trying Japanese membranes. Sigma Group has strength in designing and installing iron removal plants and water softening plants for cooling and dyeing. Therefore, they feel that Japanese technologies are not required for iron removal and softening.

According to D-Water Tech, 10 to 15 years ago, many effluent treatment plants were installed in Bangladesh. However, 98% of them are currently not fully functioning. Many of them were initially installed just to get permission to start business. Fully functional ETP is expensive but most of the customers of D-Water Tech are not aware of that. Therefore, the majority of customers leave after seeing the cost quotation of the fully functional ETPs that D-Water Tech promotes. MEL is looking for new cost-effective Japanese technologies for waste water treatment plants (not the usual expensive Japanese products based on conventional technologies). According to MEL, Japanese products are dependable, unlike Chinese products, but much more expensive than even the products from the UK. The price of Japanese products has to come down under these circumstances, because Bangladeshi customers are price conscious.

(5) Technologies for Jar and Bottled Water Plants

According to BSTI and PDWMAB, most of the companies producing jar water or bottled water with BSTI licences use RO membranes. It is noted that RO reduces TDS too much (down to 10 to 20 TDS) and requires blending with water having higher TDS to increase to a range of 70 to 80 in accordance with the standard of BSTI. PDWMAB's members of jar water companies also use other technologies such as resin, sand filter, carbon filter, and UV rays for sterilising water and chlorine for jar washing. According to PDWMAB, around 90% of water-related equipment in Bangladesh has been imported from China. Previously, Korea had second place but most Korean products no longer exist in the market due to newly imposed restrictions on Korean products. At present, the USA has second place. The prices of Chinese filters of different types are around half the prices of the filters from other countries and it would be tough to compete with Chinese products. RO membranes from the US usually cost 1.5 times more than Chinese RO membranes having similar specifications. Some jar water companies also import water-related products from Taiwan. UV lamps usually come from China, Germany and the USA. Bottle filling machines for jar water and bottled water also seem to be imported mainly from China. These Chinese bottle filling machineries often have quality problems. Therefore, D-Water Tech has installed Japanese membranes (such as the RO membranes of Toray Industries, Inc.) in some bottled water plants they designed. They also use ultrafiltration (UF), UV rays and ozonation for bottled water plants. D-Water Tech mixes 12 tons of the water treated by RO with 3 tons of the water treated by UF to increase mineral content and control pH in one of the bottled water plants.

According to BRAC, they like Japanese products because they usually have good quality and are easy to procure, although Japanese products are expensive. On the other hand, Chinese products are difficult to procure because the quality of Chinese products varies greatly. According to PDWMAB, Bangladeshi people like Japanese products. However Bangladeshi companies usually have no choice other than buying Chinese water treatment products because around 90% of the market share is occupied by Chinese products. Importers usually prefer Chinese products because of their larger profit margin. The president of PDWMAB said that Japanese products are more sustainable and could be more cost effective than Chinese products because Japanese products have longer lifespans.

Japanese companies probably need to produce products in Bangladesh to sell their products at competitive prices. However, Chinese products are too cheap to compete even for Bangladeshi companies because Chinese companies produce a large number of products. In order to compete with Chinese companies, it is necessary for Japanese companies to produce products with Bangladeshi companies in Bangladesh and to export a large number of products to other countries, including Japan.

(6) Unit-type Water Treatment Plants

As already explained in 4-2 (5), the HYSAWA Fund, financed by multiple donors, has used part of the grant aid from AusAID to procure 13 upstream filtration apparatuses called SkyHydrants. HYSAWA states they would use a Japanese product in their future water supply projects, instead of SIEMENS' SkyHydrant, explained in 4-2 (5), if Japanese technologies meet conditions including simplicity and low O&M cost. It is very important for HYSAWA to use products requiring small O&M costs because the poor beneficiaries have to cover the O&M costs in HYSAWA's water supply schemes. HYSAWA can cover the relatively expensive initial costs of Japanese technologies but the O&M cost has to be low for the CBOs operating and maintaining the facilities. If any Japanese company can produce a new arsenic removal plant having a high efficiency and capacity and requiring little O&M cost, the HYSAWA fund would use it.

DPHE has used unit-type purification plants for removing arsenic and iron with pressure filters from ground water. NGO Forum has recently provided mobile water treatment systems to treat surface water in emergencies for flooded areas. These systems are imported and available in local markets. According to NGO Forum, the cost of this mobile water treatment system is around Tk. 1.5 to 2 million.

NGO Forum expects Japanese companies to provide low-cost and high-efficiency solutions for water-related problems, including low-cost solutions to treat surface water. It seems that HYSAWA and small municipalities including Paurashavas are also interested in purchasing unit-type water purification plants to treat surface water from Japanese companies. The collaboration with local water treatment plant manufacturers such as D-Water Tech on unit-type containerized STPs (e.g., for cyclone-affected areas) is also a potential business for Japanese companies.

(7) Desalination Plants

In the coastal areas where salinity intrusion has become a serious problem, both rainwater harvesting and desalination are required. Desalination is usually applied to brackish water in Bangladesh and a low pressure RO membrane is used to avoid high O&M costs. However, desalination is still an expensive technology in Bangladesh.

According to DPHE, some NGOs have already installed desalination plants in the coastal areas. BRAC has installed two desalination plants and is currently converting their power sources into solar panels to reduce electricity costs. BRAC became interested in Japanese desalination plants (such as the desalination plant with wind and solar power generators proposed by A-Wing) in the meeting with the JICA study team. BRAC has been comparing different technologies for desalination and is looking forward to discussing the possibilities of collaboration with Japanese companies (joint pilot project, equity partnership, equipment supply, etc.). BRAC thinks that a Japanese desalination plant targeting the sales of water at Tk. 1/L in Bangladesh is within their interested technology range and that Tk. 1/L could be affordable for certain types of customers. In order to establish a good business model, BRAC and its partner have to go through many analyses and trials, including how to make cross-subsidies for ultra-poor people. For example, one small desalination plant having a capacity of 2,000 L/day may produce filtered water at an actual cost of Tk. 0.6/L. The plant owner may sell the water at Tk. 0.75/L to have a profit of around 20%. Then distributors who bought vans and jerry cans to carry the water with microenterprise loans may sell the water at around Tk. 2/L to domestic customers. The plant owner may also sell the water at Tk. 3/L to the restaurants, which otherwise have to buy bottled water, for example, at

Tk. 10/L. Tk. 1/L out of the Tk.3/L may be used for the cross-subsidy to the poor people. In Khulna Division, an Australian company has installed 20 domestic desalination devices with solar panels, which produce 15 to 20 L per day. A joint venture of US companies and Chinese companies is trying to sell community-based desalination plants. Another international NGO, WaterAid, also claims to have constructed one desalination plant but it was too expensive and difficult to operate for their activities targeting poor people. WaterAid also mentioned that desalination plants are not environmentally friendly because the concentrated saline water generated by the desalination process as a by-product (30 to 40% of their raw water) is discharged into the surrounding environment with a higher salinity concentration.

A NGO called Friendship has a plan to operate five desalination plants with RO membranes in south western areas of Bangladesh. AKKWH have been selling their WHCs as desalination plants to Friendship and providing required technical supports to them in Bangladesh.

According to DPHE Khulna, the Japanese project for environment and climate change is going to provide desalination plants for the coastal areas in Bangladesh, and the Islamic Development Bank (IDB) will also donate desalination plants. IDB has recently planned a pilot project in which a desalination plant having a capacity of 500 L/hour will be installed in Dacope Upazila, Khulna Division. In the pilot project, revenue will be collected from beneficiaries to cover only O&M costs (e.g., electricity bill, salary of pump operator and maintenance cost). If this pilot project is successful, IDB would also install desalination plants in the other two Upazilas affected by arsenic and saline. Although HYSAWA has not constructed any desalination plants to date, they have a plan to construct 10 to 15 desalination plants in Khulna Division. The initial costs of the desalination plants will be fully covered by HYSAWA and the O&M costs need to be covered by the beneficiary households. Tk. 250 to 300/month would be collected from each household because of high O&M costs. The technologies to use for the desalination plants have not been decided by HYSAWA because of the cost of the desalination technologies, which they know is high. Japanese companies have chances to sell their desalination technologies to HYSAWA, especially if the technologies are simple and do not require high O&M cost. Well water having saline is the usual target of the desalination plants.

According to UNDP, there is a massive demand for desalination plants in the coastal areas. UNDP is going to have a project for establishing desalination plants with solar panels in the coastal areas of Bangladesh. The project will have a local bidding for the selection of contractor. Japanese companies can sell their desalination plants through their local partners who will join the bidding. Their technologies should be easy and economical enough for communities to operate and maintain. UNDP is also looking for community-type small desalination plants. UNDP needs information on the costs of desalination plants of different capacities (e.g., 300,000 L/day, 100,000 L/day, 20,000 L/day and 10,000L/day). For the first test of this community-type small desalination plants project, UNDP wants to target one community with a budget of USD 50,000 to 100,000. According to UNDP, in Cox's Bazaar in the south-eastern part of Chittagong, the saline concentration of river water varies from 15 ppt in monsoon season to 31 ppt in dry season due to salinity intrusion into the river. The salinity level of sea water is around 35 ppt. The saline level of groundwater is also increasing in the coastal areas. Therefore, the saline level of the groundwater needs to be monitored and studied. It is noted that the small desalination unit of Nippon Basic was sold in the past to a NGO working in the coastal areas of Bangladesh through its local partner (DBE).

According to a report of Fuji-Keizai Group (Business Strategy Trends of Noteworthy Companies Challenging for Growing Aqua-Business 2013), SIEMENS, which produces the SkyHydrant used by HYSAWA, has experience in providing desalination technologies (RO membranes) in Singapore, Australia and various Middle East countries. In addition, SIEMENS realized a 50% energy savings in desalination by developing a hybrid seawater desalination technology because the high power cost of desalination has been a problem. This new hybrid technology is a combination of Electrodialysis and Electrodeionisation (EDI). SIEMENS concluded a contract with the Public Utilities Board of Singapore (PUB) on an energy-saving seawater desalination project and aims to start operation of a full-fledged system by 2013, after confirming its effectiveness at a demonstration plant in Singapore. It seems

necessary to carefully consider the possibility that this kind of energy-saving seawater desalination technology will be introduced in Bangladesh.

Chapter 8 Suggestions on JICA’s Support to Japanese Companies trying Water Businesses in Bangladesh

Based on the interviews and discussions with many Japanese, Bangladeshi and international institutions, private companies and NGOs, document reviews and field visits, the study team has considered suggestions to JICA, especially regarding 1) provision of information to Japanese companies, 2) indirect support for Japanese companies to collaborate with their local partners, 3) indirect financial aid to Japanese companies, and 4) improvement of JICA’s support menu with other institutions. Some of the suggestions described in the following may be difficult to realize immediately or require much more discussion to evaluate their effectiveness.

8-1 Provision of Information to Japanese Companies

(1) Use of this Report as a Guidebook

JICA is expected to provide overseas local information to Japanese companies by taking advantage of its approximately 100 overseas offices and experiences of ODA projects in more than 150 countries and regions.

It was observed that many Japanese companies, especially SMEs, consider the expansion of their water-related businesses in Bangladesh without sufficient local information. It is necessary to evaluate the feasibility of their overseas business expansion by surveying local needs, potential local partners, competitiveness of their products or services, necessary procedures, required costs, etc. This report is expected to be utilized as a guidebook when Japanese SMEs consider water-related businesses in Bangladesh. It is necessary for such SMEs without experience in overseas businesses to access this report comparatively easily in order for it to be utilized frequently as a guidebook. Therefore, the following methods are proposed to introduce and provide this report to them in addition to ordinary ways (i.e., disclosing PDF files of the report at JICA library’s portal site and providing the hard and/or soft copies of the report at JICA Bangladesh Office and/or related sections in the JICA headquarters).

- Introduction and provision of this report to Japanese companies at the headquarters of JETRO, Tokyo and the JETRO Bangladesh office
- Placing a link to the PDF file of the report on the JICA knowledge site, etc. in order for the PDF file to be found easily by searching with words such as “water business”, “BOP”, “Bangladesh”, etc. from general search-engines (e.g. GOOGLE)
- Including the report in the lists of references to be introduced in seminars held by JICA’s Special Office for Supporting Japanese SMEs, the Private Sector Partnership and Finance Department of JICA, etc.

(2) Provision of Other related Reports

This study was conducted by focusing mainly on the potential partnerships between Japanese companies and local partners based on recent changes regarding the support for Japanese companies and a growing need for related information after JICA’s “Preparatory survey on cooperation program for the improvement in water supply services in the People’s Republic of Bangladesh (Private Sector Proposal)” in 2010. Therefore, the current conditions of the water supply services provided by various public institutions in Bangladesh and their development plans, which were covered in the other study reports shown in Table 8-1, are not included in this study report. In addition, it does not show the detailed data about the arsenic contamination of groundwater in rural areas or the salination of groundwater and surface water in coastal areas. For example, if groundwater having salinity is desalinated with a low-pressure RO membrane, the seasonal variation of salinity in the groundwater needs to be checked. A Japanese company may require maps showing the conditions of water sources to identify the areas having fewer

alternative water sources as target areas for their water supply businesses. Fortunately, JICA and other institutions have conducted many surveys, partly for collecting this kind of useful information. The reports of some of these surveys are shown in Table 8-1 for ease of reference. As shown in the table, most of the reports listed are accessible at the portal website of the JICA library.

Table 8-1: Other Study Reports especially Useful for the Japanese Companies trying to develop their Water-related Businesses in Bangladesh

Author	Report or Study Title [Title translated from Japanese title]	Contents	Year	How to Get
JICA	[Preparatory survey on cooperation program for the improvement in water supply services in the People's Republic of Bangladesh (Private Sector Proposal)]	About Japanese companies' water-related BOP business and PPP projects in Bangladesh	2010	English Version of the Portal website of JICA Library: http://www.jica.go.jp/english/about/organization/library/index.html
	(Final reports of the four water-related JICA's preparatory surveys for BOP Business promotion ongoing in Bangladesh shown in Table 4-1)	About Japanese companies' water-related BOP businesses in Bangladesh	At the completion of each survey	
	Data collection survey on water supply sector in local municipalities in Bangladesh - Final Report	Basic information regarding the conditions of water supply, water source development, water tariff, etc. in Bangladesh	2012	
	Pourashava databook for water supply sector in Bangladesh		2012	
	The preparatory survey report on the ground water investigation and development of deep ground water source in urban and rural areas in Bangladesh		2012	
	Study of the tariff pricing and the impact of cross-subsidy for water supply and sewerage in Bangladesh - Final Report		2011	
	Data collection survey on water resources development in the southwest area of Bangladesh - Summary Report		2010	
	[Final Report of the data collection survey on private partnership in water supply sector]	About Japanese companies' water-related PPP projects and various BOP businesses in the world and JICA's support for private sector participation	2011	
	[Report of the Research on BOP of Private Domestic Companies in Relation to the ODA Worldwide]		2010	
	[Basic Survey on the Methods for Financing BOP Business Expansion and Evaluating its Development Impacts]		2013 or later	
HYSTRA	Access to Safe Water for the Base of the Pyramid - lessons learned from 15 case studies	About water-related BOP businesses in the world	2011	http://hystra.com/safe-water
iDE Bangladesh	The Safe Water Market System in Bangladesh - connecting public goods to private delivery (Temporary Title)	About water-related BOP businesses in Bangladesh	2013 or later	Directly from iDE Bangladesh

The survey reports related to water-related BOP business and PPP projects in developing countries (not specifically in Bangladesh) are also included in Table 8-1, especially the report "Basic Survey on the Methods for Financing BOP Business Expansion and Evaluating its Development Impacts", carried out at the same time, as this study is expected to be helpful because it includes the results of many preparatory surveys that JICA entrusted to Japanese companies for supporting their BOP business in developing countries (approximately 20 surveys each year since 2010). The scope of the basic survey includes the data collection on 1) the current state and issues related to the financing for Japanese companies' BOP businesses, 2) the financial measures for BOP businesses in other countries, and 3) suggestions on JICA's financial support mechanism for new BOP businesses.

Unfortunately, the study team could not acquire any version of the market survey report on different safe water options in Bangladesh being prepared by iDE Bangladesh. The temporary title of the survey report was ‘The safe water market system in Bangladesh - connecting public goods to private delivery’. This market survey followed the same categories of technical options for safe water access that were studied in the report “Access to safe water for the base of the pyramid - lessons learned from 15 case studies”, prepared by HYSTRA in 2011. The options are 1) Pumping & Rainwater Harvesting, 2) Water Purifying Devices, Flasks & Tablets, 3) Water Treatment Plants and Water Kiosk and 4) Pipes and Taps.

(3) Continuous Update of related Information

The study team has striven to get the latest information for the first half of 2013, but there is a need to continuously collect information about the method of water rates revision and the rate level that greatly affects the feasibility of PPP water projects. In this study, the conditions of groundwater use restrictions in different areas could not be confirmed with official documents and it seems that the groundwater use will be more strictly restricted in the future. Therefore it is necessary to update the information to the latest data periodically.

The study team has explored the various models for water-related BOP businesses and PPP projects in which Japanese companies can participate in Bangladesh. There are many potential PPP projects identified in this study. It is believed that some of these projects will be started with PPP or public sector financing in a few years. There is also a possibility that new PPP projects will appear in the near future. Regarding water-related BOP business, Japanese companies and foreign companies are currently trying to establish their business models in Bangladesh. It seems that the low feasibility of some of their business models will become very clear in a few years. Therefore, a list of the BOP businesses and PPP projects having high potential for Japanese companies must be continuously updated. The update of the list may be done by the Japanese staff to be newly assigned for supporting Japanese SMEs and/or local staff in JICA’s Bangladesh Office.

The lists of water-related local NGOs and companies were prepared in this study. The information on these potential local partners needs to be continuously updated. Although the mission of each NGO does not change, the scope of their activities might change after several years. It would be helpful for Japanese companies newly coming to Bangladesh if the JICA Bangladesh Office can continuously share with them the impressions of the local companies that have had contacts with Japanese companies and their decision-makers’ attitudes towards partnership with Japanese companies.

8-2 Indirect Support for Collaborating with Local Partners

(1) Collaboration with Government Institutions and Public Companies

The following explains an example of indirect support from JICA for the collaboration between Japanese companies and a Bangladeshi government institution/government-owned company. As explained in 7-2 (2), Japanese companies have the possibility of working with the plastic and bottled water manufacturing industry Maitri Shilpa, managed by the Ministry of Social Welfare, for the production and sales of bottled water, jar water and/or household purifiers.

According to Maitri Shilpa, the production and sales of bottled water can be easily doubled with some logistical support (e.g., provision of four pickup trucks). In the past, they could provide training and monthly salaries to their trainees, but they can no longer provide training due to their financial constraints. They hope for assistance in providing trainings including the provision of some allowance for the participating handicapped people. If JICA and/or other organizations provide assistance prior to making the agreement between Maitri Shilpa and Japanese companies, Japanese companies would be able to collaborate with Maitri Shilpa without taking high risks.

According to Maitri Shilpa, their industry is the only profitable organisation where many handicapped people can work in Bangladesh. They would like to employ 1,000 handicapped people and then increase the number of handicapped employees phase by phase.

(2) Collaboration with Local Private Companies and Associations

JETRO Bangladesh Office under the Ministry of Economy, Trade and Industry, Japan is the main organisation supporting the Japanese companies developing their overseas businesses in collaboration with local private companies in Bangladesh. JETRO Bangladesh Office mainly utilizes local business consultants to help in the matching between Japanese companies and local companies. JICA Bangladesh Office, on the other hand, will have an officer to support Japanese small and middle-sized companies by the end of September 2013 for a period of one year. JICA is well-known to the people in Bangladesh due to its many past projects. JICA also has a lot of networks with governmental organisations. In order to support the matchmaking and negotiation between Japanese companies and Bangladeshi companies with JICA's established reputation, JICA Bangladesh Office may make appointments, set meetings and offer advice at the beginning of their collaboration. JICA and JETRO have support schemes for encouraging Japanese companies to develop their businesses in developing countries and have advised accordingly.

JICA may also be able to help the water-related Japanese companies collaborate with local associations like JBCCI and PDWMAB, with JETRO, in organizing campaigns for promoting social business, introducing Japanese technologies and raising public awareness on safe water use.

(3) Collaboration with NGOs and Other International Aid Agencies

As explained in 6-4 and 7-2, there are many possibilities for Japanese companies to collaborate with NGOs in Bangladesh, such as iDE Bangladesh, BRAC and NGO Forum. JICA Bangladesh Office has been building relationship with NGOs and collecting information on the NGOs through its NGO desk. It is also expected that JICA Bangladesh Office supports the collaboration between Japanese companies and the NGOs.

JICA and BRAC agreed with a MoU to collaborate in development activities in Bangladesh, Africa and other regions in 2011. The terms of their collaboration included 1) sharing their knowledge and experiences, 2) supporting rural development, and 3) establishing a fund to back social enterprises. BRAC has been providing information to JICA Bangladesh Office, and JICA has carried out joint research through internship, etc., and has been trying to work together with BRAC.

iDE Bangladesh is going to start matchmaking between Dutch companies and Bangladeshi companies (such as bottled water suppliers) as part of a Dutch initiative called Sustainable Match. iDE Bangladesh may be able to organise a multilateral event with Dutch and Japanese companies or a bilateral event with Japanese companies. Further discussion is required to explore how iDE Bangladesh can support JICA or Japanese water-related companies effectively.

Other international aid agencies, such as UNDP Dhaka Office and ADB, are also interested in collaborating with Japanese companies. Experts from UNDP suggested that JICA help Japanese water-related companies make a showcase of Japanese technologies (e.g., showing the prices and samples of different capacities of desalination facilities) and invite other aid agencies and local decision makers (such as mayors of large cities along the coastal areas) to the showcase after the new Bangladeshi government settles down, probably in the winter of 2013. JICA would be able to help this kind of showcase effectively because it has more strong connections to other aid agencies, WASAs and local government bodies at different levels.

8-3 Indirect Financial Aid for Japanese Companies

(1) Financial Aid to the Bangladesh Funds for PPP Projects

As already explained in 2-1 (3), the GoB provides the PPP budgets, which include Project Development Facility (PPP TAF) for technical assistance, Viability Gap Fund (VGF) to make PPP projects financially feasible (about Tk.1 billion) and Bangladesh Infrastructure Finance Fund (BIFF) for loans. If the FIRR of a PPP project is not sufficient, some percentage of the project cost can be covered by Viability Gap Financing (VGF). The private company originally proposing a PPP project, for example, can get 5 to 10% preference (bonus) in the evaluation of tender.

According to the discussion between the JICA Study Team and the PPP Office, there might be three options for JICA to help Japanese companies win PPP projects through providing money to the VGF of GoB. The first option is to provide a bulk loan for the VGF, along with a PPP programme, and in return all the Japanese companies joining the tenders of PPP project get a certain percentage (5%, for example) bonus for the preference to Japanese companies. The second and third options are to provide loans with a very low interest rate and to provide grant aid, respectively, to the VGF for a specific project in which a Japanese company is interested. In return, Japanese companies get bonus points in the evaluation of tender. More discussions and studies on the current system and related regulations will be required to consider the possibilities of realizing these options.

(2) Financial Aid through HYSAWA Fund

As explained in 7-3 (6), according to HYSAWA, Japanese companies have chances to sell their water treatment products to HYSAWA, especially if the technology is simple enough for CBOs to operate and maintain the facilities and does not require high O&M cost (even if the initial cost can be high).

According to the discussion between the JICA Study Team and HYSAWA, JICA can possibly collaborate with HYSAWA in the following three ways to help Japanese companies. First, JICA may construct the required water-related facilities using Japanese companies' products as a grant aid project while HYSAWA makes sure that CBOs can operate and maintain the facilities. Second, JICA may make some financial contribution to the HYSAWA fund for certain projects using Japanese technologies. Third, JICA may provide technical assistance and conduct research with HYSAWA in corroboration with Japanese companies since HYSAWA needs a technical partner. According to HYSAWA, they can give preference to Japanese technologies in their projects based on an agreement with JICA.

(3) Formulation of PPP-Type Water Supply Projects with Grant Aid for Towns

As explained in 7-1 (6), DPHE is trying to include the development of new PPP-type piped water supply schemes for 30 medium and small unions in BRWSSP supported by WB. If WB does not allow DPHE to include this project component in BRWSSP, JICA may be able to assist DPHE in carrying out this kind of project component. From DPHE's experiences with WB regarding the PPP-type rural piped water supply schemes in BWSPP and BRWSSP (see 4-1 (2)) and Dhaka WASA's experience with ADB in trying to formulate a large water supply PPP project (see 4-1 (1)), it became obvious that piped water supply schemes in medium and small municipalities cannot be done in PPP without grant aid in Bangladesh. These schemes may need a grant aid covering about 50% of the initial cost, which is higher than the upper limit of VGF in Bangladesh (30%), to make these schemes financially feasible.

Moreover, JICA may also be able to support the medium and small municipalities (e.g., Paurashava), where the autonomy of a water-related department or section is significantly low in comparison to the WASAs of large cities, in the following two ways. One of the two ways is through the combination of a technical cooperation project and a partial-grant-aid PPP project targeting multiple medium and small municipalities. JICA may install least-required water supply facilities in these municipalities through a

partial-grant-aid PPP project while training the staff of municipalities in how to promote and manage the PPP projects (such as service contract and management contract for improving revenue collection and reducing NRW) in the technical cooperation. Through the technical cooperation project, the municipalities may also consider the establishment of additional facilities (such as a desalination facility to deal with the salinity intrusion during the dry season or advanced treatment facilities for producing jar or bottled water) as new PPP projects (e.g., BOT).

The other way is through the establishment of a special fund like the HYSAWA fund by JICA. The special fund of JICA needs to have the following functions.

- 1) To train the staff of target municipalities regarding the formulation and management of PPP projects.
- 2) To provide sufficient financial aid with mixed conditions (e.g., providing 45% of the initial cost as grant and the remainder as a loan) for the partial-grant-aid PPP piped water supply projects in small and medium municipalities, especially for those water supply projects having high social benefits but low profitability.
- 3) To facilitate Japanese companies' participation in these projects (e.g., giving extra points to Japanese companies in the bidding of the PPP projects).

(4) Financial Assistance through New Funds for Private Companies

In the interviews for this study, Japanese SMEs trying to establish their BOP businesses abroad expressed their difficulties in fund procurement. These companies usually need to find funding institutions which provide the medium-scale loans they need (a few million yen to a few hundred million yen). However, JICA's Private Sector Investment Finance (PSIF) is difficult to apply to their BOP businesses because its lower limit of loan amount is too large (at least 1 billion yen). On the other hand, a microenterprise loan is usually too little for the establishment of their BOP businesses. In case of Bangladesh, Japanese companies are not eligible to borrow microenterprise loans.

The financing from a local bank can hedge the currency risk, but it can be difficult because the local interest rates are higher than Japanese rates, by more than 10%. Therefore, it is expected that JICA, as the supporting agency for BOP businesses and Japanese SMEs' business expansion in developing countries, will develop a financing facility for concessional loans and/or investments.

However, in the current situation, the small-scale financing and investment conducted directly by JICA is not an appropriate manner of considering its management cost. Therefore, in order to provide small investments and/or loans, JICA needs to cooperate with other policy banks which finance SMEs for their overseas expansion and foundations which provide investments and loans to SMEs, venture companies and/or BOP business, as explained in Chapter 3. Alternatively, it can be considered that JICA provide funds in collaboration with local government and other donors. For example, PWRF (Philippine Water Revolving Fund), established in collaboration with USAID and Development Bank of the Philippines, is a good reference. It was a high risk for private finance institutions to provide mid- and long-term finances for the water environment sector. Therefore, Japanese Yen Loan was utilized through PWRF to encourage private finance institutions to enter the water utility financing marketplace.

It is essential that mid- and long-term financing be provided to promote capital investment in the field of environmental projects. However, it is generally difficult to make profits through investments in environmental projects. Moreover, the provision of mid- and long-term finances by private finance institutions is not common because of high investment risks. Therefore, it is necessary to provide concessional loans through public finance institutions.

8-4 Improvement of JICA's Support Menus with Other Institutions

(1) Disclosure of the Product Lists of Small and Medium Japanese Companies and Diversification of their Usages

The interest in Japanese water-related products is high in Bangladesh. In the interviews for this study, information about Japanese products was requested from international aid organisations and NGOs. Although they think Japanese products are expensive, they have confidence in Japanese products and wish to use them. As a stepping stone for SMEs to expand their businesses in foreign countries, the advertisement and pilot installation of their products are very effective. From this point of view, "Projects Formation for Overseas Expansion Utilizing ODA by SMEs" and "Pilot Survey for Disseminating SME's Technologies", which are commissioned by the Ministry of Foreign Affairs to JICA, are effective support schemes for Japanese SMEs.

On the other hand, "Non-project Grant Aid using SMEs products" is a support scheme for SMEs conducted directly by the Ministry of Foreign Affairs, which provides SMEs' products in response to requests from developing countries in reference to the SME product lists prepared for each field. Although a procurement agency is involved in the preparation of the product lists and the competitive bidding for the procurement of SMEs products, open requests/proposals from SMEs are not reflected in the product lists. For this reason, "Non-project Grant Aid using SMEs products" is different in nature from the above-mentioned support schemes for the advertisement and dissemination of SME products proposed by SMEs.

SMEs expect that their products are included in the lists of SME products. JICA can draft new lists of SME product categories for each field and can solicit ideas on the product categories and competitive products for each category from SMEs. JICA would be able to support more SMEs trying to do business in developing countries through the preparation of improved lists of SME products based on this kind of open procedure. At the same time, it is important that JICA establish a measure to provide SME products in packages, in accordance with the purposes of equipment provision, based on its experience. In the field of water supply, the packages can be made for leak detection, water meter quality control, repair of pipes, water quality management, etc. The lists of SME products prepared in this way can be used not only for the "Non-project Grant Aid using SME products" by the Ministry of Foreign Affairs but also in the following opportunities:

- 1) Provision of equipment in grant aid projects
- 2) Provision of equipment in technical cooperation projects
- 3) Introduction of Japanese technologies in the various training programs of JICA and other Japanese institutions
- 4) Introduction of Japanese technologies when JICA local offices exchange opinions with local governmental agencies and NGOs
- 5) Introduction of Japanese technologies when JICA Headquarters and JICA local offices exchange opinions with other international organisations such as the World Bank, ADB and UNDP
- 6) Introduction of Japanese technologies at JETRO's local offices and at their exhibitions

(2) Campaigns for Water-related Japanese Companies

The Japanese company, which is carrying out the preparatory survey for BOP business on the water treatment using UV lamps, expresses their concern that the number of sales may not increase greatly because BOP people often do not understand the mechanism of the water purifiers using UV lamps and the necessity of disinfection. As seen in this example, educational activities to raise public awareness on safe water and water purification technologies are often essential for successful water businesses targeting the BOP population. However, the implementation of these activities requires much time, human

resources and cost. As explained in 3-1(1), JICA has started pilot surveys and project formation surveys for disseminating SMEs' technologies as their support menus for SMEs, and SMEs can utilize those schemes for public awareness. Though those schemes, the SMEs promoting overseas expansion, including BOP businesses, may become able to secure necessary funds for public awareness activities work and collaborate with NGOs.

AKKWH considers cooperation with other rural water supply projects and businesses (e.g., those of WB, HYSAWA, Grameen Veolia Water, etc.) as cooperative promoters of safe water use because building of public awareness requires a great deal of effort and cooperation. An initiative, like Safe Water for Africa (SWA), can be organised together with JICA, AKKWH and Japanese water-related companies in Bangladesh to raise public awareness on safe water use. SWA is an innovative partnership of The Coca-Cola Africa Foundation (TCCAF), Diageo PLC, WHI and IFC to provide access to sustainable safe drinking water in Africa. It is necessary for JICA to explore the possibility of conducting effective joint campaigns for SMEs promoting their businesses in Bangladesh through its support schemes.

(3) Preparation of Overall Flowchart including the Support Menus of Other Institutions

As described in Chapter 3, there are several Japanese institutions which promote Japanese SMEs' overseas business expansion and several international organisations which may be able to support Japanese SMEs in Bangladesh. However, most Japanese SMEs do not understand their detailed support menus and how to choose the appropriate menu for their business promotions.

JICA and the Ministry of Foreign Affairs have already prepared a helpful flow chart for Japanese SMEs to identify a suitable support scheme from their support menus, depending on their business situation. However, it is difficult to compare their menus with other Japanese institutions' support menus. On the other hand, the Small and Medium Enterprise Agency in Japan has prepared a document describing measures to support Japanese SMEs in their development of overseas business operations, which covers step-by-step support menus provided by Japanese institutions, including JICA. Moreover, Japan Inclusive Business Support Centre provides updated information on those support systems of Japanese government-affiliated organisations and other international organisations.

Therefore, it is recommended that an overall flowchart be prepared by collaboration among the institutions supporting SMEs' overseas business expansion. As the first step, an overall flowchart including the support menus of all the Japanese organisations promoting Japanese companies' overseas business development, with marking of those particular for SMEs, is prepared. As the second step, the overall flow chart may be expanded to include the support menus of the international organisations (e.g., UNDP and IFC) and other donor agencies (e.g., USAID) providing support to private companies of any nationality. Finally, with collaboration between the GoB, JICA Bangladesh Office and JETRO Bangladesh Office, the expanded overall flowchart needs to be localised for the Japanese companies targeting Bangladesh. The localised overall flowchart of available support menus in Bangladesh may include the support menus of Bangladeshi government-affiliated organisations as well as those of Japanese institutions, other international organisations and other donor agencies.

It is noted that the flowchart needs to be revised regularly, so that Japanese companies can seek support from JICA and other supporting institutions in an effective and timely manner.

As described in Chapter 5, Japanese companies have to solve many issues to start and develop their water-related businesses in Bangladesh. It is not easy for Japanese companies to expand their water-related businesses in Bangladesh. Especially, it is difficult for Japanese companies to deal with different interpretations and applications of rules and regulations depending on the political situation and government agencies and persons in charge. However, it is not impossible for Japanese companies to develop their water-related businesses in Bangladesh as explained in Chapters 7 and 8. Their

development of water-related businesses in Bangladesh would also depend on the enhancement of support from JICA and other Japanese government institutions as suggested in Chapter 8.