APPENDICES

APPENDIX 1

Member List of the Study Team

Appendix 1 Member List of the Study Team

(1) During Field Survey

No.	Name	Assignment	Organization
1	Dr. Yuji MARUO	Mission Leader	JICA
2	Mr. Ryuji OGATA	Survey Planning/Arsenic Mitigation	JICA
3	Mr. Yasumasa YAMASAKI	Chief Consultant/Groundwater Development Planner	ESS
4	Mr. Takuya YABUTA	Hydrogeologist/Water Quality Specialist (Hydrogeological Structure)	ESS
5	Mr. Kazuyuki SUENAGA	Hydrogeologist/Water Quality Specialist (Arsenic Contamination)	ESS
6	Mr. Toshimasa KOBAYASHI	Geophysicist	ESS
7	Mr. Masakazu SAITO	Equipment Planner/Procurement Planner	ESS
8	Mr. Tatsuya SUMIDA	Specialist for Operation and Maintenance/Environmental and Social Consideration	ESS
9	Mr. Yuki YAMASHIRO	Cost Estimator	ESS
10	Ms. Kaoru SASAOKA	Coordinator/Assistant to Specialist for Environmental and Social Consideration	ESS

(2) During Explanation and Discussion on Draft Preparatory Survey Report and Draft Specification of Equipment

No.	Name	Assignment	Organization
1	Dr. Yuji MARUO	Mission Leader	JICA
2	Mr. Ryuji OGATA	Survey Planning/Arsenic Mitigation	JICA
3	Mr. Yasumasa YAMASAKI	Chief Consultant/Groundwater Development Planner	ESS
4	Mr Takuya YABUTA	Hydrogeologist/Water Quality Specialist (Hydrogeological Structure)	ESS
5	Mr. Tatsuya SUMIDA	Specialist for Operation and Maintenance/Environmental and Social Consideration	ESS

<Note> JICA: Japan International Cooperation Agency ESS: Earth System Science Co., Ltd.

APPENDIX 2

Study Schedule

Appendix 2 Study Schedule

Date			Officials		Consultants							
			Dr.Maruo	Mr.Ogata	Mr.Yamasaki	Ms.Sasaoka	Mr.Suenaga	Mr. Yabuta	Mr.Kobayashi	Mr. Saito	Mr. Sumida	Mr. Yamashiro
			Mission Leader	Survey Planning/Arsenic Mitigation	Chief Consultant/Groundwater Development Planner	Coordinator/Assistant to Specialist for Environmental and Social Consideration	Hydrogeologist/Water Quality Specialist (Arsenic Contamination)	Hydrogeologist/Water Quality Specialist (Hydrogeological Structure)	Geophysicist	Equipment Planner/Procurement Planner	Specialist for Operation and Maintenance/Environmental and Social Consideration	Cost Estimator
November, 2011	18	Fri	Narita to Dhaka									
	19	Sat	Internal meeting									
	20	Sun	Courtesy call to LGD, Discussion with DPHE, JICA office									
	21	Mon	Field survey (Borisal)				Narita do Dhaka					
	22	Tue	Field survey (Borisal), Discussion with DPHE				Discussion with DPHE					
	23	Wed	Discussion on Inception report, Explanation of IC/R, Dsicussion with DANIDA									
	24	Thu	Signing on Inception report				Data analysis					
			Discusion with Embassy of the Netherlands, Report to JICA office			Operational coordination						
			Leaving Dhaka		Data analysis							
	25	Fri	Arriving at Narita		Data analysis							
	26	Sat			Internal meeting							
	27	Sun			Participate in workshop of rural water supply							
	28	Mon			Discussion with DPHE, UNICEF							
	29	Tue			Courtesy call to Dhaka University							
	30	Wed			Inspection for laboratory of DPHE		Field survey					
December, 2011	1	Thu			Participate in SDP							
	2	Fri			Data analysis		Move					
	3	Sat			Internal meeting		Data analysis					
	4	Sun			Prepare for re-entrustment							
	5	Mon					Field survey		Narita do Dhaka		Narita do Dhaka	
	6	Tue							Prepare for survey		Prepae for survey	
	7	Wed			Contract of water quality analysis						Field survey	
	8	Thu			Discussion with DPHE	Data collection	Discussion with DPHE					
	9	Fri			Data analysis		Data analysis					
	10	Sat			Prepare for re-entrustment	Operational coordination	Field survey		Move		Data analysis	
	11	Sun							Geophysical survey		Field survey	
	12	Mon			Supervise entrustment		Data analysis					
	13	Tue										
	14	Wed					Report to JICA			Narita do Dhaka		Narita do Dhaka
	15	Thu			Internal meeting					Internal meeting		Internal meeting
	16	Fri			Leaving Dhaka	Briefing on social survey			Data analysis	Data analysis	Briefing on social survey	
	17	Sat			Ariiving at Narita	Pretest of Social survey	Data analysis		Move		Pretest of social survey	
	18	Sun				Operational coordination			Geophysical survey	Field survey	Field survey	
	19	Mon					Leaving Dhaka					
	20	Tue				Social survey	Ariiving at Narita					
	21	Wed										
	22	Thu										
	23	Fri							Data analysis			
	24	Sat				Move			Geophysical survey	Data analysis		
	25	Sun										
	26	Mon				Supervise Social survey				Field survey	Field survey	
	27	Tue										
	28	Wed										
	29	Thu				Operational coordination						
	30	Fri				Data analysis			Move	Data analysis		
	31	Sat				Prepare for survey			Data analysis	Field survey	Data analysis	
January, 2012	1	Sun				Supervise entrustment			Geophysical survey		Field survey	Data analysis
	2	Mon										
	3	Tue				Operational coordination						Price survey
	4	Wed										
	5	Thu										
	6	Fri			Haneda to Dhaka	Supervise social survey		Haneda to Dhaka	Data analysis		Data analysis	
	7	Sat			Internal meeting			Internal meeting			Internal meeting	
	8	Sun			Discussion with DPHE	Supervise social survey		Discussion with DPHE	Geophysical survey	Considering of survey plan	Field survey	Price survey
	9	Mon										
	10	Tue			Supervise entrustment			Data collection				Leaving Dhaka
	11	Wed								Discussion with DPHE		Ariiving at Narita
	12	Thu										
	13	Fri			Data analysis	Operational coordination			Data analysis	Data analysis		
	14	Sat			Supervise social survey				Geophysical survey	Field survey	Field survey	
	15	Sun			Field survey			Field survey				
	16	Mon										
	17	Tue										Leaving Dhaka
	18	Wed										Ariiving at Narita
	19	Thu								Discussion with DPHE		
	20	Fri			Data analysis					Data analysis		
	21	Sat			Internal meeting			Data analysis	Data analysis			
	22	Sun			Data analysis	Operational coordination				Discussion with DPHE		
	23	Mon			Discussion with DPHE				Discussion with DPHE			
	24	Tue			Discussion with DPHE	Supervise social survey		Discussion with DPHE	Data analysis			
	25	Wed										
	26	Thu			Report to JICA	Supervise social survey		Prepare for departure				
	27	Fri			Data analysis			Data collection		Leaving Dhaka		
	28	Sat								Ariiving at Narita		
	29	Sun			Leaving Dhaka			Leaving Dhaka				
	30	Mon			Ariiving at Narita			Ariiving at Narita				

APPENDIX 3

List of Parties Concerned in the Bangladesh

Appendix 3 List of Parties Concerned in Bangladesh

1.During Field Survey

(1) JICA Bangladesh Office

Takao TODA	Chief Representative
Hiroyuki TOMITA	Senior Representative
Masamitsu KASHIMURA	Representative

(2) Ministry of Finance

Economic Relations Division

Khadiza Begum	Deputy Secretary

(3) Ministry of Local Government, Rural Development and Cooperatives

1) Local Government Division

Shams Uddin Ahmed	Deputy Secretary

2) Department of Public Health Engineering

Mohamed Nuruzzaman	Chief Engineer
Sudhir Kumar Ghosh	Superintending Engineer, Ground Water Circle
Tushar Mohon Shadhu Khan	Executive Engineer, Ground Water E&D Division
Md. Shamsul Alam	Executive Engineer, Mechanical & Electrical Division
Muhammad Shamsulttuq Bhniyan	Executive Engineer, Survey and Investigation Research
Mohammad Saifur Rahman	Executive Engineer, Research & Development Division
Md. Jamanur Rahman	Executive Engineer, DPHE Pabna Division
Abdun Noor	Senior Hydrogeologist
Miah Sattar	Chief Chemist, Central Laboratory

(4) UNICEF Bangladesh

Peter Ravenscroft	Water and Environmental Sanitation Specialist

(5) Embassy of the Netherlands

A. T. M. Khaleduzzaman	Advisor, Water Management (IWRM)

(6) DANIDA

Md. Shajahan Ali	Governance Advisor
Torsten Malmdorf	Senior Sector Advisor

(7) Faridpur Paurashava

Sk. Mahtab Ali Methu	Mayor

2.During Explanation and Discussion on Draft Preparatory Survey Report and Draft Specification of Equipment

(1) JICA Bangladesh Office

Naoki MATSUMURA	Representative

(2) Ministry of Local Government, Rural Development and Cooperatives

1) Local Government Division

Zuena Aziz	Additional Secretary

2) Department of Public Health Engineering

Mohamed Nuruzzaman	Chief Engineer
Sudhir Kumar Ghosh	Superintending Engineer, Ground Water Circle
Tushar Mohon Shadhu Khan	Executive Engineer, Ground Water E&D Division
Muhammad Shamsulttuq Bhniyan	Executive Engineer, Survey and Investigation Research
Mohammad Saifur Rahman	Executive Engineer, Research & Development Division
Abdun Noor	Senior Hydrogeologist

(3) UNICEF Bangladesh

Peter Ravenscroft	Water and Environmental Sanitation Specialist

(4) DANIDA

Torsten Malmdorf	Senior Sector Advisor

APPENDIX 4

Minutes of Discussions

Appendix 4 Minutes of Discussions

MINUTES OF DISCUSSIONS
ON
THE PREPARATORY SURVEY
ON
THE GROUND WATER INVESTIGATION AND DEVELOPMENT OF
DEEP GROUND WATER SOURCE IN URBAN AND RURAL AREAS IN
THE PEOPLE'S REPUBLIC OF BANGLADESH
(EXPLANATION ON DRAFT FINAL REPORT)

In November 2011, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Preparatory Survey Team on the Ground Water Investigation and Development of Deep Ground Water Source in Urban and Rural Areas (hereinafter referred to as "the Project") and entrusted the survey to the Government of the People's Republic of Bangladesh (hereinafter referred to as "Bangladesh") and through discussion, field survey and technical evaluation of the result in Japan, JICA prepared a draft final report of the survey.

In order to explain and to consult with the Government of Bangladesh on the component of the draft final report, JICA dispatched to Bangladesh the Draft Final Report Explanation Team (hereinafter referred to as "the Team"), which is headed by Dr. Yuji Maruo, Senior Advisor, JICA from 29th July to 2nd August, 2012.

As a result of discussions, both sides confirmed the main items described in the attached sheets.

Dhaka, August 1, 2012

Yuji MARUO
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan

Khadiza Begum
Deputy Secretary
Economic Relations Division
Ministry of Finance
Bangladesh

Shams Uddin Ahmed
Deputy Secretary,
Local Government Division
Ministry of Local Government,
Rural Development and Co-operatives
Bangladesh

Sudhir Kumar Ghosh
Superintending Engineer
Department of Public Health Engineering
Bangladesh

ATTACHMENT

1. Component of the Draft Final Report

The Bangladesh side agreed and accepted in principle the main component of the draft final report explained by the Team. The Project sites map and component of the Project are respectively shown in **Annex-1** and **Annex-2.**

2. Responsible and Implementation Agency

2-1) The Responsible Ministry is Ministry of Local Government and Rural Development & Co-operatives, specifically Local Government Division (hereinafter referred to as LGD). The focal person of LGD for the Project is Deputy Secretary, Water Supply 1 of Water Supply Wing.

2-2) The Implementing Agency is Department of Public Health Engineering (hereinafter referred to as "DPHE"). The focal person of DPHE for the Project is Superintending Engineer, Ground Water Circle.

3. Japan's Grant Aid Scheme

3-1) The Bangladesh side understands the Japan's Grant Aid Scheme explained by the Team, as described **Annex-3.**

3-2) The both sides will take necessary measures, as described in **Annex-4**, for smooth implementation of the Project, as condition for the Japan's Grant Aid to be implemented.

4. Submission of Final Report

JICA will complete the final report in accordance with the confirmed items in consultation of DPHE and send it to the Government of Bangladesh by September, 2012.

5. Other Relevant Issues

5-1) Cost Estimate

The Team explained to the Bangladesh side the Cost Estimate as described in **Annex-5**. It is provisional estimate and would be further examined by the Government of Japan for the approval of the Grant. The Bangladesh side understood that the Cost Estimate is not final and subject to be modified. Both sides agreed that the Cost Estimate should never be duplicated or released to any outside parties other than Bangladesh concerned officials until signing of all the contract(s) for the Project.

5-2) Technical Transfer of the Project

In order that the equipment to be procured in the Project is properly operated by Bangladesh side and that the project goal is certainly achieved, the technical transfer will be conducted.

The contents of the technical transfer have been examined considering the current status of the drilling team and the workshop of DPHE.

The technical transfer to the drilling team and the geophysical survey team will be carried out by on-the job-training (OJT) and lecture. The technical transfer by means of 6 sites of geo-physical survey and three (3) deep wells (2 production wells and 1 hand pump well) drilling in the Study area will be carried out.

5-3) 5-Year Action Plan

5-Year Action Plan shown in **Annex-6** for deep tube well drilling in the target area has prepared throughout the Survey considering the amount of a budget and manpower which DPHE can secure. Procured equipment in the Project will be used for carrying out the 5-Year Plan.

5-4) Expansion of Technical Transfer to Local Driller

Technical transfer described in **5-3)** will involve local drillers in order to expand knowledge of deep tube well drilling to private sector, though main target of the technical transfer component of the Project is related DPHE staff.

5-5) Undertakings by the Bangladesh Side

In case the request is approved by the Japanese Government, the Bangladesh side agreed to undertake following issues in addition to the general undertaking shown in **Annex-4**.

1) Implementation structure of 2 production well and 1 hand pump well construction by the Bangladesh side

The both sides confirmed that the construction works of the deep tube wells 5-Year Action Plan shall be executed by the Bangladesh side with its full responsibility.

- DPHE will assign appropriate number of staffs who have experience and skill of drilling deep tube wells. The staff allocation plan is shown in **Annex-7**.
- DPHE will secure the necessary budget shown in **Annex-5** timely.

2) Operation and Maintenance of Facilities, Equipment and Materials

The water supply facilities constructed by the Bangladesh side shall be properly operated and maintained by the target paurashavas/village with support of DPHE. The equipment and materials procured through the Project shall also be properly operated and maintained by DPHE.

3) Workshop and Stockyard for the procured equipment

DPHE will prepare a workshop and stockyard for maintenance for the procured equipment by December, 2013 as recommended by the Study team

4) Half-Yearly Report

Half Yearly report of progress of the deep tube well construction work will be submitted by DPHE to JICA Bangladesh Office. Following items should be included in the report.

- Progress of the well construction
- Utilization record of procured equipment
- Others (water quality issues, etc.

5) Travel Allowance, Daily Allowance Venue Cost for the Training of DPHE Staff for the Technical Transfer

DPHE will bear the necessary expenses for travel allowances which are necessary for the training of DPHE staff implemented in the technical transfer of the Project.

6) Staff Allocation for Technical Transfer of the Project

DPHE will timely assign appropriate number of qualified staffs for implementing soft component of the Project.

7) Facility for the constructed wells through Technical Transfer of the Project

DPHE will prepare necessary facilities for the constructed wells through Technical Transfer of the Project such as hand pump for hand pump well and mechanical pump and connection to piped water supply system for production wells as soon as the wells are constructed.

8) Preparation of Technical Assistance Project Proforma (TPP)/ Development Project Proforma (DPP)

Bangladesh side will prepare TPP/DPP for implementation of the Project. The Project cost will be comprised of Japan's grant aid and contribution of Bangladesh side.

5-6) Payment of Tax

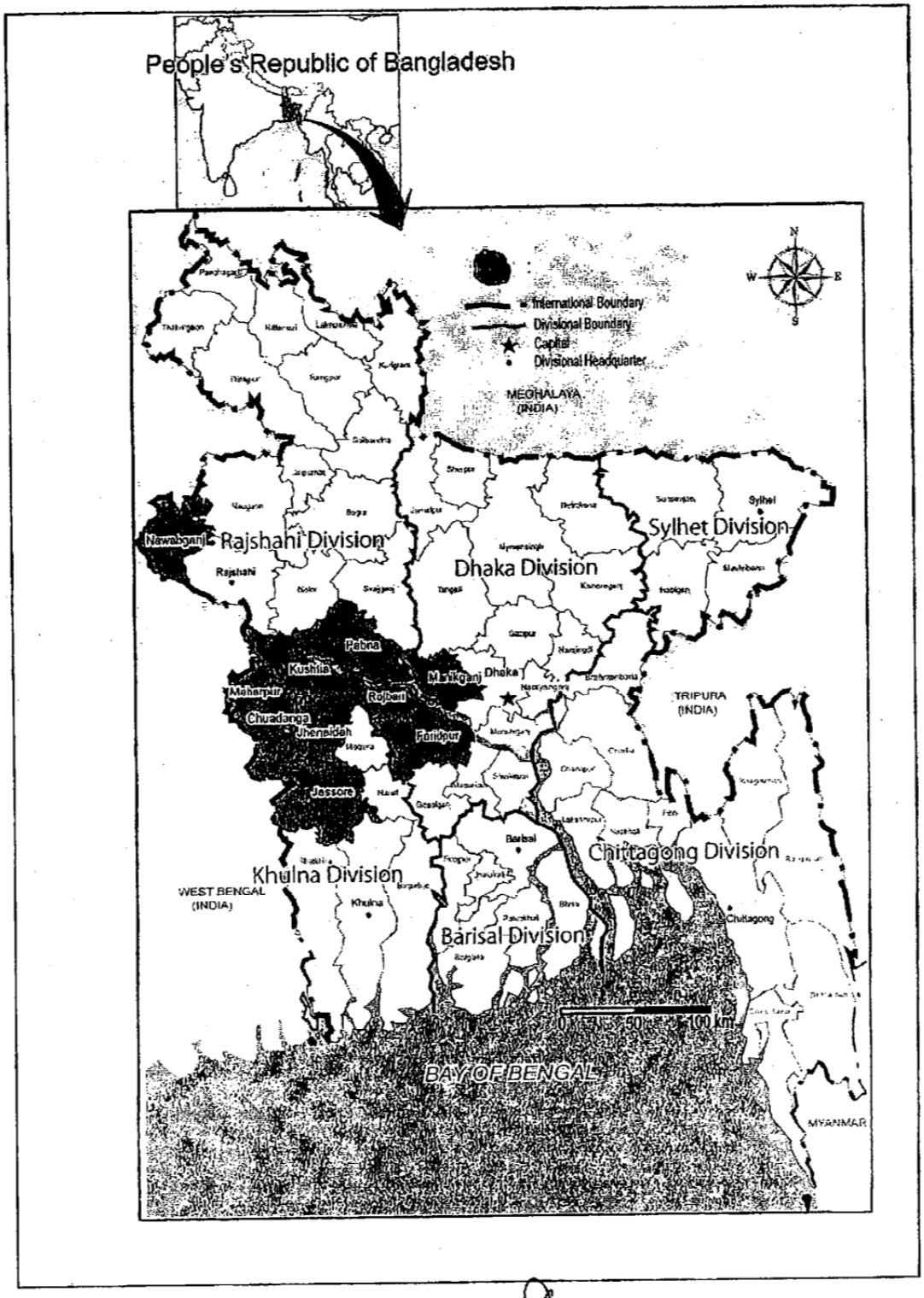
Bangladesh side is responsible for covering custom duty, and other taxes in Bangladesh which are to be arisen from the Project activities. DPHE will take any timely procedures for above mentioned matters.

5-7) Dissemination Plan of the Project Experience

The technique and experience which is obtained in the Project and during 5-Year Plan will be shared with relevant bodies in National Water Supply and Sanitation Technology Sharing Workshop every year.

Annex-1	Project Sites Map
Annex-2	Components of the Project
Annex-3	Japan's Grant Aid Scheme
Annex-4	Major Undertakings to be taken by Each Government
Annex-5	Cost Borne by Japanese and Bangladesh Sides
Annex-6	5-Year Action Plan
Annex-7	Staff Allocation Plan of DPHE

Annex-1 Project Sites Map



Annex-2 Component of the Project

No.	Name of Equipment	Specification	Quantity
1	**Drilling Rig**		
(1)	Truck-mounted Drilling Rig	Drilling capacity: 400m (for production well) including accessories	1 set
(2)	Truck-mounted Drilling Rig	Drilling capacity: 400m (for hand pump well) including accessories	1 set
(3)	Truck-mounted Air Lift/ Pumping Test Unit	For Production Well	1 set
(4)	Truck-mounted Air Lift/ Pumping Test Unit	For Hand pump Well	1unit
2	**Vehicle**		
(1)	5 Ton Cargo Truck with Crane	For Production Well	1unit
(2)	3 Ton Cargo Truck with Crane	For Production Well	1unit
(3)	3 Ton Cargo Truck with Crane	For Hand pump Well	2 unit
(4)	Pick-up Truck	For Production Well	1unit
(5)	Pick-up Truck	For Hand pump Well	1 unit
3	**Geophysical Survey Equipment**		
(1)	Resistivity Survey Equipment (with analysis software)	—	1set
(2)	Logging Equipment (with analysis software)	—	1set
4. Equipment for Workshop		-	1set
5. Well Construction Materials for Technical Assistance			1set
6. Spare Parts			1set

Annex-3 JAPAN'S GRANT AID SCHEME

The Government of Japan (hereinafter referred to as "the GOJ") is implementing the organizational reforms to improve the quality of ODA operations, and as part of this realignment, JICA was reborn on October 1, 2008. Following the decision of the GOJ, Grant Aid for General Project is extended by JICA.

Grant Aid is non-reimbursable fund to a recipient country to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

1. Grant Aid Procedures (Attachment 1)

Japanese Grant Aid is conducted as follows-

- Preparatory Survey (hereinafter referred to as "the Survey")
  - The Survey conducted by JICA
- Appraisal & Approval
  -Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- Determination of Implementation
  -The Notes exchanged between the GOJ and a recipient country
- Grant Agreement (hereinafter referred to as "the G/A")
  -Agreement concluded between JICA and a recipient country
- Implementation
  -Implementation of the Project on the basis of the G/A

2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide a basic document necessary for the appraisal of the Project by JICA and the GOJ. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of agencies concerned of the recipient country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed on by both parties concerning the basic concept of the Project.
- Preparation of a basic design of the Project.
- Estimation of costs of the Project.

The contents of the original request by the recipient country are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of the Japan's Grant Aid scheme.

JICA requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project.

Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA uses (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

The Report on the Survey is reviewed by JICA, and after the appropriateness of the Project is confirmed, JICA recommends the GOJ to appraise the implementation of the Project.

3. Japan's Grant Aid Scheme

(1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the E/N will be singed between the GOJ and the Government of the recipient country to make a plead for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

(2) Selection of Consultants

The consultant firm(s) used for the Survey will be recommended by JICA to the recipient country to also work on the Project's implementation after the E/N and the G/A, in order to maintain technical consistency.

(3) Eligible source country

Under the Japanese Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When JICA and the Government of the recipient country or its designated authority deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

(4) Necessity of "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by JICA. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

(5) Major undertakings to be taken by the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Attachment 1.

(6) Proper Use

The Government of recipient country is required to maintain and use the facilities constructed and the

equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

(7) Export and Re-export

The products purchased under the Grant Aid should not be exported or re-exported from the recipient country.

(8) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). JICA will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to JICA under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

(9) Authorization to Pay (A/P)

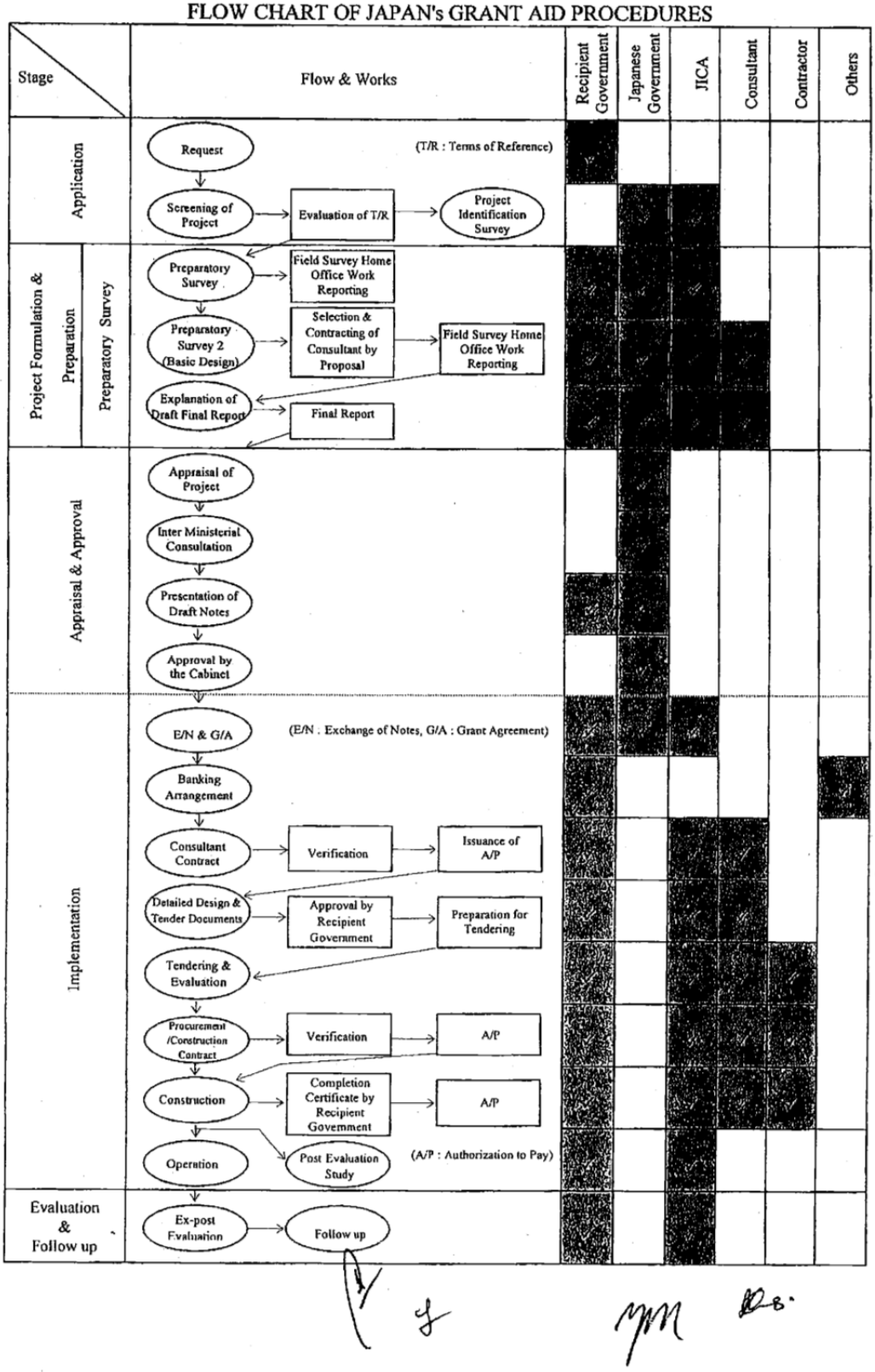
The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions to the Bank.

(10) Social and Environmental Considerations

A recipient country must ensure the social and environmental considerations for the Project and must follow the environmental regulation of the recipient country and JICA environmental and social considerations guideline.

Attachment 1 for Annex-4

FLOW CHART OF JAPAN's GRANT AID PROCEDURES



Annex-4: Major Undertakings to be taken by Each Government

NO	Items	To be covered by Grant Aid	To be covered by Recipient side
1	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
2	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country and to assist internal transportation of the products		
	1) Marine (Air) transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and custom clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	(●) Port to Dhaka DPHE Workshop	(●) Dhaka DPHE workshop to the Project Site
3	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
4	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract		●
5	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		●
6	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for such as transportation and installation of the equipment		●
7	To give due environmental and social consideration in the implementation of the Project		●

(B/A: Banking Arrangement, A/P: Authorization to Pay)

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Annex-6: 5- Year Action Plan of DPHE

1. DRILLING PLAN OF THE BANGLADESH SIDE

DPHE has following basic principle on the drilling of production wells and hand pump wells in the arsenic contaminated area.

- District Paurashava: Deep wells for water sources of the piped water supply are mainly drilled (production wells).
- Villages: Deep wells for handpump wells are basically drilled (handpump well).

According to the plan, a total of 43 production wells and 256 handpump wells will be drilled up to the year 2017. However, in case of Paurashava, there are two areas, the urban area and the rural area, therefore, suitable type of wells will be selected considering the situation.

Numbers of production wells and handpump wells in the Study area are 28 and 30, respectively.

The drilling plan of DPHE is attached to the Minutes concluded on 24 November 2011.

2 5-YEAR ACTION PLAN

A well drilling plan of DPHE was formulated as an 5-Year Action Plan after the delivery of the drilling rigs. Types of well are production wells and handpump wells. Summary of the Action Plan is summarized in Table 1.

Table 1 Summary of the Action Plan

	Production Wells	Handpump Well
Schedule	5 years from November 2014 to October 2019	
Target Area	9 Districts - 2 Districts in Dhaka Division - 5 Districts in Khulna Division - 2 Districts in Rajshahi Division	35 villages - 30 villages - 5 villages addistionally selected
Number of Wells to be Drilled	25 wells	35 wells
Number of Recipient	200,000 persons	16,425 persons
Number of Total Recipient	216,425 persons	

In the Project, two (2) production wells and one (1) handpump well will be drilled for a technical transfer to the Bangladesh side on the deep well drilling technique. For this purpose, a field survey was conducted by the Study Team. As the result the field survey, type of deep well was changed in two (2) sites after discussion with DPHE considering the situation. Contents of the change are as follows.

- A production well to be drilled in Paurashava, Chuadanga Sadar, Chuadanga District, Khulna Division was changed to a handpump well because the site was located in the rural area instead of the urban area in Paurashava.

1 - 1

- A handpump well to be drilled in Shanila village, Pabna District, Rajshahi Division was changed to a production well because the site was located in the urbanized area.

2.1 Production well

Drilling sites for the production well are District Paurashavas in nine (9) Districts included in the drilling plan of DPHE. A total of 28 production wells will be drilled in the plan against the number of production wells to be drilled in the action plan is 25. Accordingly, the drilling plan of DPHE was revised to adjust the number of production well of the action plan (25 wells) reducing the number of well in Jessore District from 7 wells to 4 wells. Paurashava wise number of production well is shown in Table 2. The population and water supply condition of the target Paurashavas are also shown in Table 2.

Table 2 Number of Production Well to be Drilled in Paurashava

Division	District	District Paurashava	Number of Production Well
Dhaka	Faridpur	Faridpur Sadar	2
	Manikganj	Manikganj Sadar	3
Khulna	Chuadanga	Chuadanga Sadar	3
	Jessore	Jessore Sadar	4
	Jhenaidah	Jhenaidah Sadar	2
	Kushtia	Kushtia Sadar	2
	Meherpur	Meherpur Sadar	3
Rajshahi	Nawabganj	Nawabganj Sadar	3
	Pabna	Pabna Sadar	3
Total			25

According to DPHE, water supply coverage in nine (9) District Paurashavas selected reaches 97% (30% by piped water supply and 67% by point sources), however it decreases to less than 60% in dry season due to dried up of groundwater in the wells caused by lowering of water table. Therefore, water supply coverage of these Paurashavas is considered as 60% in the Study. Table 3 shows the population and water supply coverage of nine (9) Paurashavas.

The served population is about 1,211 thousand people against the total population about 2,019 thousand people providing water supply coverage as 60%. Therefore, the target population is about 808 thousand people.

Table 3 The Population and Water Supply Coverage of Nine (9) District Paurashavas (2012)

Division	District	District Paurashava	Population	Served Population	Unserved Population
Dhaka	Faridpur	Faridpur Sadar	198,727	119,236	79,491
	Manikganj	Manikganj Sadar	80,491	48,295	32,196
Khulna	Chuadanga	Chuadanga Sadar	171,315	102,789	68,526
	Jessore	Jessore Sadar	391,717	235,030	156,687
	Jhenaidah	Jhenaidah Sadar	255,065	153,039	102,026
	Kushtia	Kushtia Sadar	143,222	85,933	57,289
	Meherpur	Meherpur Sadar	56,788	34,073	22,715
Rajshahi	Nawabganj	Nawabganj Sadar	312,565	187,539	125,026
	Pabna	Pabna Sadar	408,896	245,338	163,558

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Total	2,018,786	1,211,272	807,514
	100%	60.0%	40.0%

A total of 25 production wells will be drilled in five (5) years as shown in Table 4, since necessary duration of drilling for one (1) production well is estimated as 60 days (2 months).

Table 4 Number of Production Well to be drilled by the Procured Rig

Item	Number of Well
Duration of drilling for one well	2 months/well
Transfer between the sites, maintenance of equipment	2 months/year
Number of well possible to drill in five (5) years	5 wells/year, 25 wells/(5 years)

The number of production well to be drilled in the Action Plan is 25 wells. As one (1) production well is capable to supply water to 8,000 persons, water supply to 2,000 thousand persons becomes possible. Conditions of this assumption are as follows.

- Groundwater yield per one (1) production well: 80 m^3/hour (assumed based on the hydrogeological conditions and existing study data)
- Pumping duration: 12 hours/day
- Unit water demand: 120 L/capita/day (standard of DPHE for piped water supply in urban area)

2.2 Handpump well

One (1) well is planned to be drilled in each target village, totaling 30 wells. However, five (5) wells were added to the Action Plan because it was possible to drill 35 wells in five (5) years as shown in Table 5.

Table 5 Number of Handpump Well to be drilled by the Procured Rig

Item	Number of Well
Duration of drilling for one well	1.5 months/well
Transfer between the sites, maintenance of equipment	1.5 months/year
Number of well possible to drill in five (5) years	7 wells/year, 35 wells/(5 years)

Following conditions were applied for the selection of additional five (5) villages based on the discussion with DPHE.

- Five (5) Unions were selected considering the high priority. Then, one (1) Union is selected in one (1) District to avoid deviation in a District.
- The village of the second priority was selected since the village of the first priority was already selected.

In Manikganj District, no access of drilling rig to the selected village was confirmed after field survey, therefore, Kotkandi Village (the 2nd priority) was alternatively selected. The village is located next to the village of the second priority.

The target 35 villages for the action plan were finally decided as shown in Table 6.

Table 6 The Population and Water Supply Condition of 35 Villages (2012)

District	Upazila	Union	Village	Population	Served Population	Unserved Population
Faridpur	Faridpur Sadar	Aliabad	Bhajondanga	4,348	2,355	1,993
			Bhilmamudpur	10,137	1,275	8,862
		Kaijory	Purbo Gangabardi	2,900	1,431	1,469
		Krishunanagar	Bhadukudia	640	366	274
		Majchar	Dayarampur	4,027	1,831	2,196
Manikganj	Harirampur	Kanchanpur	Kutirhat	832	46	786
			Kotkandi	2,043	76	1,967
Rajbari	Rajbari Sadar	Dadoshi	Pakurikanda	1,138	700	438
Chuadanga	Alamdanga	Baradi	Anupnagar	1,373	213	1,160
			Kachikata	691	94	597
		Jehala	Betbaria	697	203	494
	Chuadanga Sadar	Paurashava	Hochockpara	-	-	-
	Damurhuda	Howli	Boro Dudhpatila	2,256	1,514	742
		Natipota	Boalmari	1,705	1,038	667
Jessore	Chaugachha	Chaugachha	Daskin Kyarpara	1999	420	1,579
			Bergomindapur	3,044	639	2,405
		Jagadishpur	Marua	2,959	1,434	1,525
		Patibila	Purahuda	1,555	617	938
		Phulsara	Baruihati	817	417	400
Jhenaidah	Jhenaidah Sadar	Padmakar	Achintanagar	1,481	1,065	416
	Mahesgpur	Fatepur	Krishna Chandrapur	1,341	849	492
Kushtia	Bheramara	Dharampur	North Bhabanupur	5,632	2,724	2,908
		Junidah	Jagshar	4,834	3,123	1,711
		Mokarimpur	Nawdakhemediar	2,904	2,222	682
	Daulatpur	Pragpur	Pakuria	2,140	1,042	1,098
Meherpur	Meherpur Sadar	Amihupi	Alampur	1,541	674	867
		Kutubpur	Subidpur	4,799	2,372	2,427
Nawabganj	Nawabganj Sadar	Char Anupnagar	Anupnagar	5,795	3,251	2,544
		Maharajpur	Moharajpur	25,845	3,625	22,220
		Ranihati	Ghorapakhia	3,573	605	2,968
			Bohrom	2,858	462	2,396
	Shibganj	Chhatrajtpur	Satrajipur	6,940	1,524	5,416
Pabna	Bera	Masumdia	Khanae Bari	1,715	1,162	553
		Natun Bharenga	Morichapara	1,240	1,020	220
		Ruppur	Boronagaon	659	511	148
Totak				116,458	40,900	75,558

Note *: Population of Hochockpara village is included in that of Chuadanga Sadar (Population data of Hochockpara Is not available).

One (1) deep well will be constructed in each village by implementation of the Action Plan. Number of recipient is assumed in the following manner.

- One tube well can be provided for at most 500 recipients.

A total of 16,425 people will be served by 35 handpumps in 35 villages.

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2.3 NUMBER OF RECIPIENT BY THE ACTION PLAN

One (1) production well is capable to supply water to 8,000 people. Therefore, a total of 200,000 people can be served by 25 production wells. On the one hand, one (1) handpump well has capacity to serve water to 500 people. In case that unserved population is less than 500 people in a village, served population by one (1) handpump well is same as the unserved population in such village. If 35 handpump wells are drilled by the Action Plan, number of recipient is 16,425 people. Therefore, total number of recipient by the Action Plan will be 216,425 people at the completion of the Action Plan in 2020. Through implementation of the Action Plan, potential aquifer is identified and more people can be benefited using the discovered potential aquifer.

Changing in water supply condition by implementation of the Action Plan is shown in Table 7.

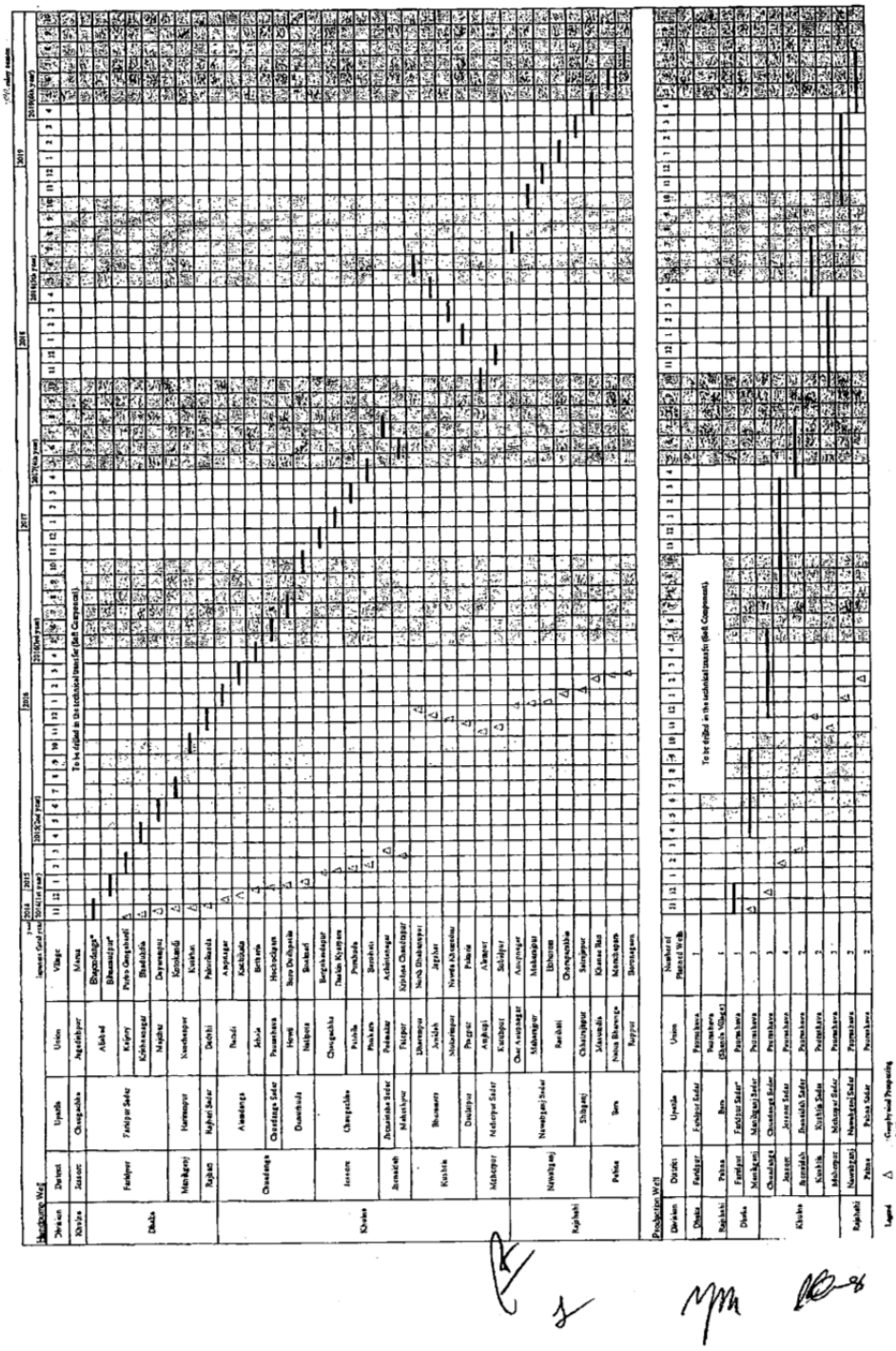
Table 7 Changing in Water Supply Condition by Implementation of the Action Plan

	2012			2020				
	Population	Served Population	Water Supply Coverage	Population	Served Population by existing schemes	Served Population by the Action Plan	Total Population Served	Water Supply Coverage
9 Paurashavas	2,018,786	1,211,272	60.0%	2,206,926	1,211,272	200,000	1,411,272	63.9%
35 villages	116,458	40,900	35.1%	127,310	40,900	16,425	57,325	45.0%
Total	2,135,244	1,252,172	58.6%	2,334,236	1,252,172	216,425	1,468,597	62.9%
Without Implementation of the Action Plan					1,252,172	-	1,252,172	53.6%

2.4 IMPLEMENTATION SCHEDULE OF THE ACTION PLAN

25 production wells and 35 handpump wells will be drilled in the Action Plan. Among them, tow (2) production wells and one (1) handpump well will be drilled in the technical transfer (soft component). Therefore, the implementation schedule for the Action Plan is formulated for the remaining 23 production wells and 34 handpump wells. The technical transfer in the Project is planned to be completed in March 2015. Accordingly, the Action Plan will be commenced on April 2015 and completed in March 2020. The implementation schedule is shown in Table 8.

Table 8 Implementation schedule of the Action Plan



ANNEX-7 STAFF ALLOCATION PLAN OF DPHE

The current organization of Ground Water Circle of DPHE is shown in Figure 1. Staff Allocation Plan as necessary organization for implementation of the Action Plan is shown in Figure 2.

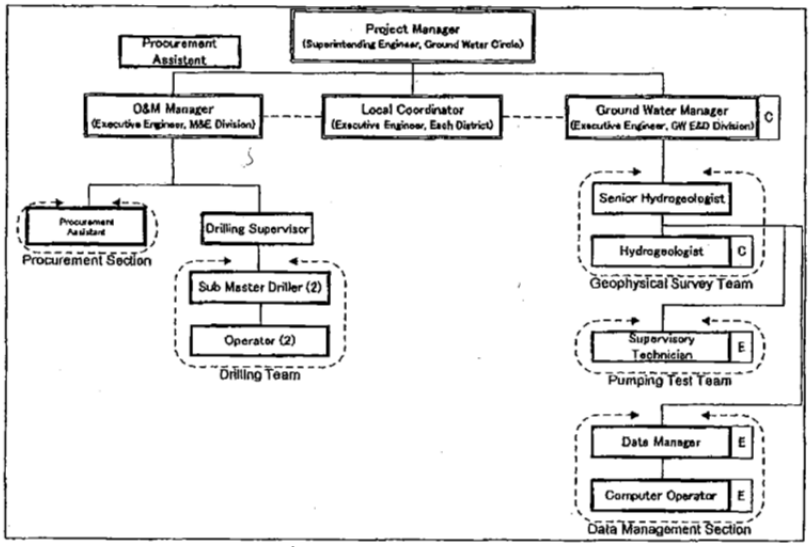


Figure 1 Current Organization of the Ground Water Circle of DPHE

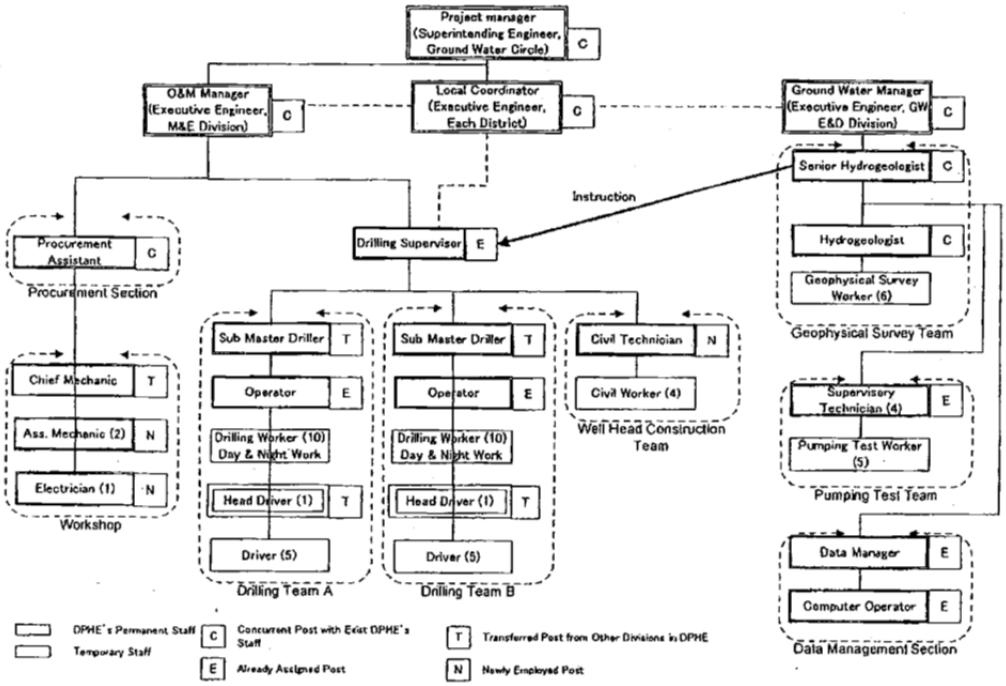


Figure 2 Staff Allocation Plan as Required Organization of the Ground Water Circle of DPHE for Implementation of the Action Plan