



Government of the People's Republic of Bangladesh
Department of Public Health Engineering (DPHE)



Union Wise Water Supply Technology Mapping
Circle: Sylhet
District: Sylhet



June 2018

Union Wise Water Supply Technology Mapping
Circle: Sylhet
District: Sylhet

Published by:
Ground Water Circle
Department of Public Health Engineering (DPHE)
14, Shaheed Captain Monsur Ali Sarani
Kakrail, Dhaka

June, 2018

ISBN: 978-984-34-5249-8

All rights reserved by:
Department of Public Health Engineering
Under Copy right Act.28 of 2000

This book or any part of it cannot be replaced/ reprinted in any form or by any means without prior approval of Department of Public Health Engineering (DPHE)

Design & Composed by: Research & Development (R&D) Division, DPHE

Printed by: Village Water Supply Project (VWSP), DPHE

FOREWORD

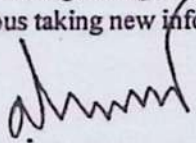
Rural water supply in Bangladesh is primarily depends on groundwater, using low cost tube well technology. The groundwater received importance for drinking purpose particularly due to its safety on microbial content. But the presence of arsenic in groundwater mostly in shallow aquifer posed a threat on the groundwater-based drinking water supply systems.

Providing safe drinking water is quite challenging in Bangladesh. Due to high variability in availability and quality of water, it is difficult to provide unique solution throughout the country. Moreover, present aquifer condition, hydrological/hydrogeological situation, different heavy metal contamination, saline intrusion, pollution etc. poses serious threat to determine safe water sources for drinking. The situation is further challenging for rural water supply systems. Therefore, suitable drinking water supply technologies need to be identified on priority basis covering the lowest administrative boundary, such as union level. Selection of union boundary as unit for determining suitable water supply alternatives will help to identify, regulate and monitor the effectiveness and efficiency of the options installed, data management and also future project planning & development.

Now that, Ground Water Circle of DPHE initiated necessary steps and identified procedures for collecting and preparing union based suitable water options with priority ranking. The outcomes of these initiatives will help to decide suitable water supply technologies for preparing project proposals. This document will be useful for decision making in WASH sector and will be a valuable reference as well. It contains the basic concepts along with advantages and constraints of different drinking water supply options available. It also includes an outline-methodology to select alternative water supplies of different union.

I would like to express gratitude to UNICEF and Village Water Supply Project (VWSP) for providing necessary support in preparing this document. My sincere thanks to Mr. A.K.M. Ibrahim, Additional Chief Engineer (Planning), DPHE and Mr. Md. Saifur Rahman, Superintending Engineer, Ground Water Circle, DPHE who provided utmost effort in completing this task. Special thanks are also extended to Ms. Dilruba Farzana, Executive Engineer, VWSP, Mr. Md. Didarul Alam Tusher, Executive Engineer to complete the field work and data management. Mr. A.H.M. Khalequr Rahman, Executive Engineer, R&D Division and Ms. Firoza Akhter, Deputy Project Director, National Sanitation Project (Phase – III) also deserve appreciation for their involvement in preparing the documentation. Credit also goes to DPHE field-level officials for their valuable contribution in the experience sharing workshop.

Considering changed scenario with elapsed time updating and revision of this document would be obvious taking new information and field experience into account.



(Md. Rashidul Huque)
Chief Engineer
Department of Public Health Engineering
Government of Bangladesh

Table of Content

1.0	Introduction	1
2.0	Objective	1
3.0	Methodology	1
4.0	Present challenges in drinking water supply	2
5.0	Alternative water supply options	2
	5.1 Different alternative water supply options	3
	5.1.1 Dug Well (DW)	3
	5.1.2 Pond Sand Filter (PSF)	4
	5.1.3 Improved Deep Tubewell	5
	5.1.4 Rain Water Harvesting System (RWHS)	6
	5.1.5 Arsenic Removal Technologies (ART)	7
6.0	Low water table technology	7
7.0	Iron removal technology	9
8.0	Salinity issues	9
9.0	Union wise technology	9
10.0	Use of union wise water supply technology mapping documentation	10
	Annex – A Union wise Technology maps and data files	11

1.0 Introduction:

Rural water supply in Bangladesh is predominantly based on ground water. But identification of arsenic in ground water particularly in shallow aquifer causes threat on ground water based water supply system. The project emphasizes on arsenic issue for providing safe water to the community. Arsenic has been identified in 271 upazilas of which 29% tub wells are found arsenic contaminated in terms of Bangladesh standard (50ppb) (BAMWSP, 2003). Spreading pattern of arsenic is sporadic, not uniform. In one upazila, some unions are severally arsenic contaminated and some are not like that. However, arsenic contamination also varies with depth of aquifer for a particular place.

The ground water of Bangladesh is extremely complex in terms of water chemistry and geology as well. On the other hand, protected but perennial surface water source is not available in many parts of the country. So, one technology may not be suitable for the larger areas because of different hydro-geological situation. In that case the water technology is required to be identified on priority basis up to specific boundary, such as union level.

In this context, initiatives were taken by Ground Water Circle of DPHE to prepare the technological map for different districts. The field visit and workshops were supported by UNICEF and documentation has been completed with the assistance from village water supply project (VWSP).

2.0 Objective of Task:

- Identification of the union wise water supply technology based on hydro-geological situation of the particular areas.
- Preparation of the GIS mapping on union wise water options.
- Preparation of union wise technology map document for future reference and use.

3.0 Methodology:

1. Union wise basic data regarding lowest water table, arsenic contamination, iron and salinity problem available in Ground Water Circle has been furnished in a table (Union wise technology 2009 as reference).
2. Based on basic information, a desk review has been made to primarily identify union-wise technology analyzing the hydro-geological situation of that particular area. In most cases particularly in the arsenic affected unions, two or more options were identified on priority basis. The forecasting of groundwater level in year 2017 is considered as maximum water level in the area.
3. The primarily identified union wise technology list was provided to the DPHE SEs, EEs and SAEs to facilitate their participation in the workshop.

4. Circle wise workshops were held with the participation of concerned Superintending Engineer, Executive Engineer, Assistant Engineer, Sub-Assistant Engineer and Mechanics. Representatives from Ground Water Circle and from different projects were present there to facilitate the workshop.
5. The workshops discussed the experience and views of the field officer focusing on technology table prepared by DPHE Ground Water Circle and along with the policy guidelines particularly “National Policy for Arsenic Mitigation 2004 and Implementation Plan for Arsenic Mitigation in Bangladesh”.
6. Incorporating the findings of Workshop, the technology table has been send to concerned SEs, EEs and SAEs.
7. Based on the feed back from the field, technology table has been finalized, on basis of that GIS map for union-wise technology has been prepared.

4.0 Present challenges in drinking water supply:

The problems of water source have been discussed which are as follows:

- i. Lowering of water table
- ii. Arsenic contamination in ground water particularly in shallow aquifer
- iii. Salinity in ground water
- iv. Iron & Manganese in ground water
- v. Non availability of suitable aquifer or rocky/hard layer
- vi. Non-availability of protected and perennial surface water source round the year

5.0 Alternative water supply options:

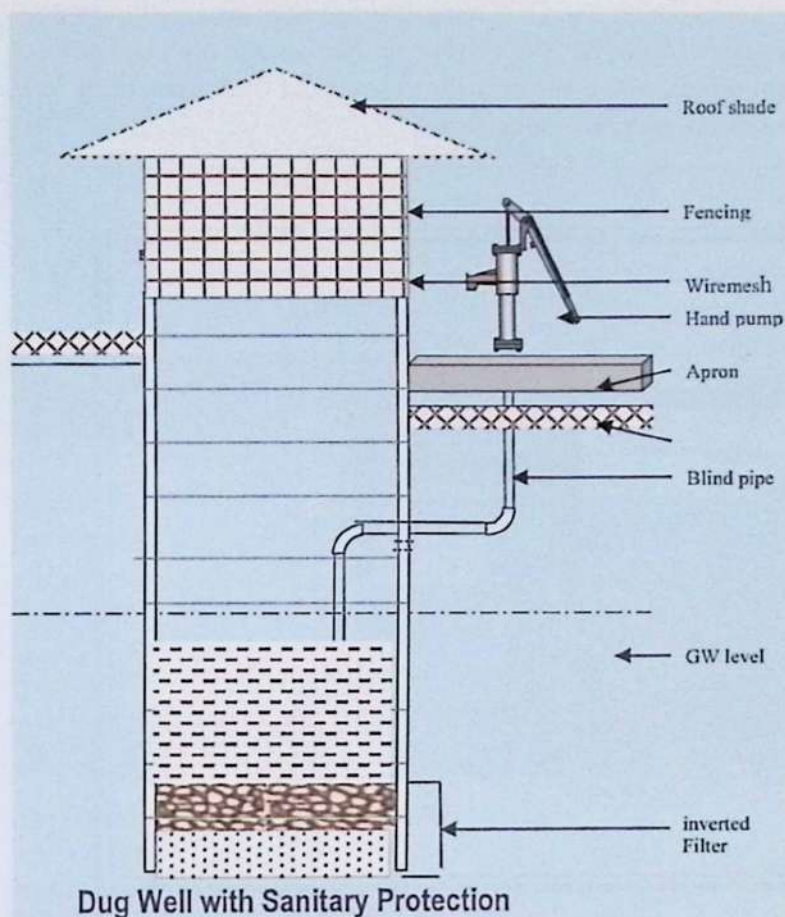
The project has given importance on arsenic mitigation approach as arsenic contamination emerges as a great concern for ground water based rural water supply system in Bangladesh. The project area and arsenic contamination is shown in Map as Annex- B. Different Arsenic mitigation options has been discussed following “National Policy for Arsenic Mitigation 2004 & Implementation Plan for Arsenic Mitigation in Bangladesh”. The mitigations options are:

- Dug/Ring Well
- Pond Sand Filter
- Deep Tubewell
- Rain Water Harvesting as promotional option and
- Arsenic Removal Technology (ART)

5.1 Different alternative water supply options:

Regarding identification of the Arsenic Mitigation Option, the criteria including the potentialities and limitation of each option were discussed in contrast with hydro-geological situation for the particular area considering the guidelines mentioned in the “National Policy for Arsenic Mitigation 2004 & Implementation Plan for Arsenic Mitigation in Bangladesh”. According to the said policy guidelines PSF and dug well will be tried first. If these technologies are found not feasible deep tubewell could be tried following the “Protocol for sinking Deep Tubewells in Arsenic contaminated areas”.

It was also advised that not only the technical aspect but O&M and user friendliness should be taken under consideration for selecting the options to make it sustainable. The main feature and basic criteria for each of the option are presented as follows:



5.1.1 Dug Well:

Dug well is the oldest method of groundwater withdrawal for water supplies. The water of the dug well has been found to be free from dissolved arsenic and iron even in locations where tubewells particularly in shallow aquifer are contaminated.

Pre-requisite criteria

- # There should be stable soil layer at the top (a clay layer is preferable)
- # Presence of sandy layer within 9 to 12 m

Not Feasible

- # Areas with the loose sandy soil
- # Areas with more than 15m consolidated clay.
- # Tidal zones of the coastal belt
- # Areas of stony hills
- # Area of peaty soil should be avoided for DW as these cause an unpleasant taste and smell.

Design Requirements:

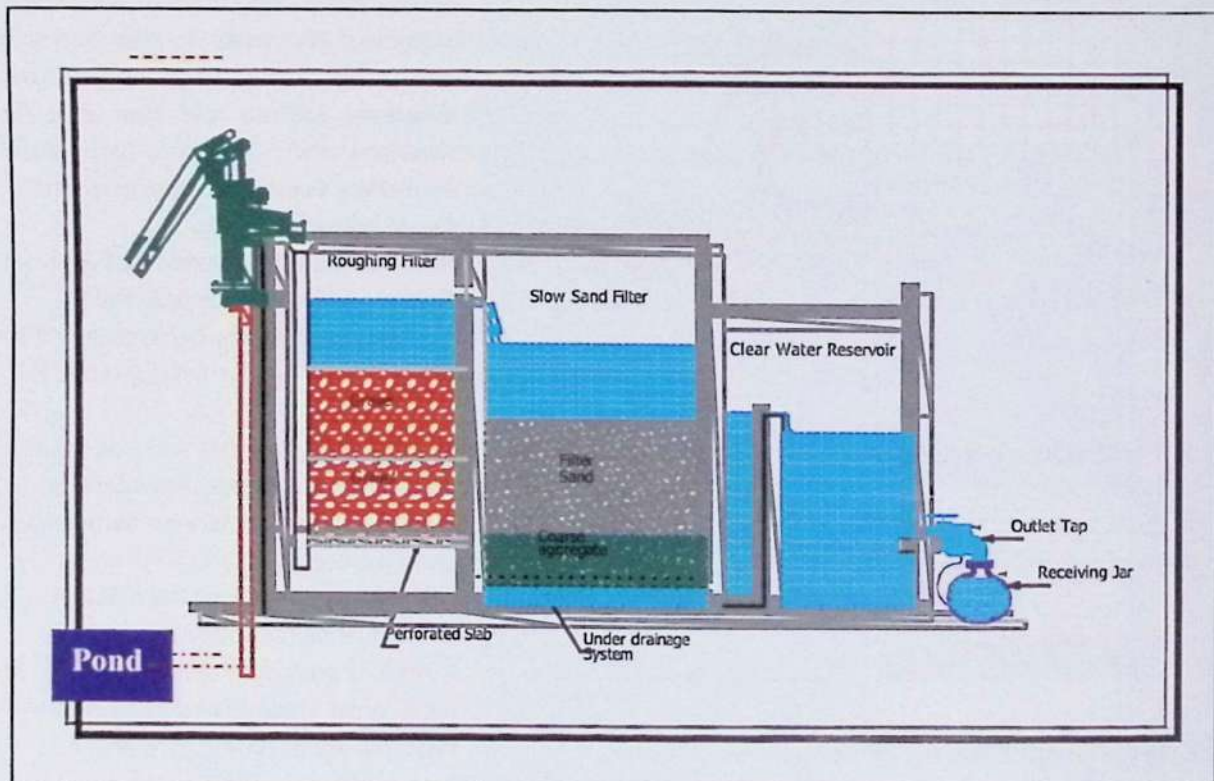
- # Concrete rings of 1.0 to 1.2 m in diameter used as lining.
- # Wells should be at least 1.0 to 1.5 m deeper than the lowest water table in the driest month.
- # Dug well should be constructed in the dry season to ensure availability of water round the year.

- # Test well is to be drilled prior to construction of ring well to make sure about the soil condition and water quality.
- # The well lining should be extended at least 0.5m above the ground to form a 'head wall' around the outer rim of the well.
- # A concrete apron, about 2 m in width, should be constructed on the ground surface extending all around the outer rim of the well.
- # The intake of water from a dug well can alternatively be made using float.

Very Shrouded Shallow Tubewell (VSST) can be considered as option in the DW area at the same depth. The availability of water in saturated zone should be ensured in this case. The main feature of this technology is the shrouded with coarse sand around the filter area. This is a low cost technology. This technology is also used in the saline problem areas.

5.1.2 Pond Sand Filter:

Pond sand filter is a surface water treatment option which is primarily a slow sand filter unit. If the turbidity of water is high then, there is necessity to use horizontal roughing filter.



Raw water from pond is pumped up from a pond; the turbidity gets down through the roughing filter and then discharged into the filtration unit. The water is filtered and then collected in a clear water reservoir by an under drainage system. PSF is a good option for arsenic mitigation as well as for salinity prone areas

Pre-requisite criteria

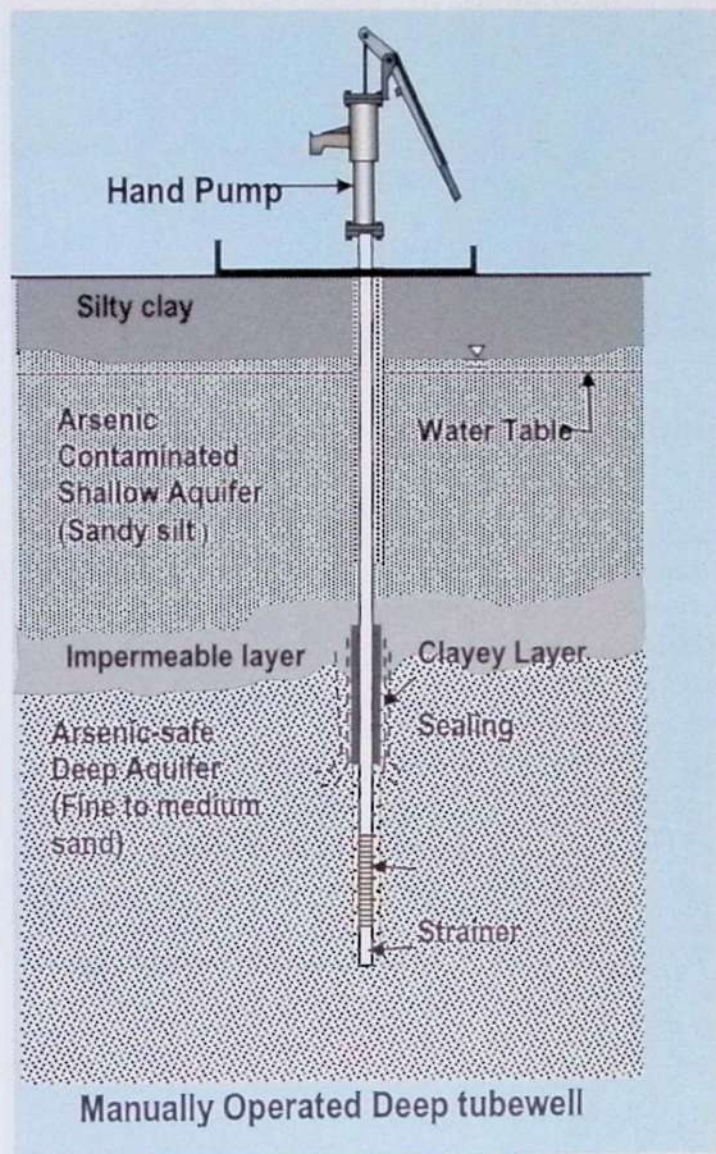
Viable alternative water supply option where perennial rivers, canals, fresh water lakes and ponds of acceptable water quality are available.

Regular maintenance is crucial for the effectiveness of PSF

Such maintenances need high level of community mobilization and proper attention to ensure safe water particularly from bacteriological contamination.

Design Criteria

- The horizontal roughing filter is divided into 3 parts: inlet tank, gravel zone and outlet tank. The gravel zone consists of 3 chambers loaded by different size of gravel (5-15 mm).
- The Sand Filter bed should be composed of 0.22 mm – 0.35 mm fine sand with a thickness of 60 to 120 cm. There is also a layer of coarse aggregate below the fine sand to support the sand against washing out through under drainage system. The uniformity coefficient should be from 2 to 3. The size of the gravel zone is 5-15 mm
- The filtration rate through SF is 0.2 – 0.3 m/hr and through roughing filters 1.5-2.0 m/hr.

**5.1.3 Improved Deep Tubewell**

The deep aquifers in Bangladesh have been found to be relatively free from arsenic contamination. The aquifers in Bangladesh are stratified and in some places the aquifers are separated by relatively impermeable strata. Deep tubewells installed in those protected deeper aquifers are producing arsenic safe water. Sealing in the impervious layer is done to prevent the leaching of arsenic through path way created during drilling of the well.

Pre-requisite criteria

It can be installed where shallow aquifer is separated from deeper aquifer by substantially thick impervious layer.

It can be installed in the coastal areas of Bangladesh having safe aquifer.

Design Requirements:

- The entire tube well should be installed straight and vertically deep bore hole is required therefore.
- The annular space of bore holes of the deep tube wells are required to be sealed at the level of impermeable strata.

- The entire tube well should be installed straight and vertical.

5.1.4. Rain Water Harvesting:

Rainwater harvesting is a technology to collect rainwater for its use in drinking purposes. About 203 cm rainfall occurs annually in Bangladesh. The rain water is safe if it maintained hygienically. The main limitation of this option is non-availability of rain water round the year. But it can be widely used as supplementary source. As per “National Policy for Arsenic Mitigation 2004 & Implementation Plan for Arsenic Mitigation in Bangladesh” the government’s role is mainly to conduct promotional activities for RWH.

Pre- requisite criteria

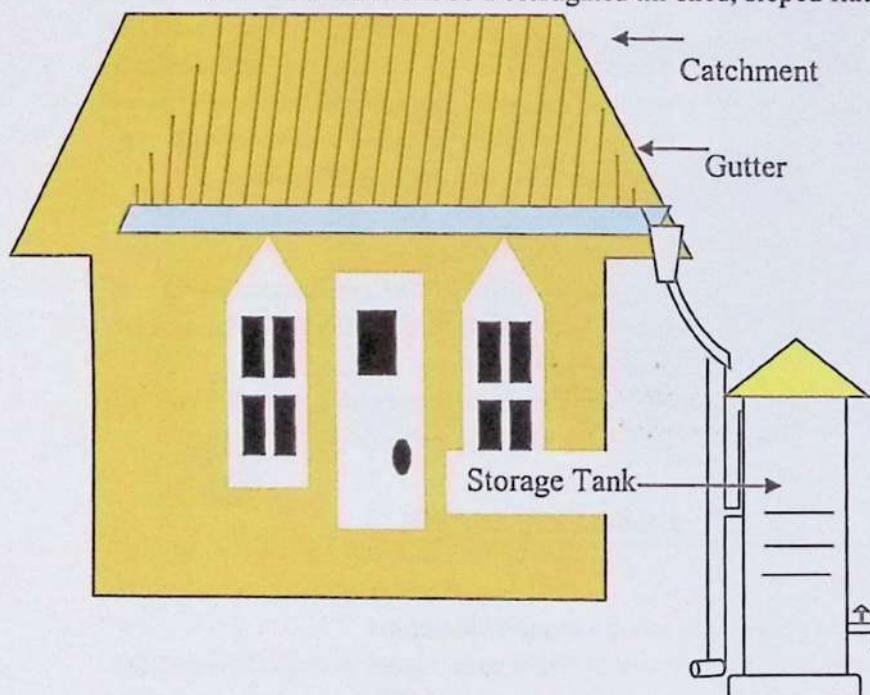
Feasible where average rainfall is 1600 mm per annum.

There should have required catchment area for rain water harvesting

Design Criteria

- Rain water has 3 basic units. 1. The catchment area (like corrugated roof top) and 2. Supporting collection system (gutter and pipe collection pipe) and 3. Storage tank.

- Catchment zone can be a corrugated tin-shed, sloped flat roof top, polythene sheet etc.



- The tank can be made of GI, ferro-cement, burned clay (motka), plastic etc.

- The collection pipe should have an exit way beyond the connection with storage tank to let the first flush flow away.

- The down pipe should have net to bar mosquitoes, flies from entering into the storage tank.

- There should be an end plug to stop flush discharge to enter water into the storage tank after flushing.

- The location should be so

selected that it allows accessibility of people.

5.1.5 Arsenic Removal Technology (ART):

ARTs are the chemical options which remove arsenic mainly using media. Four options are provisionally certified by BCSIR of which three are house hold and one is community based. These can be selected as a last effort particularly where deep tubewell and Dug well is not feasible. Filter media have to be changed after the media being clogged. The quality of raw water is specified for each technology.

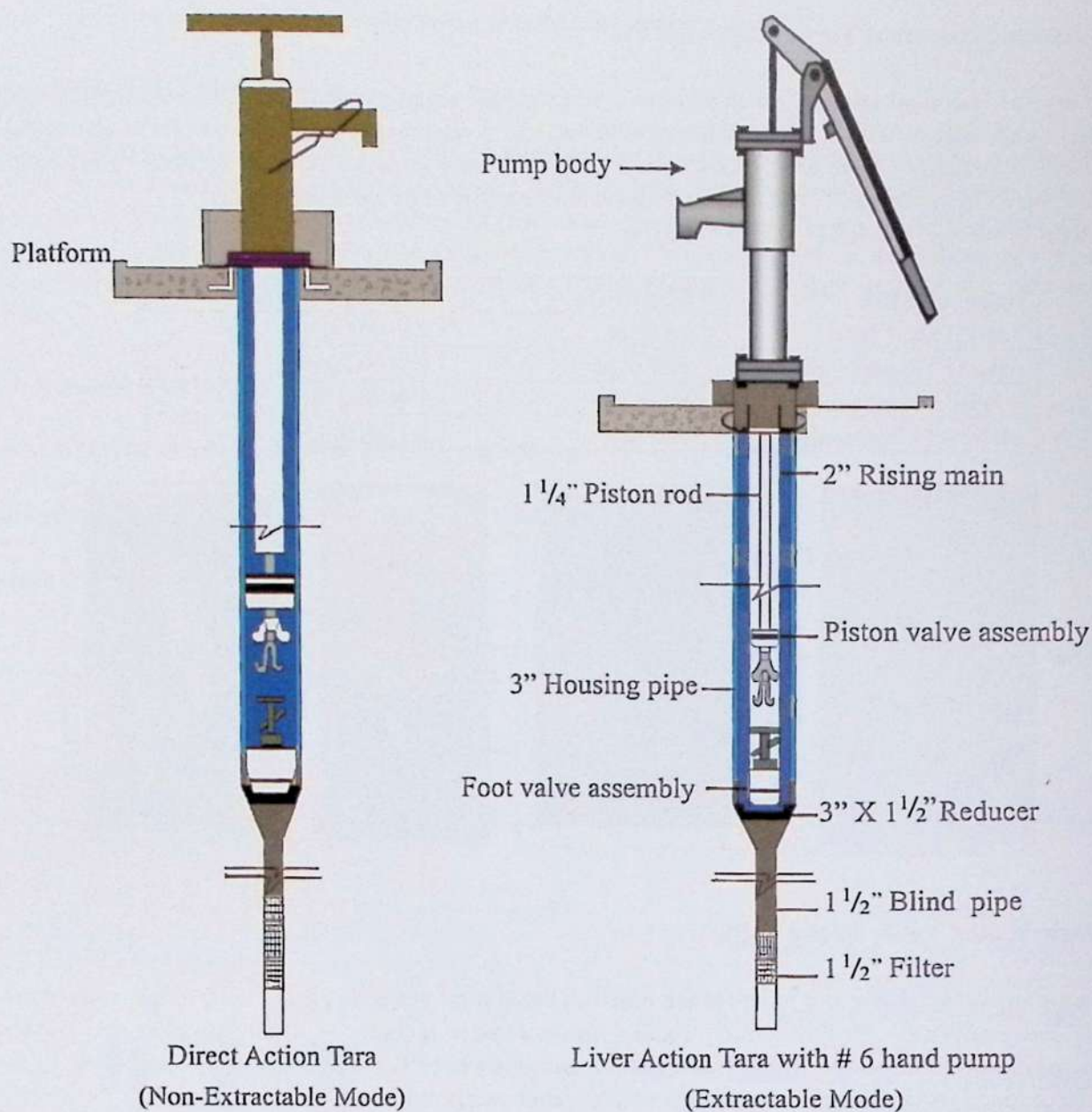
The main features of the ARTs are given below:

Name of ARTs	Filter rate	Total Treatment
Sono (House hold)	16 lit/hr	8100 liter
Alkan (House hold)	120 lit/hr	8100 liter
Read-F (House hold)	60 lit/hr	40,000 liter
SIDKO (Community)	240 liter/hr	1,21,500 liter



6.0 Low Water Table Technology:

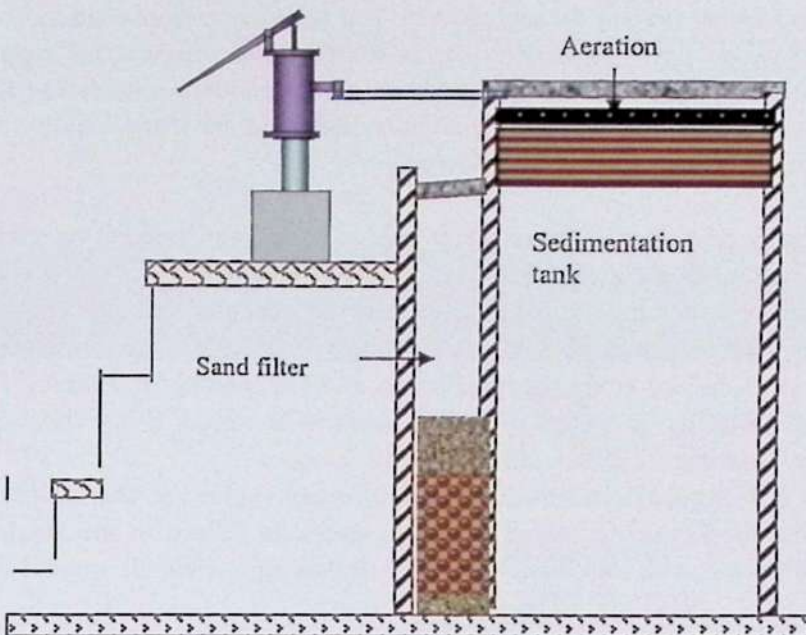
Lowering of water table is big issue for the tubewell based rural water supply. In view of low cost, easy to O&M and availability in the market, suction mode number 6 pump is widely used as the tubewell technology. But its limitation is that it can not abstract water beyond the 26 ft depth of water table. In that case force mode pump has to be used. Earlier direct action pump was used. In some cases where the depth of water table is marginal, in that case Tara tube well may be given preference. Now Tara #6 head pump (lever action) is being used which can abstract water upto 80-90 ft depth of water table in both extractable and non-extractable mode. The component of direct action Tara and lever action Tara with # 6 hand pump are shown as below:



In selecting the areas of low water table in the upazilas, the study on forecasting groundwater level declination in Bangladesh conducted from early 1990 has been used and the delineated low water table map for 2017 is considered as the reference of maximum depth to water level. The pump technology is then selected for the union.

7.0 Iron Removal Technology:

Iron content exceeding 5mg/l will require treatment using Iron Removal Unit (IRU). It is to be mentioned



that concentration of Iron varies with different aquifer. Iron in ground water may be present in different forms and its removal can be effected by simple methods such as aeration with or without sedimentation followed by filtration. Iron from the water, thus making it acceptable for the users. Dissolved iron in water is converted into insoluble ferric form in contact with air. This form will be removed by settling in the sedimentation tank and remaining by the filtration through sand filter. The sedimentation tank is required to reduce the load on sand filter in order to minimize the frequency of filter clogging.

8.0 Salinity issues:

Salinity problem is now not limited in the coastal belt rather salinity intrusion is now expanded in the various part of the country. Deep tubewell and PSF are the best feasible option in this area. It is to be mentioned that RWH is a suitable option as average rainfall is high in the coastal belt. The VSST is also an option in the coastal belt.

9.0 Union wise water supply technologies:

A set of technologies has been recommended for each union on priority basis based on the available hydro-geological information, the views of field personnel & policy guidelines. However, these technologies have to be implemented systematically ensuring the participation of communities. According to the policy guidelines the water options will be selected following the community action plan ensuring the active participation of community. So proper knowledge about the option shall have to be provided to the community so that the option can meet the basic criteria of the water supply such as safe, adequate and reliable round the year. It is to be mentioned that if a technology is new for the particular area, utmost care should be taken for its implementation and replication. The experience regarding implementation of the technologies in the field will be helpful for upgrading the technological mapping and for proper application of the technologies.

10.0 Use of union wise water supply technology mapping document:

It has been proved from different studied that hand pump system of water options particularly Shallow and Deep hand pump tube wells are very much popular among the community. But the arsenic contamination in groundwater compelled the implementer of water supply to switch over to different alternative water supply options in the arsenic affected areas. The technology in a union has been recommended considering the Arsenic Policy 2004 and its implementation plan along with other particular information of the locality. In implementing water supply options the following steps should be followed:

- a) In all cases arsenic and other required water quality parameters need to be tested before the system is bought to operation.
- b) In the villages/unions where there is presence of arsenic but the average contamination level is less than 5%, the existing technology is recommended STW. In that case, before going for installation of STW, testing of arsenic of 5 to 10 tube wells within 500 meters of the site need to be tested. If any tubewell shows arsenic >0.05 mg/L, follow the alternative option.
- c) Dug well and PSF should be investigated as the feasible option of alternative of STW. If sufficient documentation is available about its failure in the locality then Deep tubewell with modified design (following protocol) should be adopted.
- d) In case of non-successful of non chemical based option (STW, DW, PSF and DTW) chemical based option for Arsenic Removal Unit should be used as the technology.
- e) In all cases in problem areas promotional activities on RWH should be done.

List of Upazillas

Circle : Sylhet

District: Sylhet

Serial No	Name of District	Name of Upazila	No. of Union	Page No.
1	Sylhet	Balaganj	14	A-1
2		Beani Bazar	10	A-6
3		Bishwanath	8	A-11
4		Companiganj	6	A-16
5		Dakshin Surma	10	A-21
6		Fenchuganj	5	A-26
7		Golapganj	11	A-31
8		Gowainghat	9	A-36
9		Jaintiapur	6	A-41
10		Kanaighat	9	A-46
11		Sylhet Sadar	8	A-51
12		Zakiganj	9	A-56
	Total	12	105	

District: Sylhet

Upazila:

Balaganj

Beani Bazar

Bishwanath

Companiganj

Dakshin Surma

Fenchuganj

Golapganj

Gowainghat

Jaintiapur

Kanaighat

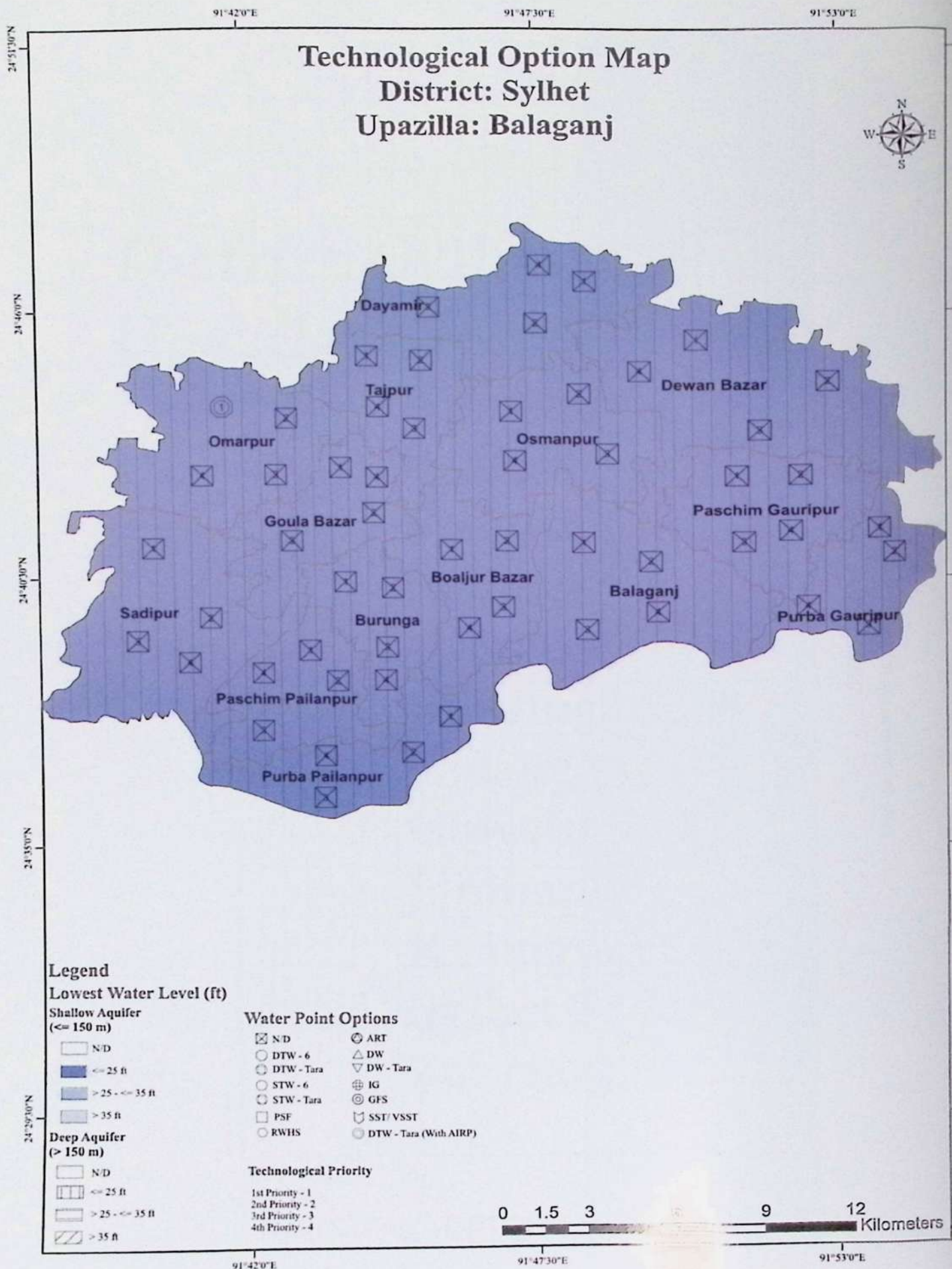
Sylhet Sadar

Zakiganj

Table for mapping union wise Water Supply Technology
Balaganj, Sylhet

SL	District	Upazila	Union	Lowest Water Table of the Union in the year 2017, ft	As contamination Status (% of Contaminated TW as per NAIMC, BAWWS 2003)	As Contamination Status (% of affected DPHE Water Points Installed during 2006-12)	Fe Problem (>5ppm) (% of DPHE TW)		Cl Problem (>100ppm) (% of DPHE TW)		Average Depth of Water point, ft		11				Remark															
							7		8		9		10																			
							STW	DTW	STW	DTW	STW	DTW	STW	DTW	STW	DTW		STW	DTW	STW	DTW											
1	Syhet	Balaganj	4	2	3	4	5	6	7	8	9	10	11	12	13	14																
1																	Omarpur	24	20	17.05	20	100	80	0	0	0	280	750	N/D	- Tara (With	-	-
2																	Sadpur	23	20	46.01	27.27	80	80	0	0	0	280	750	N/D	-	-	-
3																	Paschim Pallanpur	24	21	63.89	33.33	50	80	0	0	0	280	750	N/D	-	-	-
4																	Purba Pallanpur	24	20	55.51	16.67	0	80	0	0	0	280	750	N/D	-	-	-
5																	Bosjur Bazar	22	20	10.7	12.5	0	80	0	0	0	280	750	N/D	-	-	-
6																	Burunga	22	21	20.33	11.11	0	80	0	0	0	280	750	N/D	-	-	-
7																	Gouls Bazar	22	21	16.35	28.57	100	80	0	0	0	280	750	N/D	-	-	-
8																	Tajpur	24	21	7.06	0	0	80	0	0	0	280	750	N/D	-	-	-
9																	Dayanir	22	20	12.45	0	0	80	0	0	0	280	750	N/D	-	-	-
10																	Omanpur	22	20	36.61	12.5	0	80	0	0	0	280	750	N/D	-	-	-
11																	Dewan Bazar	22	19	13.89	0	0	80	0	0	0	280	750	N/D	-	-	-
12																	Paschim Gauripur	22	19	27.41	0	0	80	0	0	0	280	750	N/D	-	-	-
13																	Balaganj	24	21	61.62	13.04	0	80	0	0	0	280	750	N/D	-	-	-
14	Purba Gauripur	23	21	14.23	N/D	N/D	80	10	0	0	280	750	N/D	-	-	-																

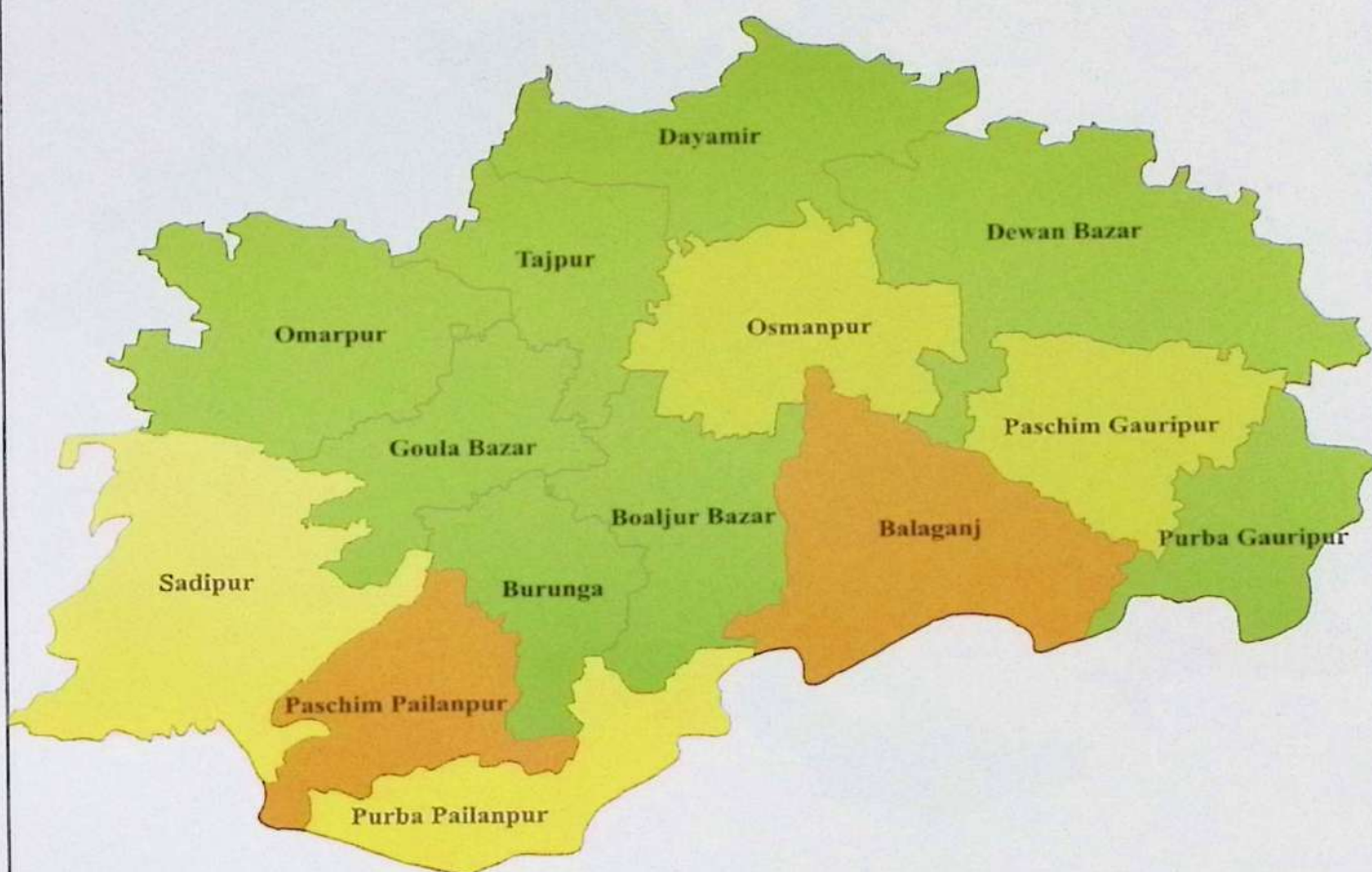
Note: Iron and Chloride contamination derived based on people's perception, 2014
N/D = No Data



Arsenic Contamination Map - 1

District: Sylhet

Upazilla: Balaganj



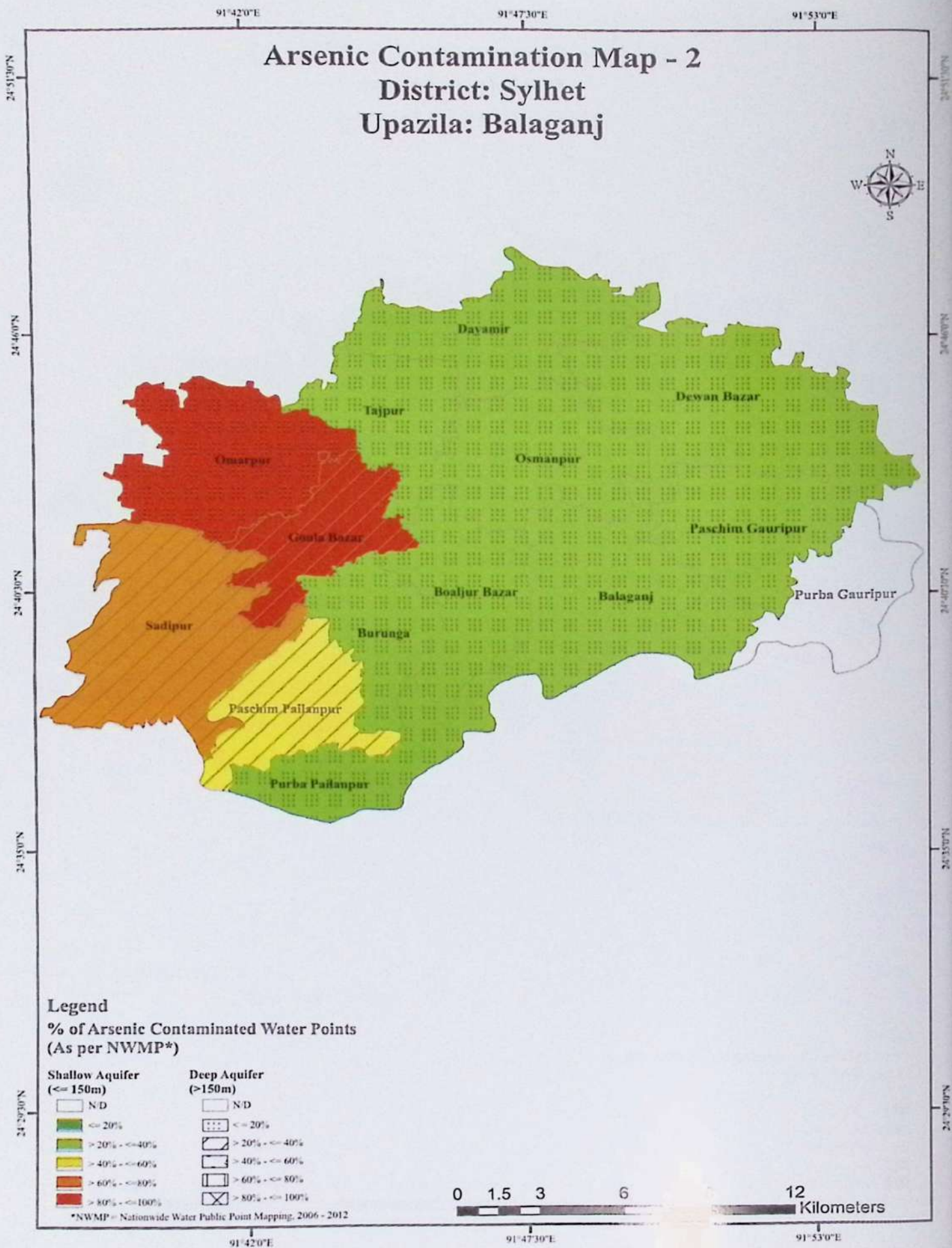
Legend

% of Arsenic Contaminated Water Points
(As per BAMWSP*)

- N/D
- $\leq 20\%$
- $> 20\% - \leq 40\%$
- $> 40\% - \leq 60\%$
- $> 60\% - \leq 80\%$
- $> 80\% - \leq 100\%$

*BAMWSP = Bangladesh Arsenic Mitigation Water Supply Project, 2003

0 1.75 3.5 7 10.5 14 Kilometers



91°42'0"E

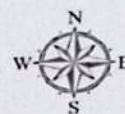
91°47'30"E

91°53'0"E

Chloride Concentration Map

District: Sylhet

Upazila: Balaganj



24°51'30"N

24°46'0"N

24°40'30"N

24°35'0"N

24°29'30"N

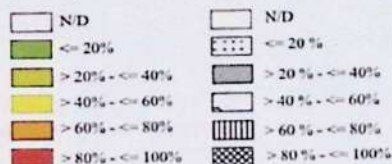


Legend

% of Chloride Contamination

Shallow Aquifer
(≤ 150m)

Deep Aquifer
(> 150m)



0 1.5 3 6 9 12 Kilometers

91°42'0"E

91°47'30"E

91°53'0"E

Table for mapping union wise Water Supply Technology
Beani Bazar, Sylhet

Sl.	District	Upazila	Union	Lowest Water Table of the Union in the year 2017, R		As contamination Status (> 50ppb) (% of affected DTWLE Water Points installed during 2006-12)		Fe Problem (> 5ppm) (% of DTWLE TUV)		Cl Problem (>1000ppm) (% of DTWLE TUV)		Average Depth of Water point, ft				Remark		
				5		6		7		8		9		10				
				STW	DTW	STW	DTW	STW	DTW	STW	DTW	STW	DTW	STW	DTW		STW	DTW
1	Sylhet	Beani Bazar	Alinagar	19	18	1	0	0	25	15	0	0	175	650	40	DTW - 6 STW - 6	DW	STW - Tara
2				16	19	4.92	0	20	30	25	0	0	210	690	N/D	DTW - 6 STW - 6	STW - Tara	RWHS
3				18	19	8.18	0	18.18	25	20	0	0	180	650	35	DTW - 6 STW - 6	STW - Tara	DW
4				16	19	3.14	0	0	30	20	0	0	150	680	40	DTW - 6 STW - 6	STW - Tara	DW
5				18	19	0	0	0	25	15	0	0	130	600	45	DTW - 6 STW - 6	STW - Tara	STW - Tara
6				20	19	6.61	0	0	20	15	0	0	245	680	N/D	DTW - 6 STW - 6	DW	STW - Tara
7				21	20	0	0	0	10	0	0	0	135	680	45	DTW - 6 STW - 6	DW	STW - Tara
8				27	25	0.37	0	0	20	15	0	0	185	680	45	DTW - Tara STW - Tara	DW	RWHS
9				18	15	0.08	0	0	30	15	0	0	150	700	30	DTW - 6 STW - 6	DW	STW - Tara
10				21	20	10.64	0	0	20	10	0	0	220	700	35	DTW - 6 STW - 6	STW - Tara	DW

recent and Chloride contamination derived based on people's perception, 2014
N/A = No Data

92°40'E

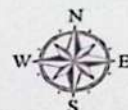
92°9'30"E

92°15'0"E

Technological Option Map

District: Sylhet

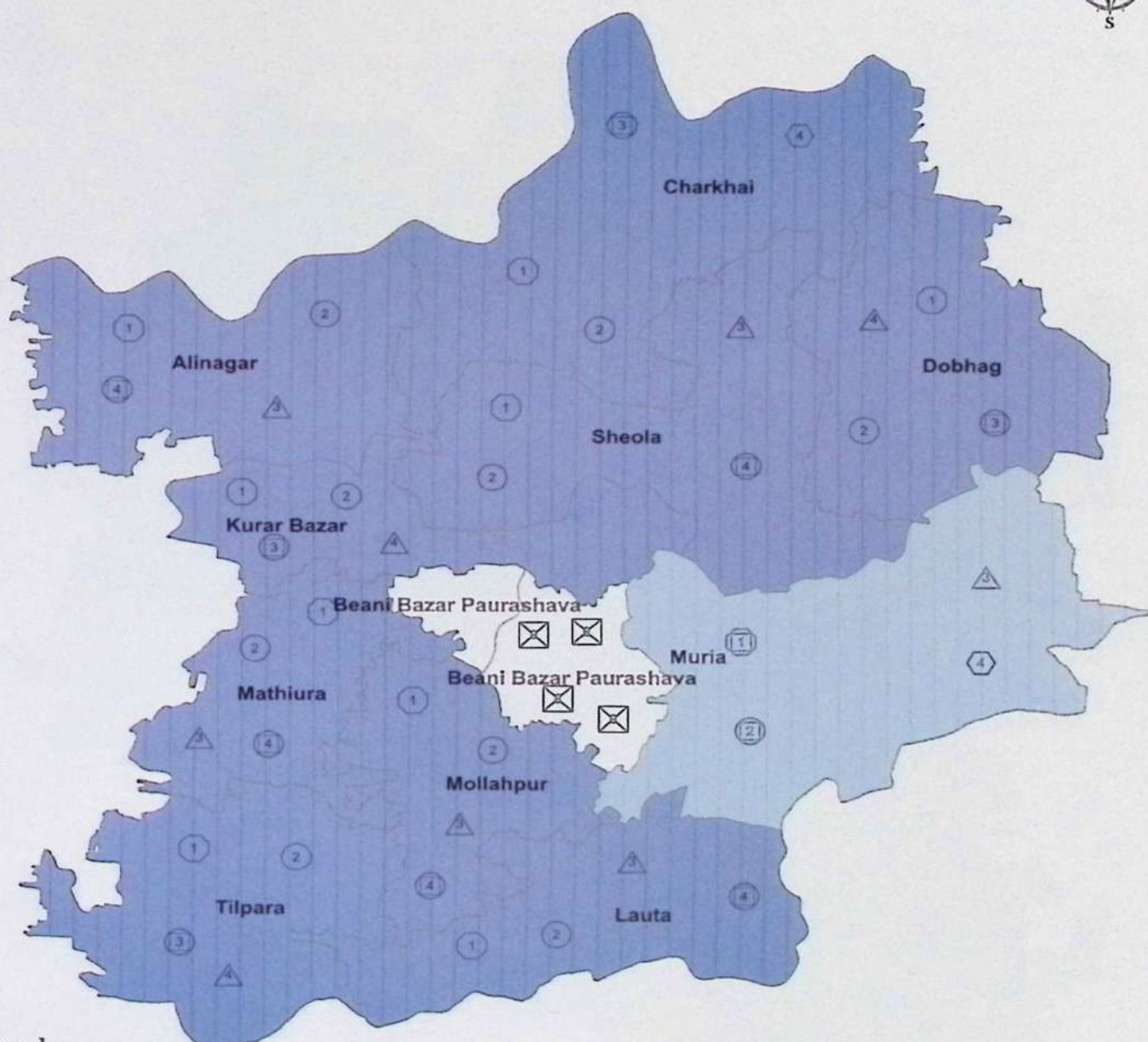
Upazilla: Beani Bazar



24°57'0"N

24°51'30"N

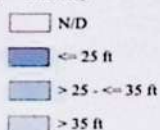
24°46'0"N



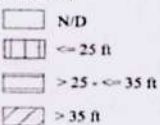
Legend

Lowest Water Level (ft)

Shallow Aquifer
(≤ 150 m)



Deep Aquifer
(> 150 m)

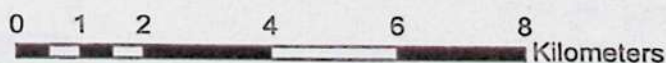


Water Point Options



Technological Priority

- 1st Priority - 1
- 2nd Priority - 2
- 3rd Priority - 3
- 4th Priority - 4



92°40'E

92°9'30"E

92°15'0"E

Arsenic Contamination Map - 1

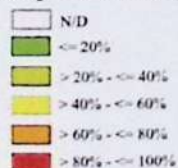
District: Sylhet

Upazilla: Beani Bazar



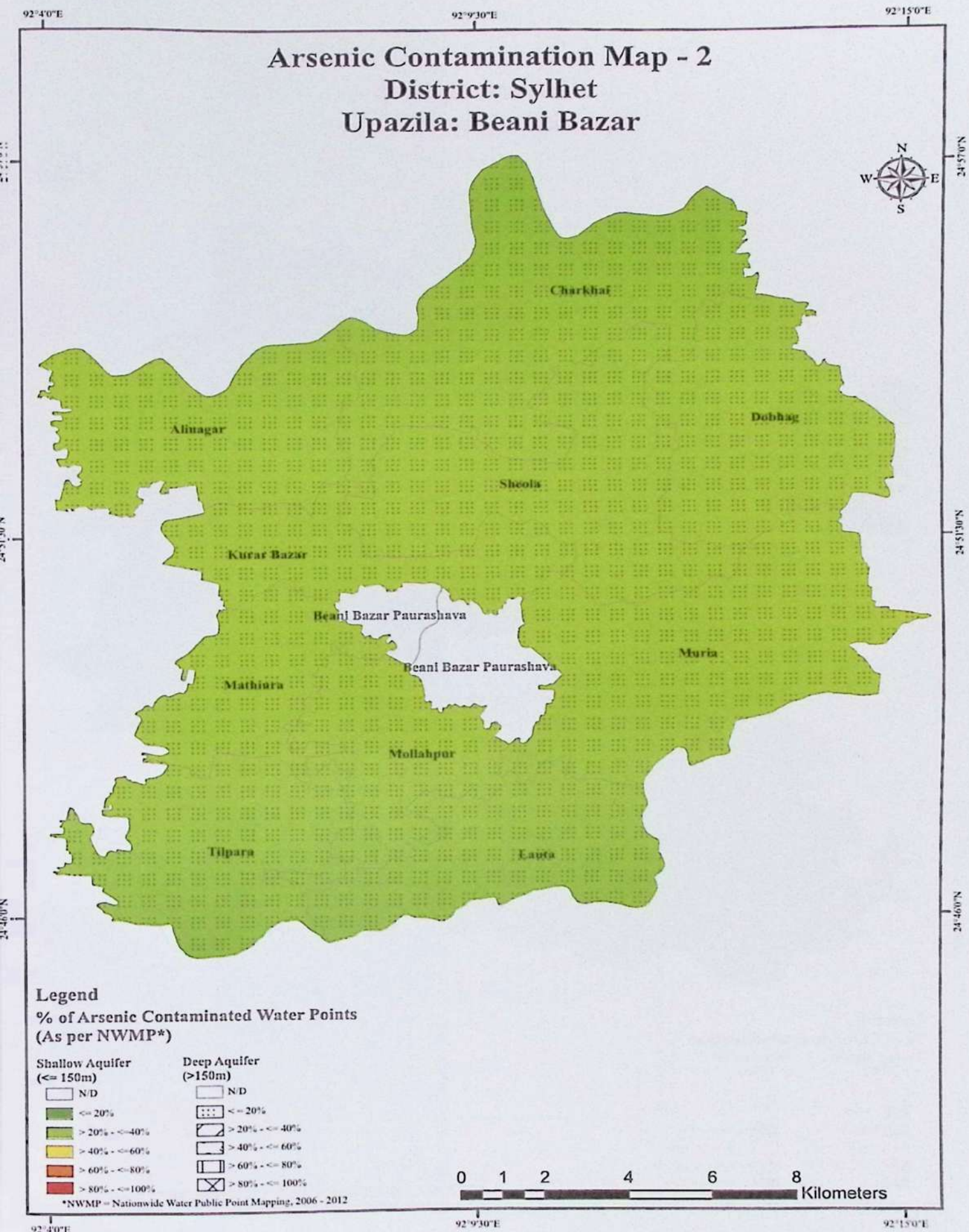
Legend

% of Arsenic Contaminated Water Points
(As per BAMWSP*)



*BAMWSP = Bangladesh Arsenic Mitigation Water Supply Project, 2003





Chloride Concentration Map

District: Sylhet

Upazila: Beani Bazar

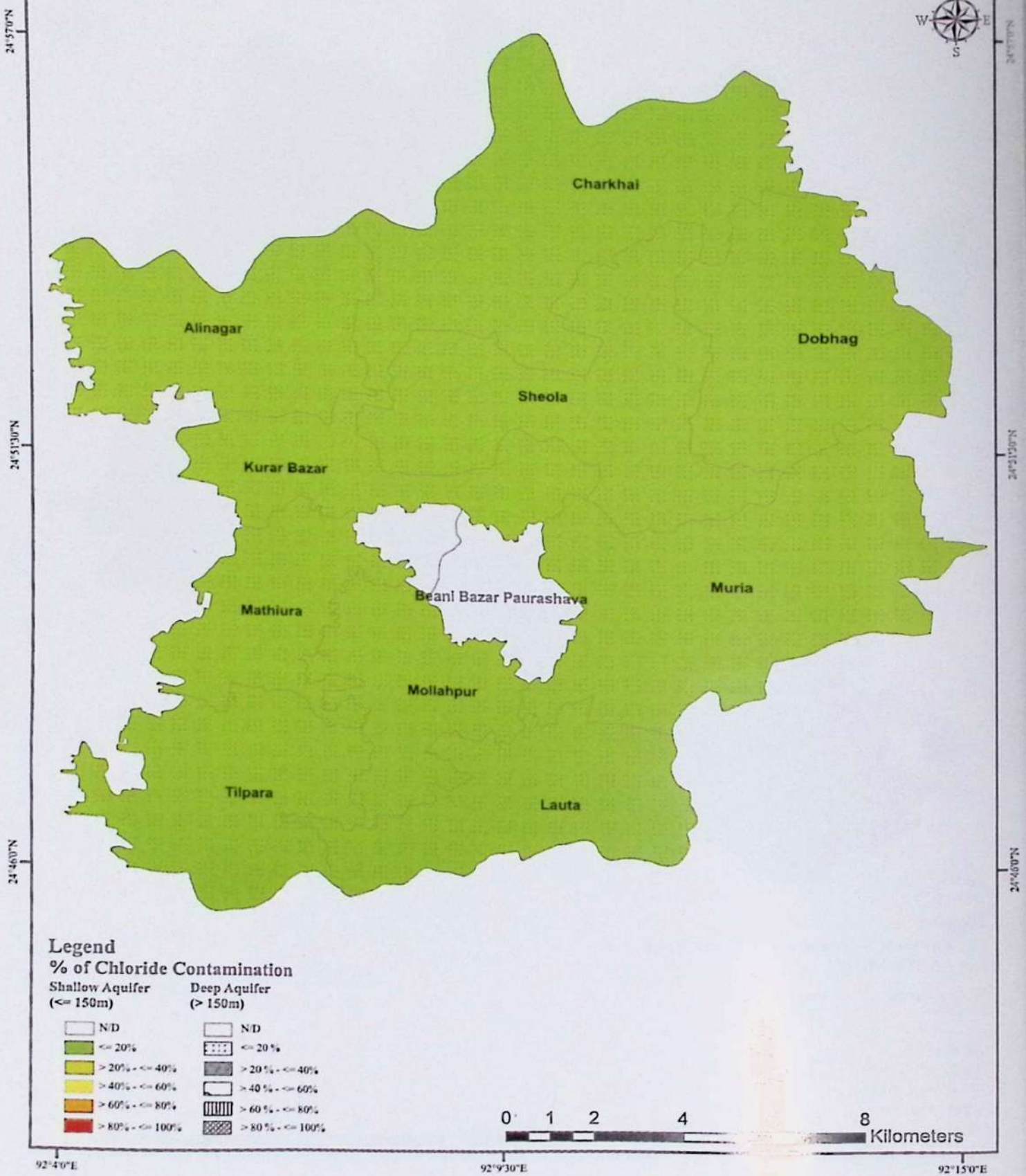


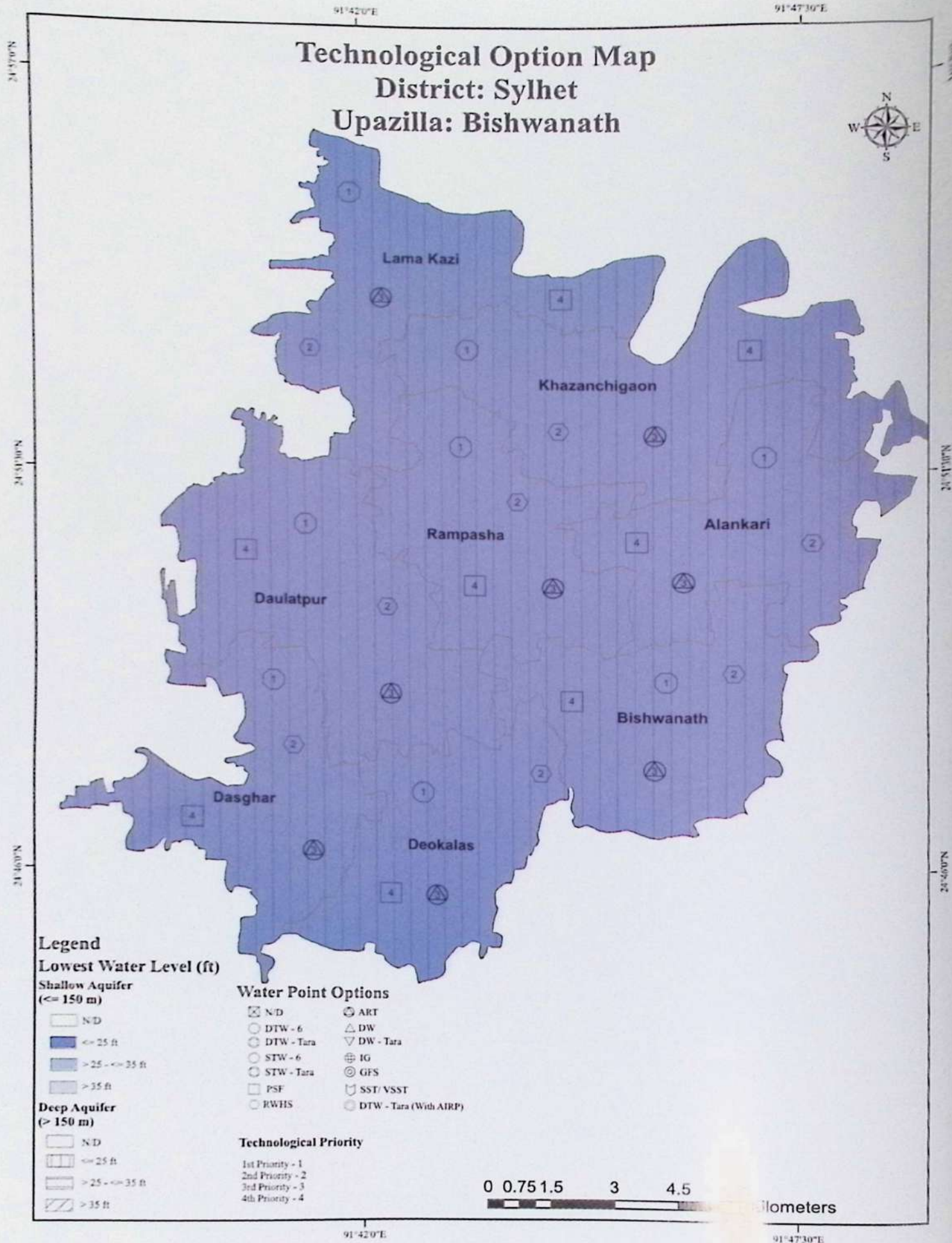
Table for mapping union wise Water Supply Technology

Bishwanath, Sylhet

SL	District	Upazila	Union	5		6		7		8		9		10		11				Remark			
				Lowest Water Table of the Union in the year 2017, R		As contamination Status (% of Contaminated TW as per NAMTC, BAWWSP 2002)		As Contamination Status (% of affected DTWE Water Points installed during 2004-12)		Fe Problem (% of DTWE TW)		Cl Problem (% of DTWE TW)		Average Depth of Water point, R		DTW		DW	1		2	3	4
				STW	DTW	STW	DTW	STW	DTW	STW	DTW	STW	DTW	STW	DTW	STW	DTW	STW	DTW		STW	DTW	STW
1				24	19	18.49	0	0	0	50	0	0	0	260	800	N/D	DTW - 6	RWHS	ART		PSF		
2				22	19	6.1	0	0	0	50	0	0	0	260	750	N/D	DTW - 6	RWHS	ART		PSF		
3				24	20	0.49	0	0	0	50	0	0	0	260	700	N/D	DTW - 6	RWHS	ART		PSF		
4				24	19	2.89	0	0	0	50	0	0	0	260	800	N/D	DTW - 6	RWHS	ART		PSF		
5				24	19	3.82	20	0	0	50	0	0	0	260	750	N/D	DTW - 6	RWHS	ART		PSF		
6				23	21	4.29	0	0	0	50	0	0	0	260	750	N/D	DTW - 6	RWHS	ART		PSF		
7				23	21	3.49	33.33	0	0	50	0	0	0	260	750	N/D	DTW - 6	RWHS	ART		PSF		
8				22	21	3.06	33.33	100	0	50	0	0	0	260	750	N/D	DTW - 6	RWHS	ART		PSF		

Note: Iron and Chloride contamination derived based on people's perception, 2014

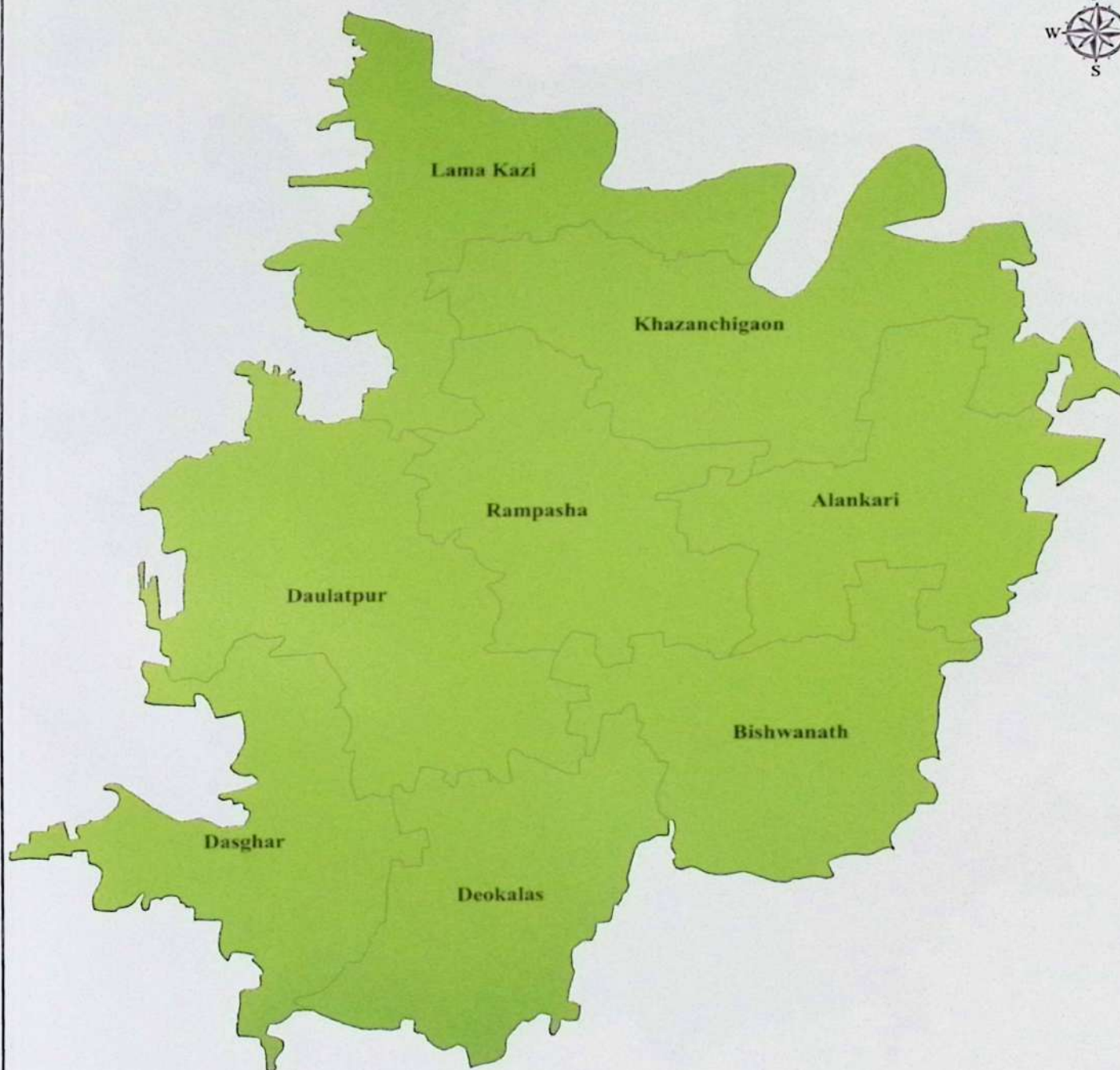
N/D = No Data



Arsenic Contamination Map - 1

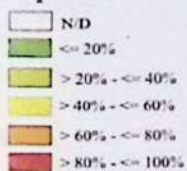
District: Sylhet

Upazilla: Bishwanath

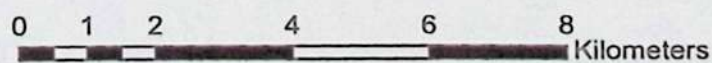


Legend

% of Arsenic Contaminated Water Points
(As per BAMWSP*)



*BAMWSP = Bangladesh Arsenic Mitigation Water Supply Project, 2003

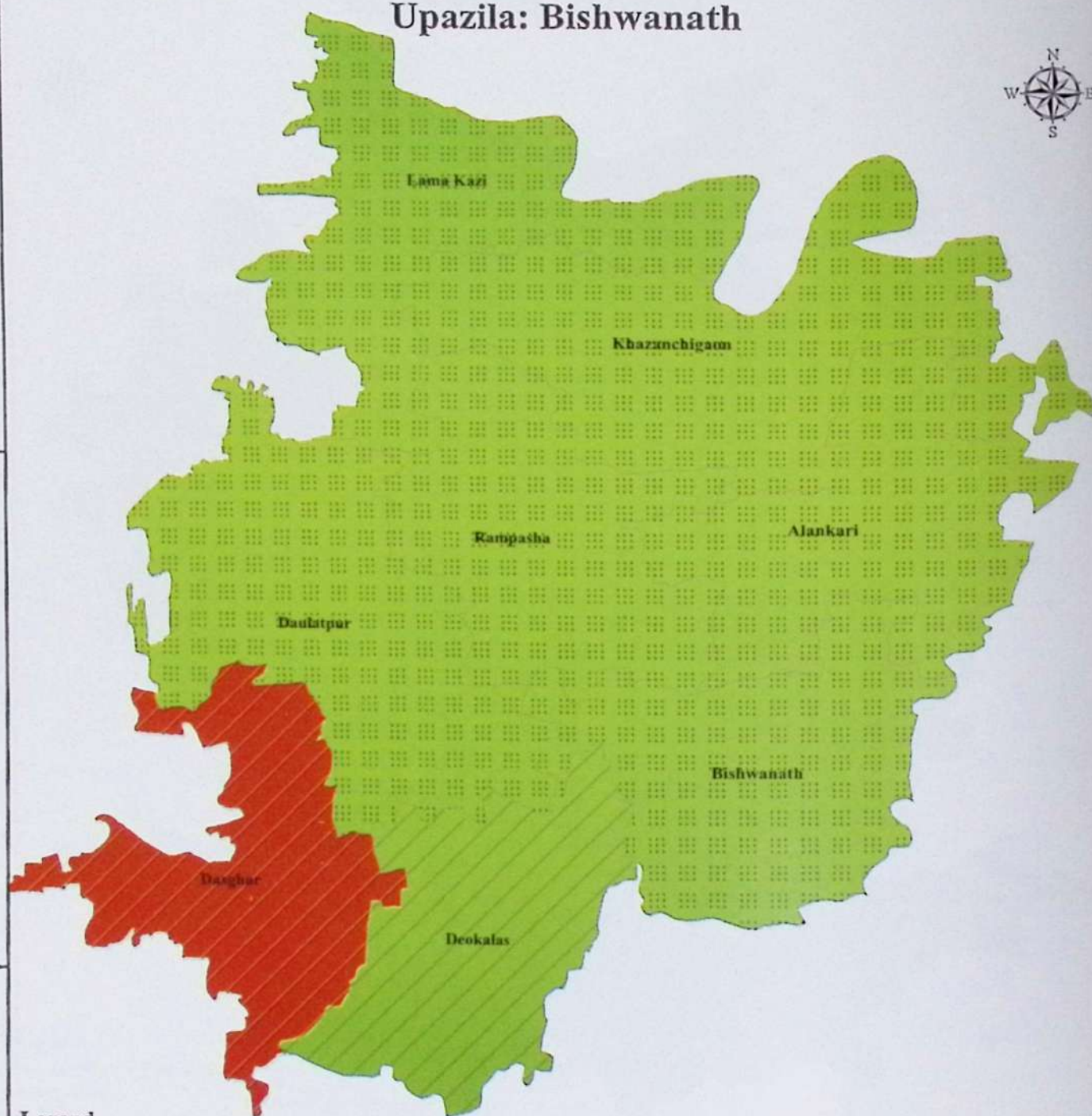
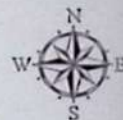


91°42'0"E 91°47'30"E

Arsenic Contamination Map - 2

District: Sylhet

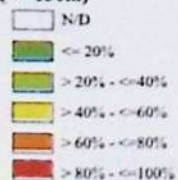
Upazila: Bishwanath



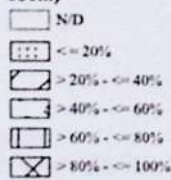
Legend

% of Arsenic Contaminated Water Points
(As per NWMP*)

Shallow Aquifer
($\leq 150\text{m}$)



Deep Aquifer
($> 150\text{m}$)



*NWMP = Nationwide Water Public Point Mapping, 2006 - 2012



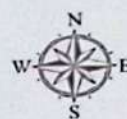
91°42'0"E

91°47'30"E

Chloride Concentration Map

District: Sylhet

Upazila: Bishwanath



Legend

% of Chloride Contamination

Shallow Aquifer
(≤ 150m)

Deep Aquifer
(> 150m)

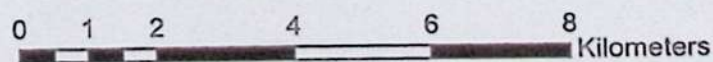
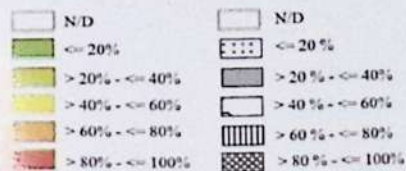


Table for mapping union wise Water Supply Technology
Companiganj, Sylhet

Sl.	District	Upazila	Union	Lowest Water Table of the Union in the year 2017, ft		As contamination Status % of Contaminated TW as per NAWIC, BAWSP 2003	As Contamination Status (% of affected DWLE Water Points installed during 2006-12)		Fe Problem (> 1ppm) (% of DWLE TW)	Cl Problem (> 100ppm) (% of DWLE TW)		Average Depth of Water point, ft		Recommended Private Outlets*				Remark
				STW	DTW	STW	DTW	STW	DTW	STW	DTW	STW	DTW	1	2	3	4	
1		3	4	18	N/D	8		0	12.5	0	N/D	200	N/D	50	DTW	50	RWHS	
1		Companiganj	Islampur Purbu	18	N/D	8		0	12.9	0	N/D	250	N/D	50	DTW	50	RWHS	
2			Islampur Paschim	17	16	24.15		0	32	40	N/D	275	700	N/D	DTW	6	RWHS	
3			Telikhal	19	17	N/D		20	58.33	75	N/D	275	800	N/D	DTW	6	RWHS	
4			Ishakalas	18	N/D	18		0	18.75	25	N/D	200	N/D	50	DTW	6	RWHS	
5			Ranikhal Uttar	17	17	18		12.5	10	40	N/D	275	800	N/D	DTW	6	RWHS	
6			Ranikhal Dakshin															

Note: Iron and Chloride contamination derived based on people's perception, 2014
N/D = No Data

91°42'0"E

91°47'30"E

Technological Option Map

District: Sylhet

Upazilla: Companiganj



25°8'0"N

25°8'0"N

25°2'30"N

25°2'30"N

24°57'0"N

24°57'0"N

Legend

Lowest Water Level (ft)

Shallow Aquifer (≤ 150 m)

- N/D
- ≤ 25 ft
- > 25 - ≤ 35 ft
- > 35 ft

Deep Aquifer (> 150 m)

- N/D
- ≤ 25 ft
- > 25 - ≤ 35 ft
- > 35 ft

Water Point Options

- N/D
- DTW - 6
- DTW - Tara
- STW - 6
- STW - Tara
- PSF
- RWHS
- ART
- DW
- DW - Tara
- IG
- GFS
- SST/VSST
- DTW - Tara (With AIRP)

Technological Priority

- 1st Priority - 1
- 2nd Priority - 2
- 3rd Priority - 3
- 4th Priority - 4

0 1 2 4 6 8 Kilometers

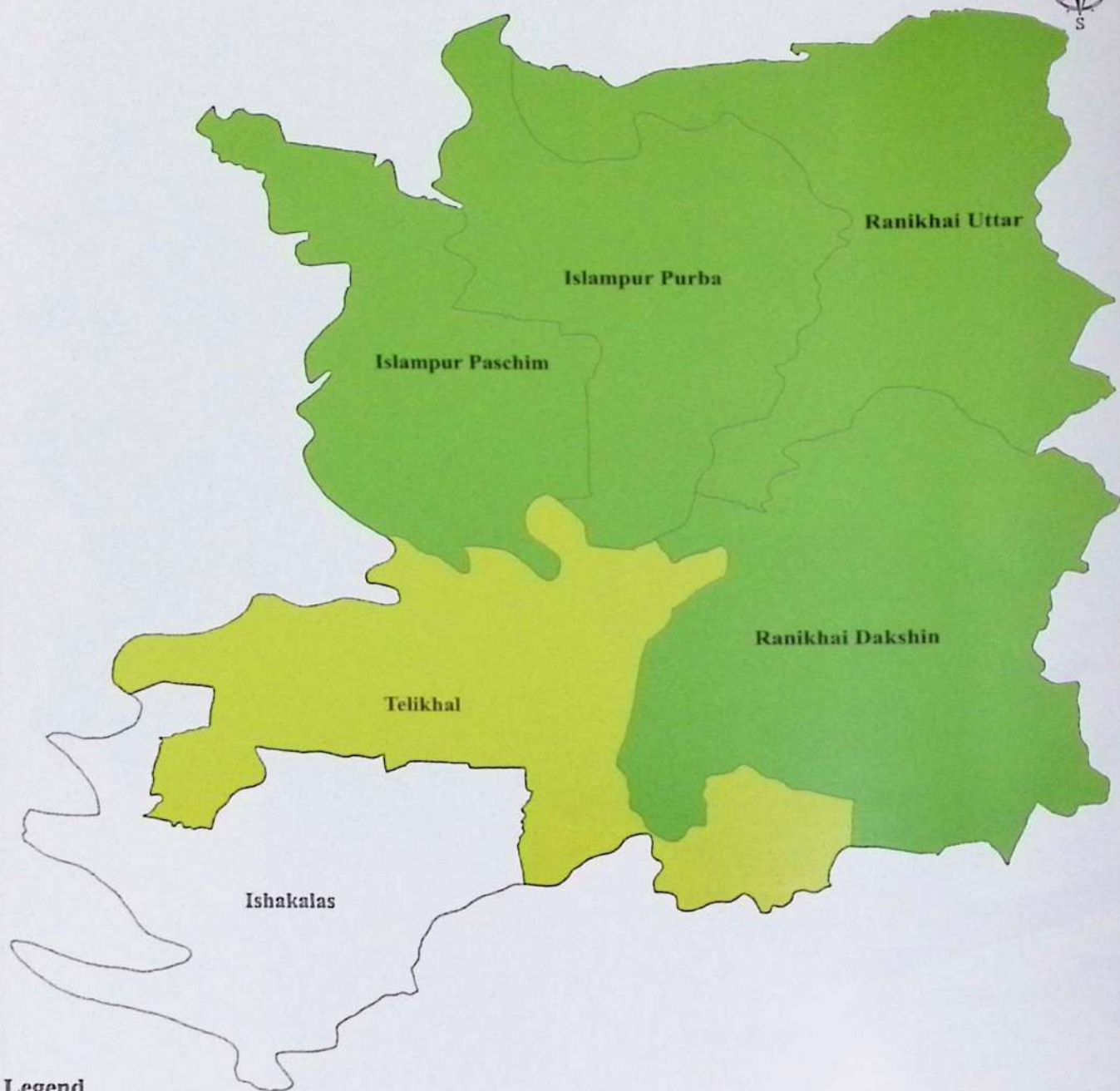
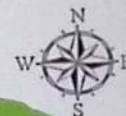
91°42'0"E

91°47'30"E

Arsenic Contamination Map - 1

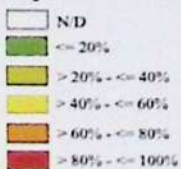
District: Sylhet

Upazilla: Companiganj

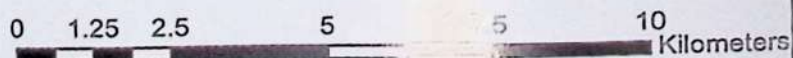


Legend

% of Arsenic Contaminated Water Points
(As per BAMWSP*)



*BAMWSP = Bangladesh Arsenic Mitigation Water Supply Project, 2003



91°42'0"E

91°47'30"E

Arsenic Contamination Map - 2

District: Sylhet

Upazila: Companiganj



25°8'0"N

25°8'0"N

25°2'30"N

25°2'30"N

24°57'0"N

24°57'0"N

Legend

% of Arsenic Contaminated Water Points
(As per NWMP*)

Shallow Aquifer
(≤ 150m)

- N/D
- ≤ 20%
- > 20% - ≤ 40%
- > 40% - ≤ 60%
- > 60% - ≤ 80%
- > 80% - ≤ 100%

Deep Aquifer
(> 150m)

- N/D
- ≤ 20%
- > 20% - ≤ 40%
- > 40% - ≤ 60%
- > 60% - ≤ 80%
- > 80% - ≤ 100%

*NWMP = Nationwide Water Public Point Mapping, 2006 - 2012

0 1 2 4 6 8 Kilometers

91°42'0"E

91°47'30"E

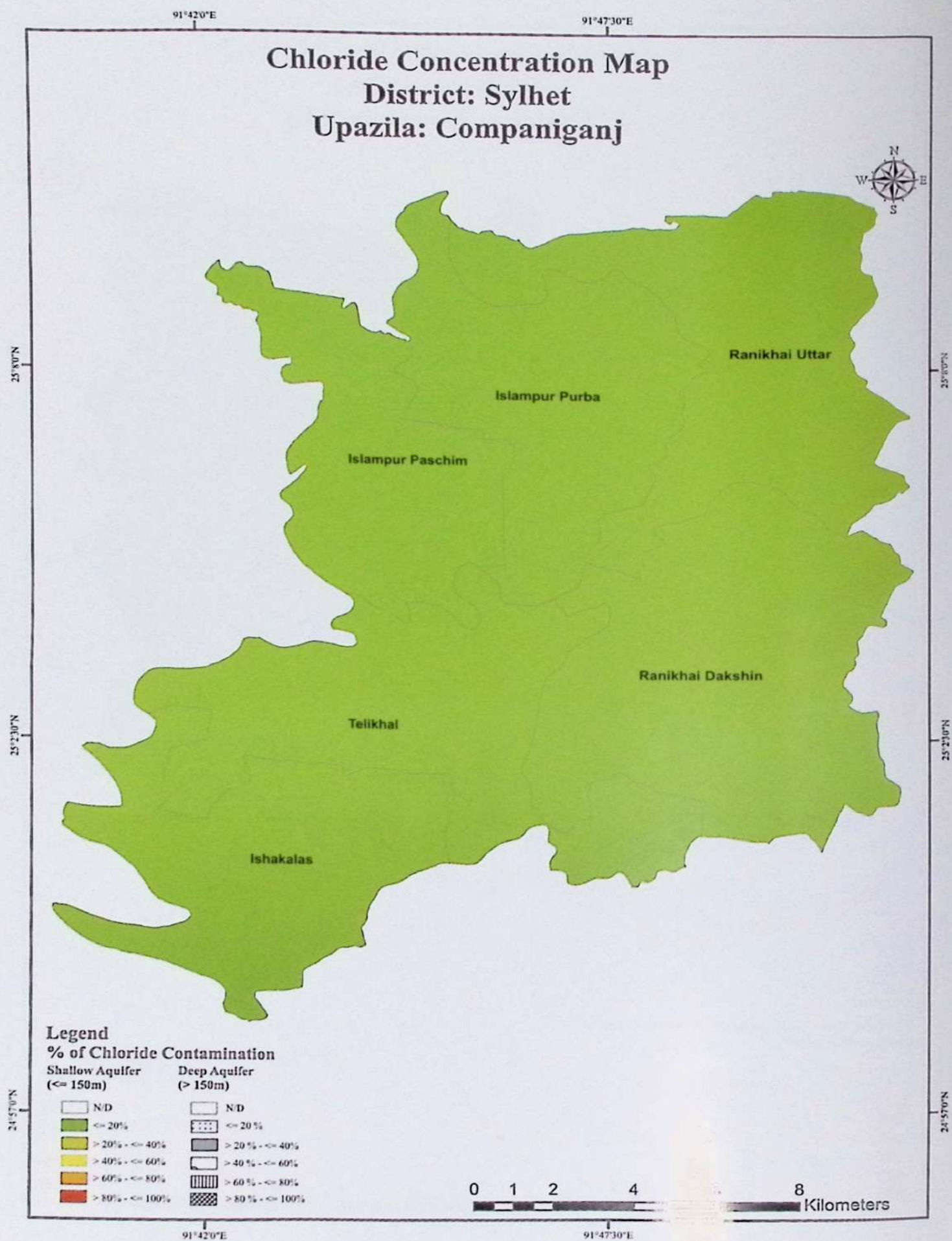


Table for mapping union wise Water Supply Technology

Dakshin Surma, Sylhet

Sl.	District	Upazila	Union	Lowest Water Table of the Union in the year 2017, ft	As contamination Status (% of contaminated TW as per NAMIG, BAN/WSP 2005)	As Contamination Status (P-50ppb) (% of affected DPHIE Water Falut, Installed during 2006-12)	Fe Problem (P-50ppm) (% of DPHIE TW)	Cl Problem (P-100ppm) (% of DPHIE TW)	Average Depth of Water point, ft				Remarks																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
									7		8			9		10																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
									STW	DTW	STW	DTW		STW	DTW	STW	DTW																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000

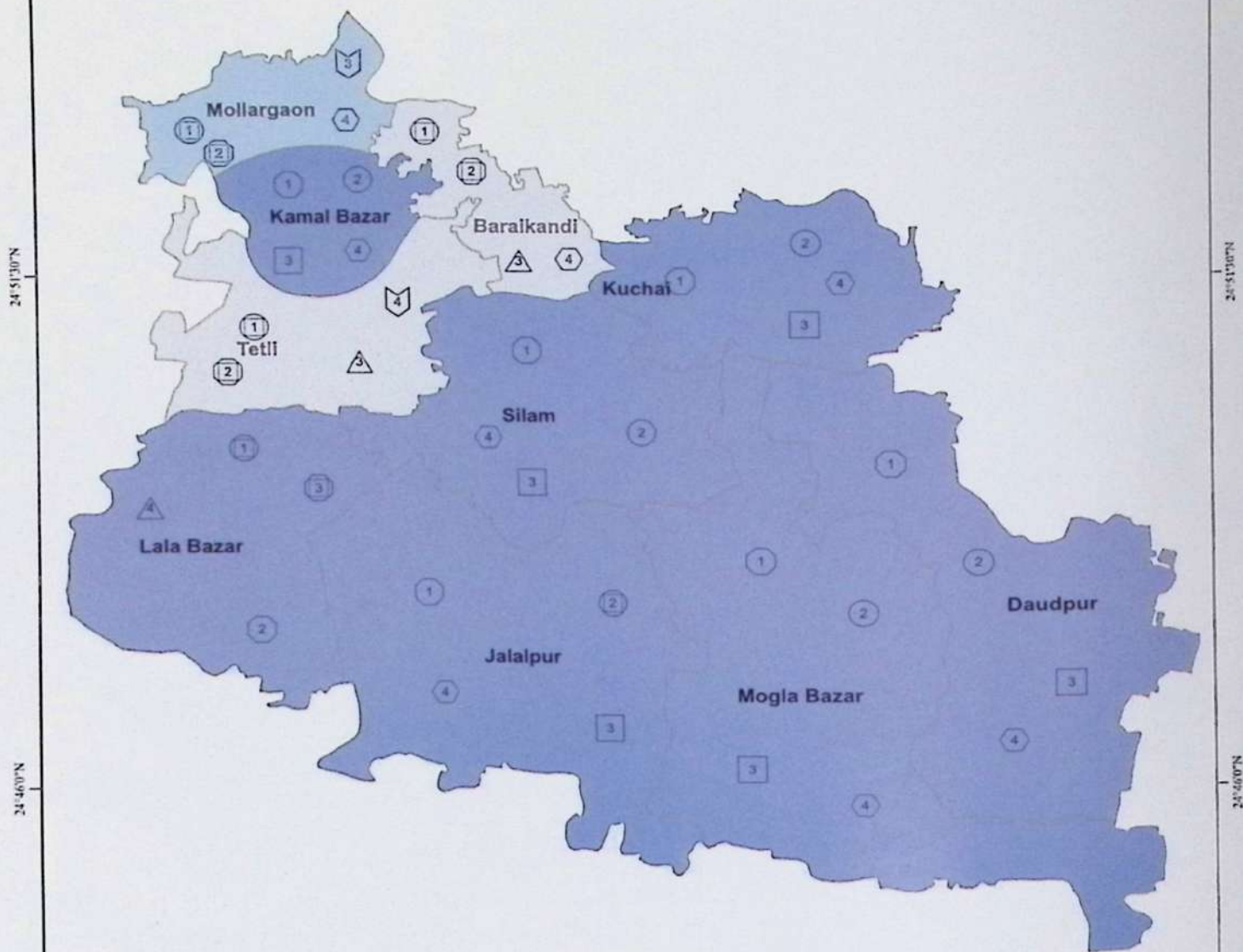
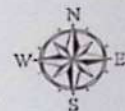
91°47'30"E

91°53'0"E

Technological Option Map

District: Sylhet

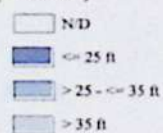
Upazilla: Dakshin Surma



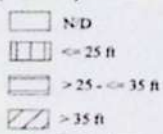
Legend

Lowest Water Level (ft)

Shallow Aquifer (≤ 150 m)



Deep Aquifer (> 150 m)



Water Point Options



Technological Priority

- 1st Priority - 1
- 2nd Priority - 2
- 3rd Priority - 3
- 4th Priority - 4



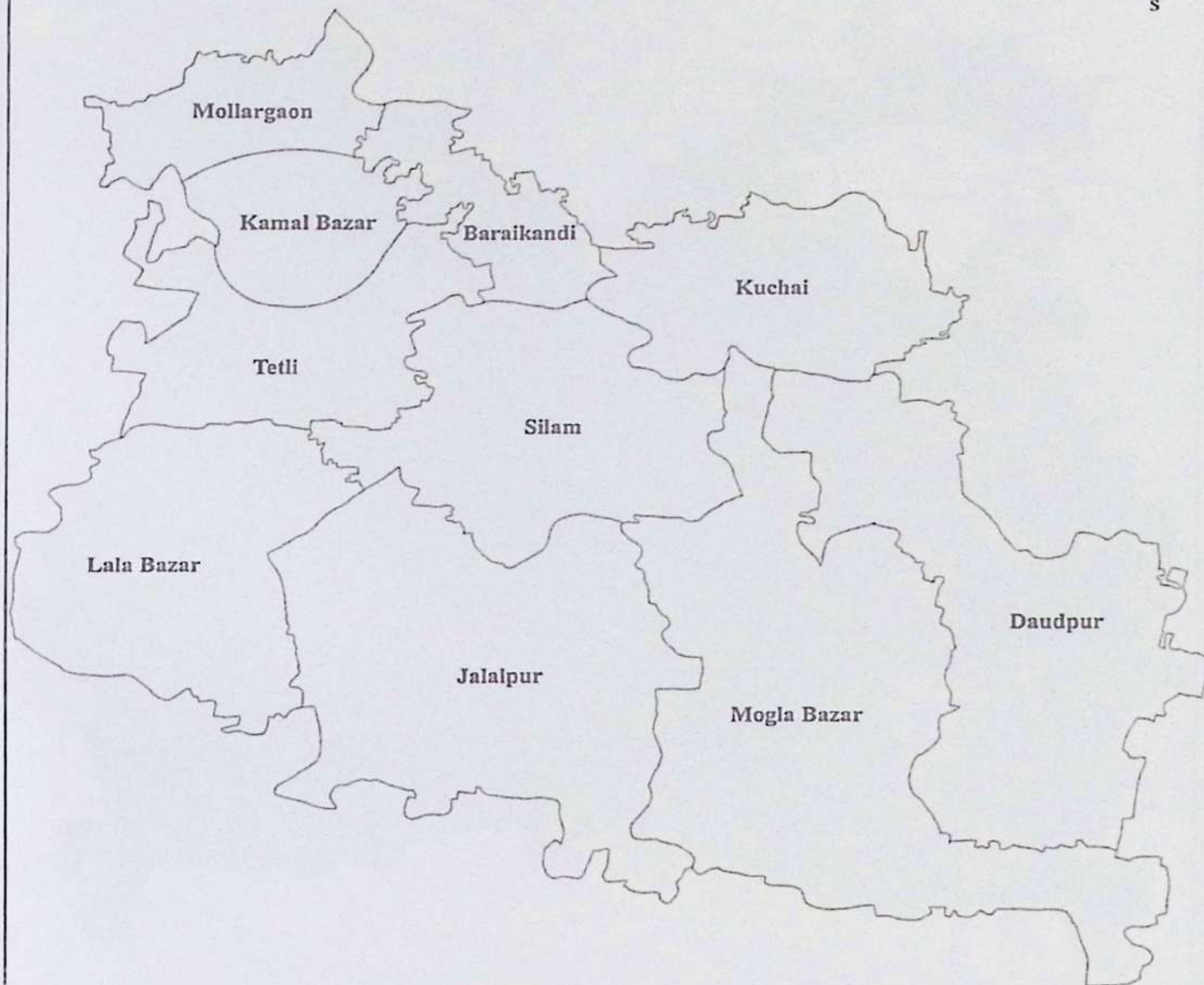
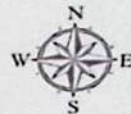
91°47'30"E

91°53'0"E

Arsenic Contamination Map - 1

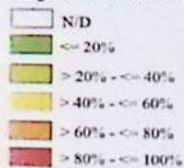
District: Sylhet

Upazilla: Dakshin Surma

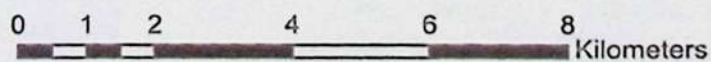


Legend

% of Arsenic Contaminated Water Points
(As per BAMWSP*)



*BAMWSP = Bangladesh Arsenic Mitigation Water Supply Project, 2003



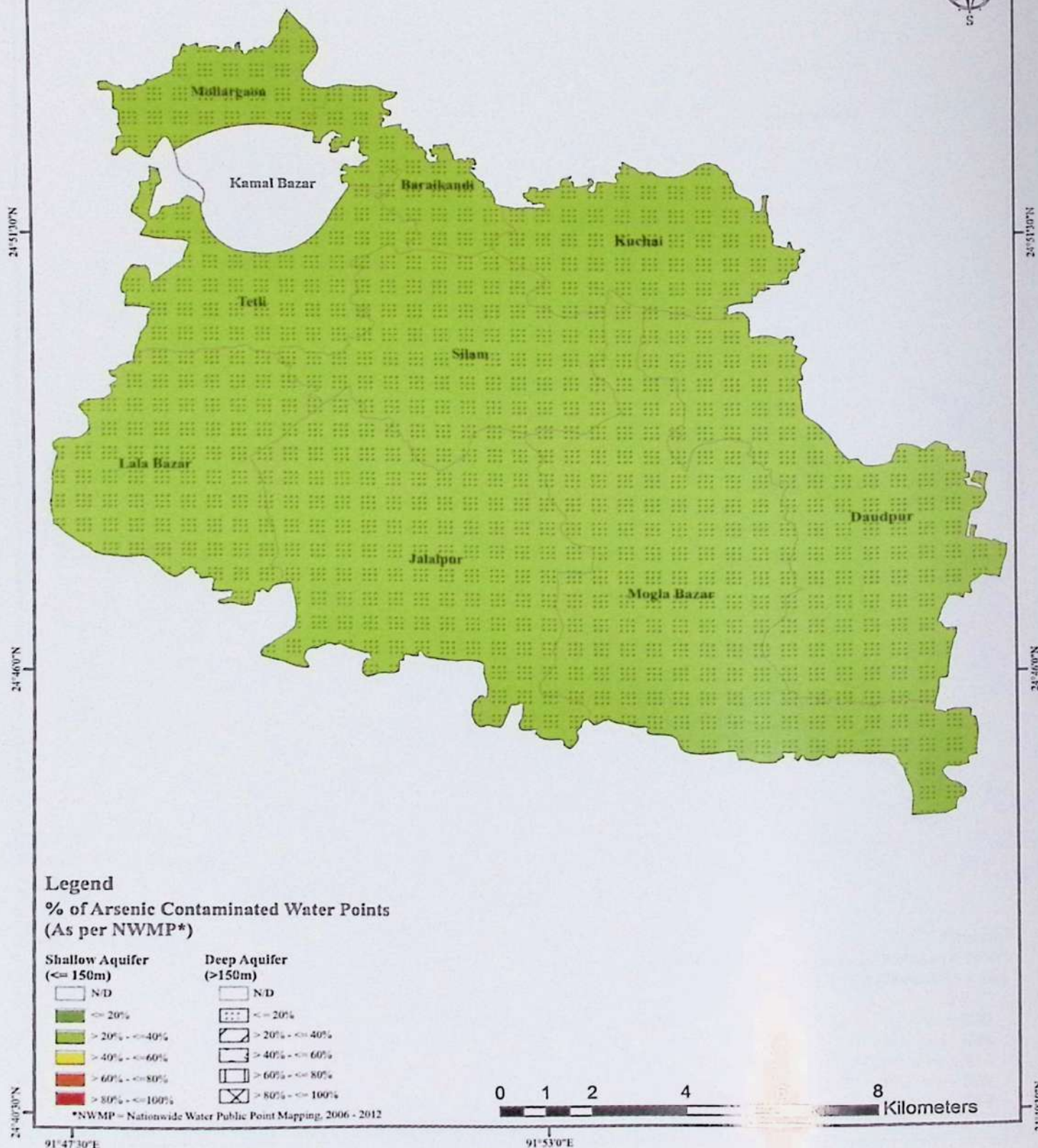
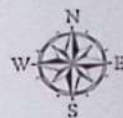
91°47'30"E

91°53'0"E

Arsenic Contamination Map - 2

District: Sylhet

Upazila: Dakshin Surma



91°47'30"E

91°53'0"E

Chloride Concentration Map

District: Sylhet

Upazila: Dakshin Surma



Legend

% of Chloride Contamination

Shallow Aquifer
(≤ 150m)

Deep Aquifer
(> 150m)

N/D	N/D
≤ 20%	≤ 20%
> 20% - <= 40%	> 20% - <= 40%
> 40% - <= 60%	> 40% - <= 60%
> 60% - <= 80%	> 60% - <= 80%
> 80% - <= 100%	> 80% - <= 100%

0 1 2 4 6 8 Kilometers

91°53'0"E

Table for mapping union wise Water Supply Technology
Fenchugani, Sylhet

Sl.	District	Upazila	Union	Lowest Water Table of the Union in the year 2017, ft		As contamination Status (% of Contaminated TW as per NACMC, BAWWP 2003)		As Contamination Status (% of affected DTW Water Points installed during 2009-11)		Fe Problem (% of DTW TV)		Cl Problem (% of DTW TV)		Average Depth of Water point, ft		Remarks					
				5		6		7		8		9		10							
				STW	DTW	STW	DTW	STW	DTW	STW	DTW	STW	DTW	STW	DTW		STW	DTW			
1	Sylhet	fenchugani	Fenchuganj	15	12	N/D	0	0	0	50	60	0	0	250	700	80	DTW - 6	STW - 6	DW	DW	PSF
2				19	5	N/D	0	0	0	10	50	0	0	250	680	90	DTW - 6	STW - 6	DW	DW	PSF
3				11	10	N/D	0	0	0	10	50	0	0	180	700	90	DTW - 6	STW - 6	DW	DW	PSF
4				15	12	N/D	N/D	N/D	8	40	0	0	190	720	45	DTW - 6	STW - 6	DW	DW	PSF	
5				13	11	N/D	N/D	N/D	15	60	0	0	180	750	40	DTW - 6	STW - 6	DW	DW	PSF	

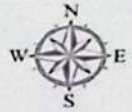
Note: Iron and Chloride contamination derived based on people's perception, 2014

N/D = No Data

Technological Option Map

District: Sylhet

Upazilla: Fenchuganj

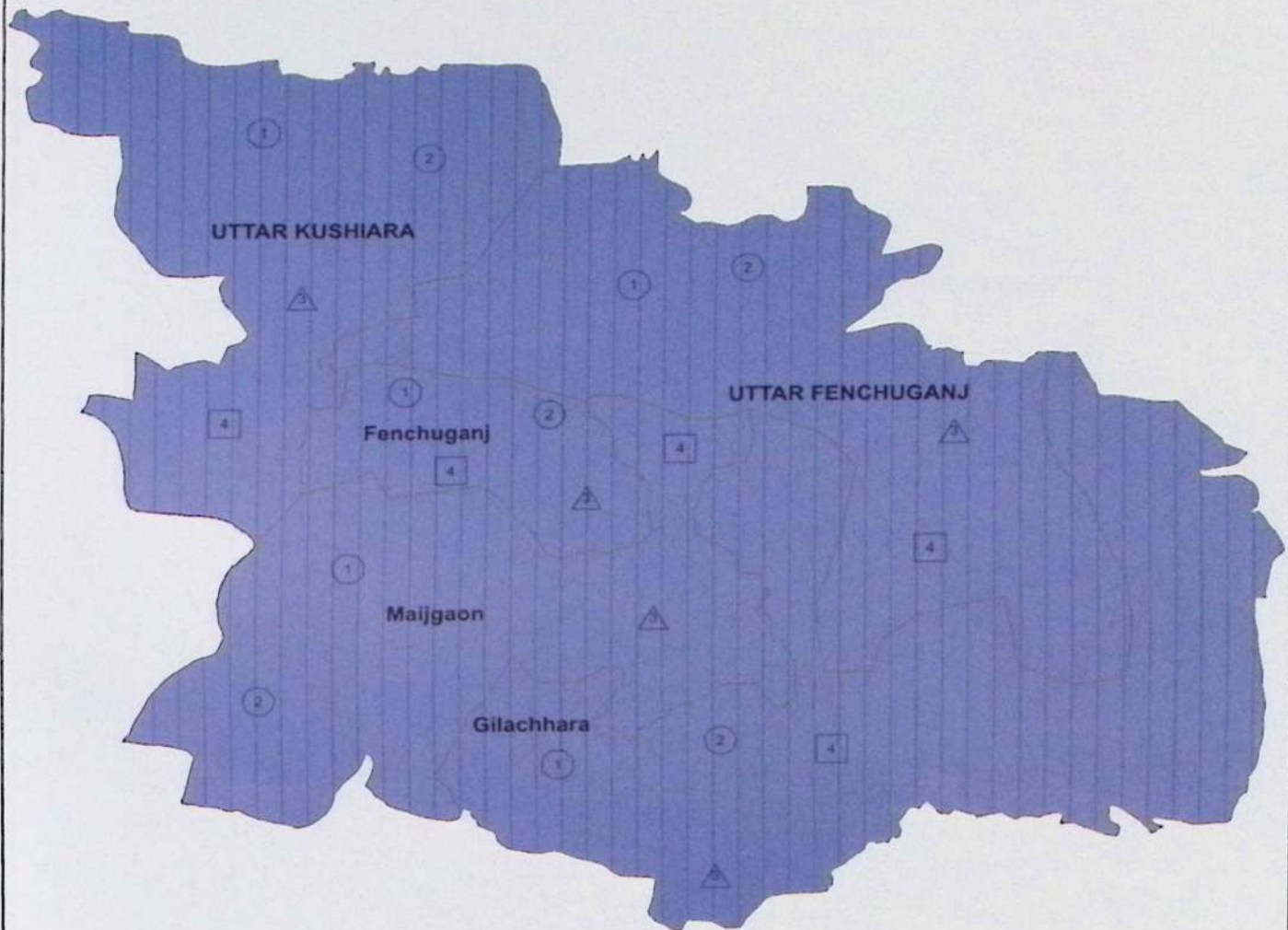


24°40'0"N

24°40'0"N

24°40'30"N

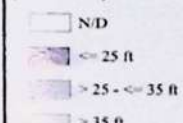
24°40'30"N



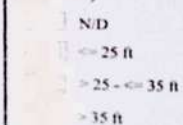
Legend

Lowest Water Level (ft)

Shallow Aquifer
(≤ 150 m)



Aquifer
(> 150 m)

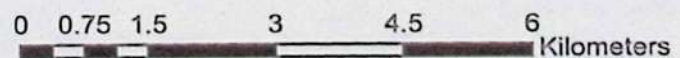


Water Point Options



Technological Priority

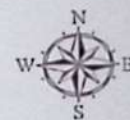
- 1st Priority - 1
- 2nd Priority - 2
- 3rd Priority - 3
- 4th Priority - 4



Arsenic Contamination Map - 1

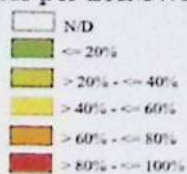
District: Sylhet

Upazilla: Fenchuganj



Legend

% of Arsenic Contaminated Water Points
(As per BAMWSP*)



*BAMWSP = Bangladeshi Arsenic Mitigation Water Supply Project, 2003

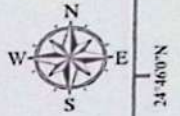
0 0.75 1.5 3 4.5

Kilometers

Arsenic Contamination Map - 2

District: Sylhet

Upazila: Fenchuganj



24°46'0"N

24°46'0"N

24°40'30"N

24°40'30"N

24°35'0"N

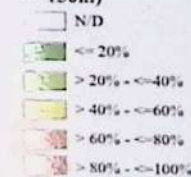
24°35'0"N



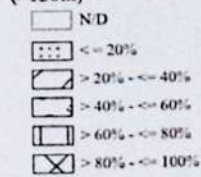
Legend

% of Arsenic Contaminated Water Points
(As per NWMP*)

Shallow Aquifer
(≤ 150m)



Deep Aquifer
(> 150m)



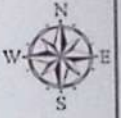
*NWMP = Nationwide Water Public Point Mapping, 2006 - 2012

0 0.75 1.5 3 4.5 6 Kilometers

Chloride Concentration Map

District: Sylhet

Upazila: Fenchuganj



Legend

% of Chloride Contamination

Shallow Aquifer
($\leq 150\text{m}$)

N/D

$\leq 20\%$

$> 20\% - \leq 40\%$

$> 40\% - \leq 60\%$

$> 60\% - \leq 80\%$

$> 80\% - \leq 100\%$

Deep Aquifer
($> 150\text{m}$)

N/D

$\leq 20\%$

$> 20\% - \leq 40\%$

$> 40\% - \leq 60\%$

$> 60\% - \leq 80\%$

$> 80\% - \leq 100\%$

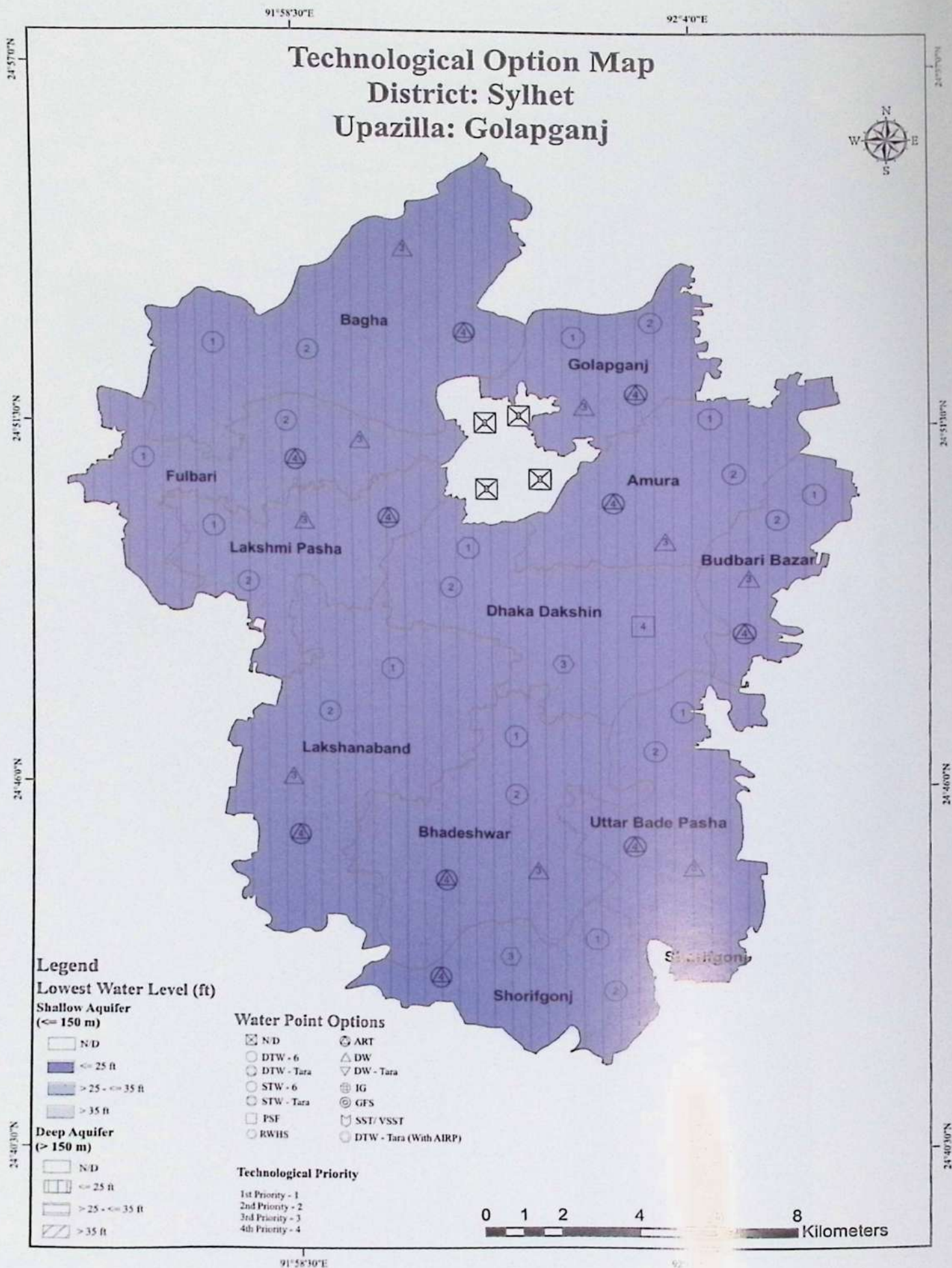
0 0.75 1.5 3 6 Kilometers

Table for mapping union wise Water Supply Technology

Golapganj, Sylhet

Sl.	District	Upazila	Union	5		6	7		8		9		10				11				Remarks
				Lowest Water Table of the Union in the year 2017, ft	As contamination Status (% of Contaminated TW as per NAMIC, BAATWSP 2003)	As Contamination Status (> 5ppb) (% of affected DTWE Water Poles Installed during 2006-13)	Fe Problem (> 5ppm) (% of DTWE TW)	Cl Problem (> 100ppm) (% of DTWE TW)	Average Depth of Water point, ft	10		11		12		13		14			
										STW	DTW	STW	DTW	STW	DTW	STW	DTW	STW	DTW	STW	
1																					
1			Golapganj	15	18	7.33	0	5.26	45	25	0	0	215	650	50	DTW - 6	STW - 6	DW	ART		
2			Fulbari	12	15	23.81	0	17.65	30	35	0	0	180	660	50	DTW - 6	STW - 6	DW	ART		
3			Lakshmi Pasha	13	10	25.46	0	7.69	35	35	0	0	260	700	48	DTW - 6	STW - 6	DW	ART		
4			Budbari Bazar	10	15	14	0	0	25	35	0	0	220	650	50	DTW - 6	STW - 6	DW	ART		
5			Dhaka Dakshin	13	14	0.09	0	0	30	25	0	0	180	650	N/D	DTW - 6	STW - 6	DW	ART		
6	Sylhet	Golapganj	Bagha	18	19	15.49	0	16.67	25	30	0	0	150	650	50	DTW - 6	STW - 6	DW	ART		
7			Lakshanaband	13	15	0.61	0	0	30	20	0	0	160	640	50	DTW - 6	STW - 6	DW	ART		
8			Bhadeshwar	10	12	6.79	0	0	25	25	0	0	190	650	45	DTW - 6	STW - 6	DW	ART		
9			Amura	18	19	0.77	0	0	20	30	0	0	160	630	48	DTW - 6	STW - 6	DW	ART		
10			Uttar Badi Pasha	15	18	18.37	0	25	20	20	0	0	170	650	45	DTW - 6	STW - 6	DW	ART		
11			Sharifganj	10	12	N/D	0	0	25	25	0	0	200	680	N/D	DTW - 6	STW - 6	RWHS	ART		

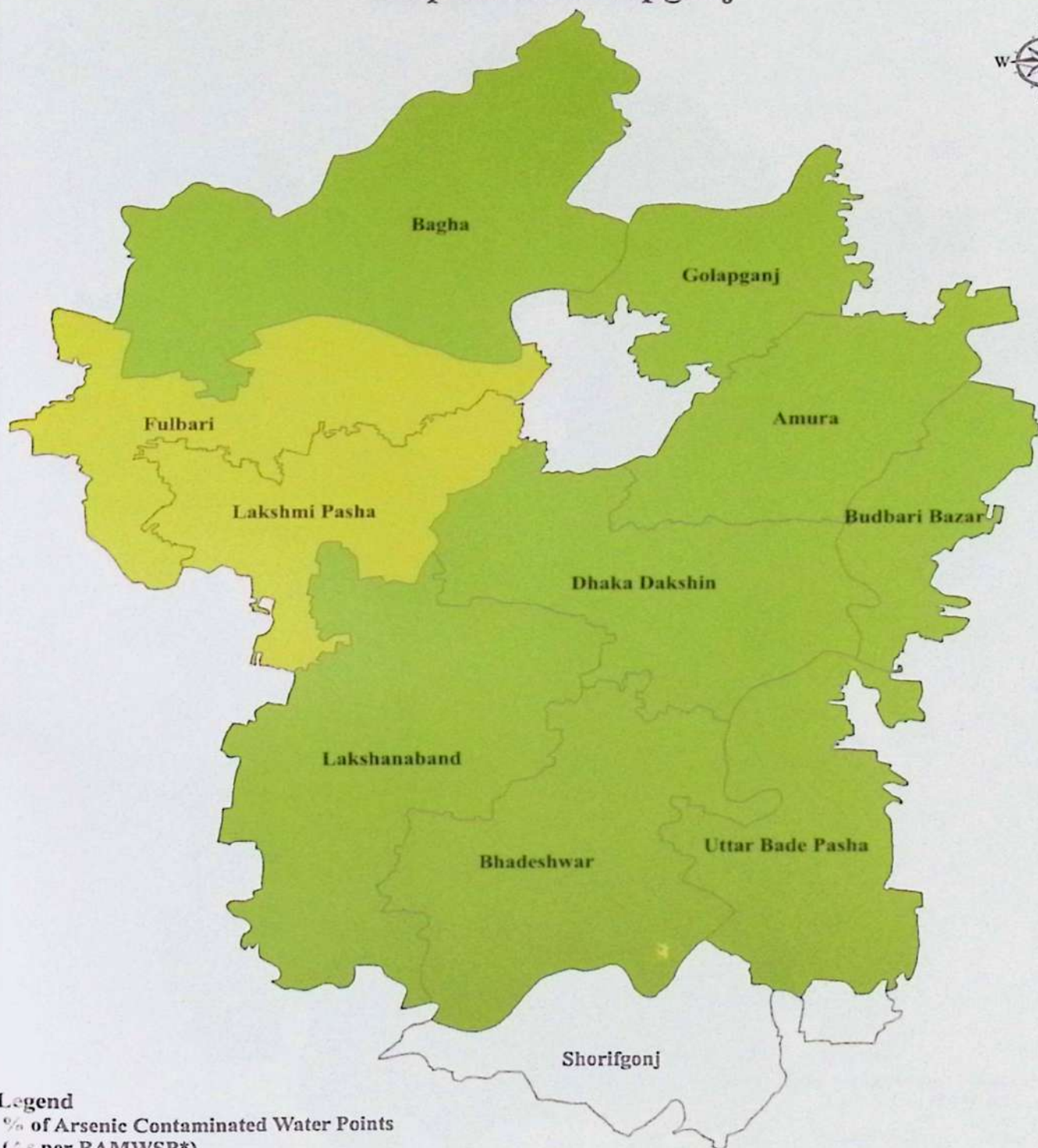
Note: Iron and Chloride contamination derived based on people's perception, 2014
N/D - No Data



Arsenic Contamination Map - 1

District: Sylhet

Upazilla: Golapganj



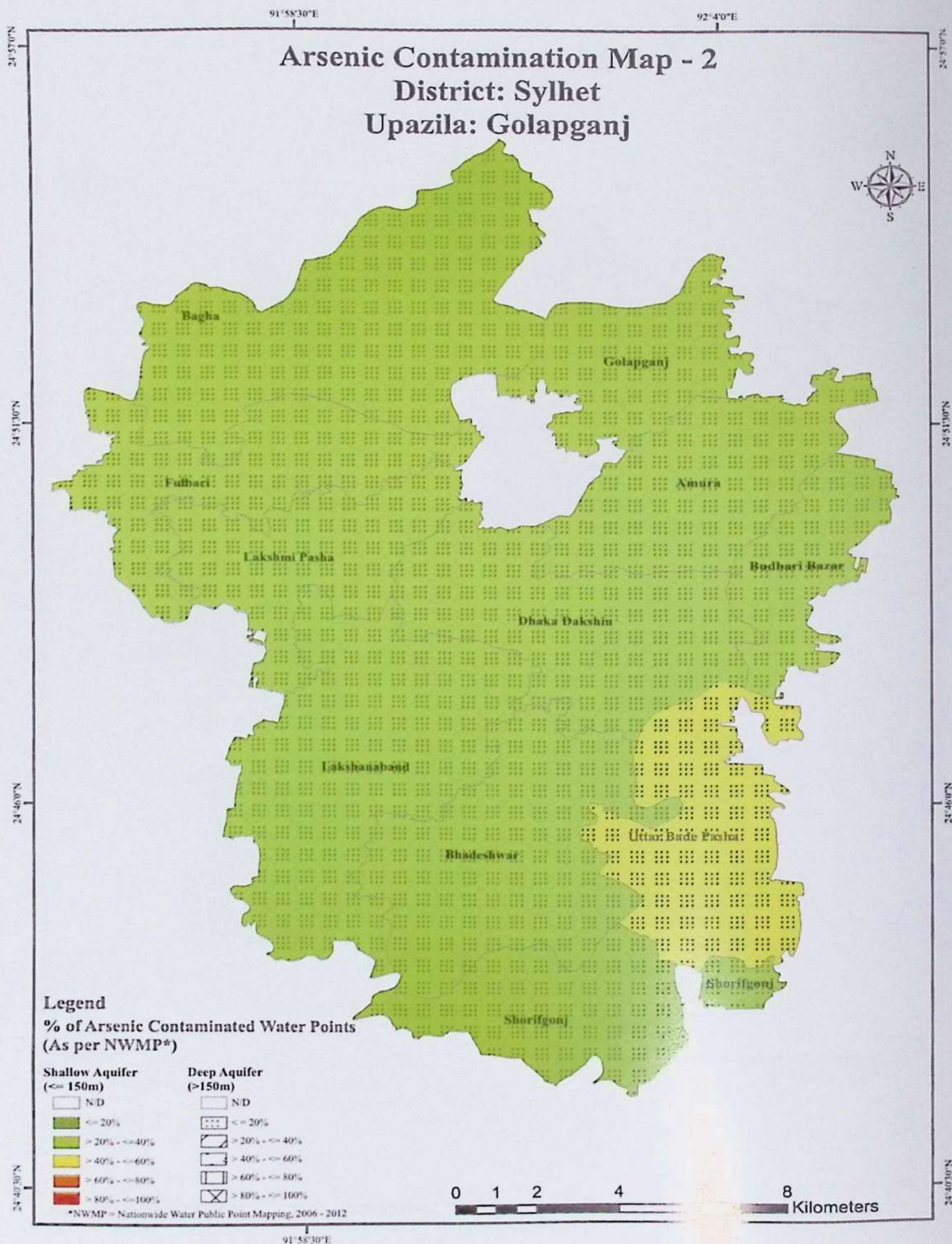
Legend

% of Arsenic Contaminated Water Points
(As per BAMWSP*)

- N/D
- ≤ 20%
- > 20% - ≤ 40%
- > 40% - ≤ 60%
- > 60% - ≤ 80%
- > 80% - ≤ 100%

0 1.25 2.5 5 7.5 10 Kilometers

*BAMWSP = Bangladesh Arsenic Mitigation Water Supply Project, 2003



Chloride Concentration Map

District: Sylhet

Upazila: Golapganj

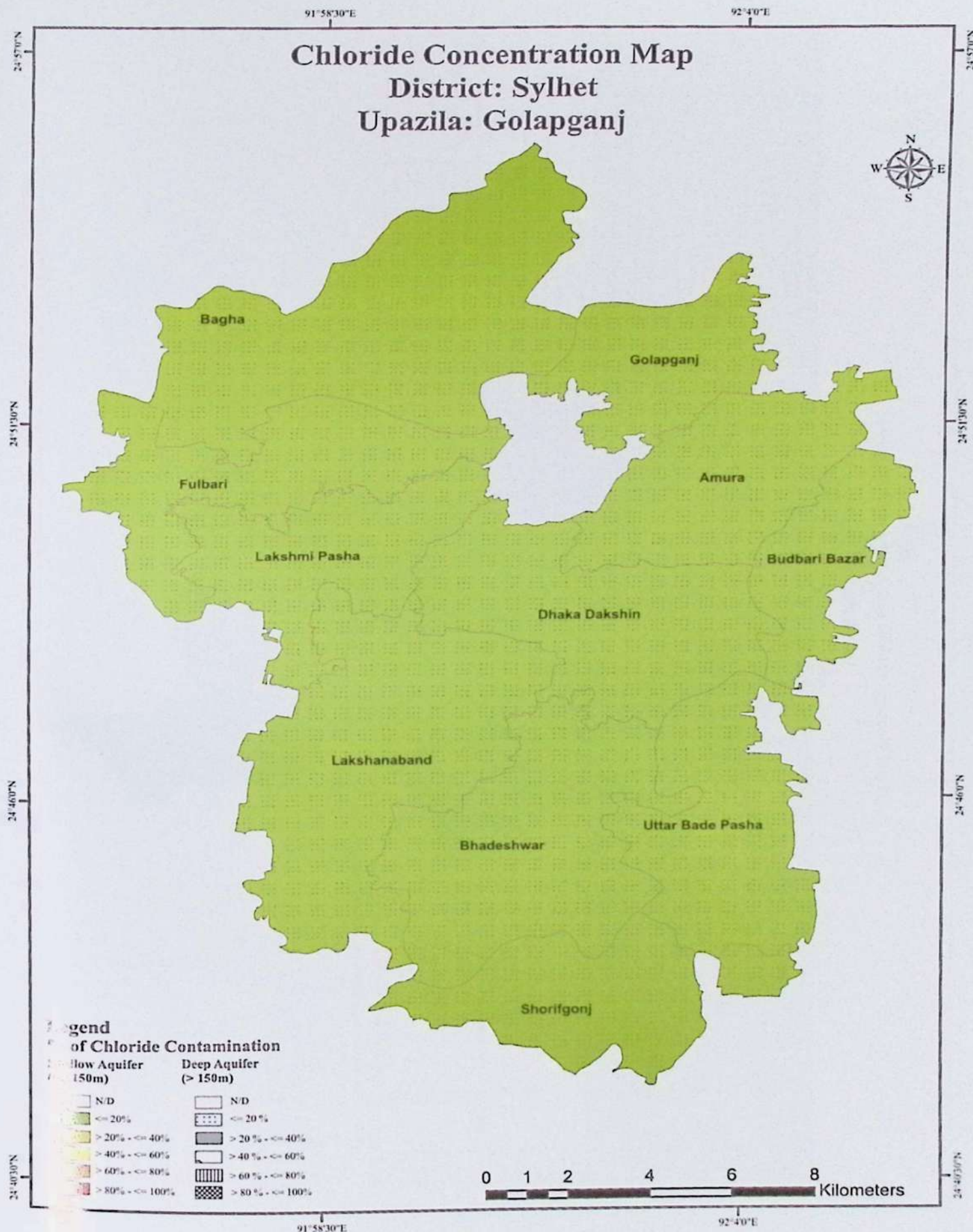


Table for mapping union wise Water Supply Technology

Gowainghat, Sylhet

Sl.	District	Upazila	Union	Lowest Water Table of the Union in the year 2017, ft	As contamination Status (% of Contaminated TW as per NASQIC, BAN/WS/2003)	As Contamination Status (% Supply (% of affected DTUE Water Points installed during 2006-12)	Fe Problem (% of DTUE TW)	Cl Problem (>1000ppm) (% of DTUE TW)	10				11				Remark			
									8		9		10		11					
									STW	DTW	STW	DTW	STW	DTW	STW	DTW		1	2	3
1	Sylhet	Gowainghat	Rustampur	19	19	9.61	0	12.5	80	50	0	0	250	800	N/D	DTW - 6	STW - 6	PSF	RWHS	
2				18	17	21.14	0	29.17	90	70	0	0	250	800	N/D	DTW - 6	STW - 6	PSF	RWHS	
3				17	N/D	4.25	0	0	0.5	N/D	0	N/D	150	N/D	60	DW	STW - 6	RWHS	-	
4				17	16	33.51	0	29.41	80	60	0	0	250	800	N/D	DTW - 6	STW - 6	PSF	RWHS	
5				20	19	22.97	0	36.84	80	50	0	0	250	800	N/D	DTW - 6	STW - 6	PSF	RWHS	
6				17	N/D	0	0	0	0	N/D	0	N/D	189	N/D	50	STW - 6	DW	PSF	RWHS	
7				21	18	21.02	0	0	85	60	0	0	280	800	N/D	DTW - 6	STW - 6	PSF	RWHS	
8				18	18	70.29	0	25	60	30	0	0	280	700	N/D	DTW - 6	STW - 6	DW	RWHS	
9				19	19	N/D	N/D	N/D	80	30	0	0	250	750	N/D	DTW - 6	STW - 6	DW	RWHS	

Note: Iron and Chloride contamination derived based on people's perception, 2014
N/D = No Data

91°53'0"E

91°58'30"E

92°40"E

Technological Option Map

District: Sylhet

Upazilla: Gowainghat



25°13'30"N

25°8'0"N

25°23'0"N

24°57'0"N

24°51'30"N

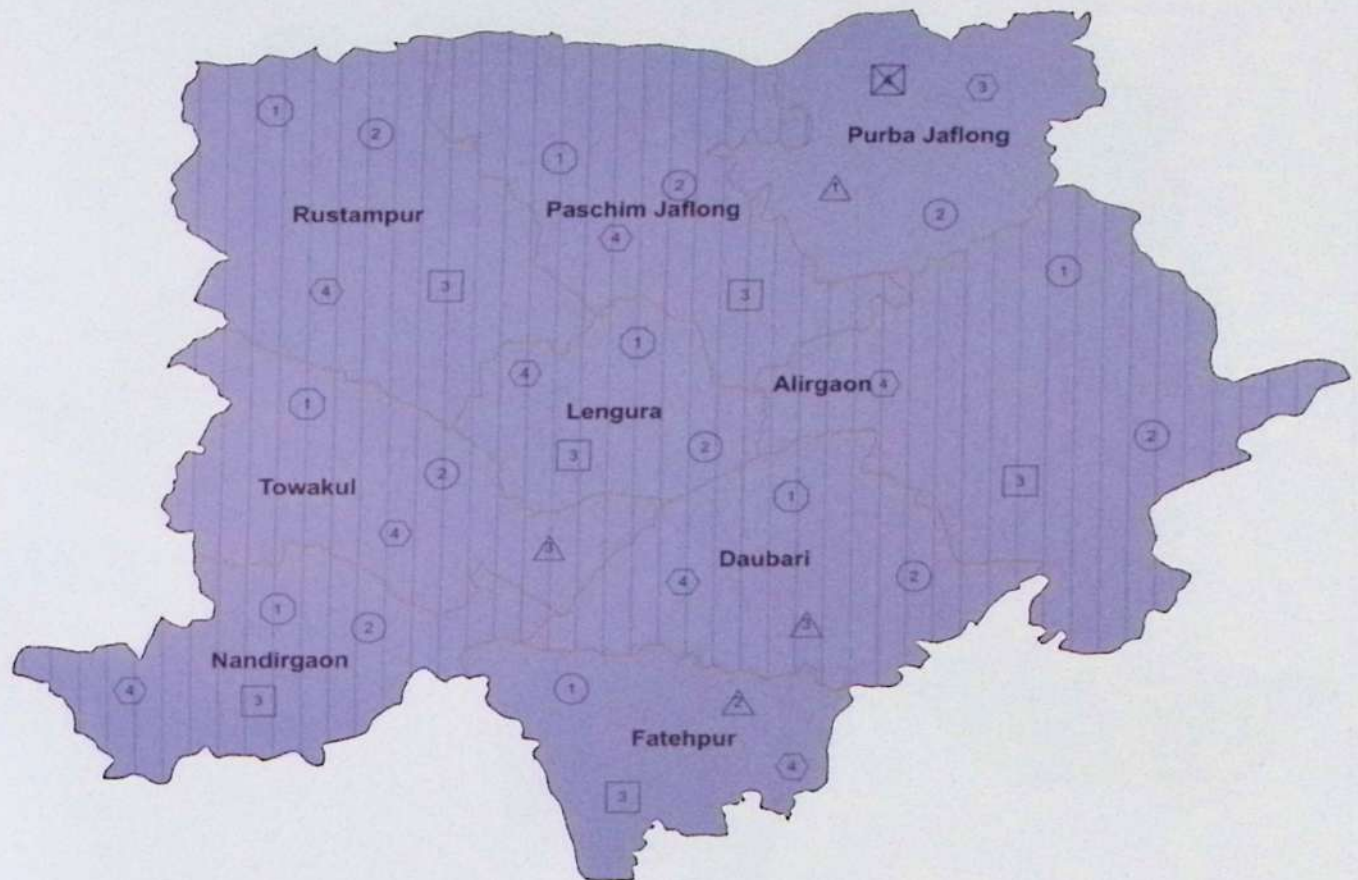
25°13'30"N

25°8'0"N

25°23'0"N

24°57'0"N

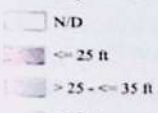
24°51'30"N



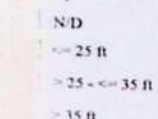
Legend

Lowest Water Level (ft)

Shallow Aquifer
(≤ 150 m)



Deep Aquifer
(> 150 m)

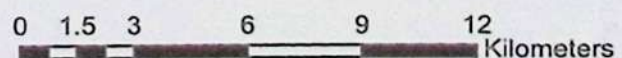


Water Point Options



Technological Priority

- 1st Priority - 1
- 2nd Priority - 2
- 3rd Priority - 3
- 4th Priority - 4



91°53'0"E

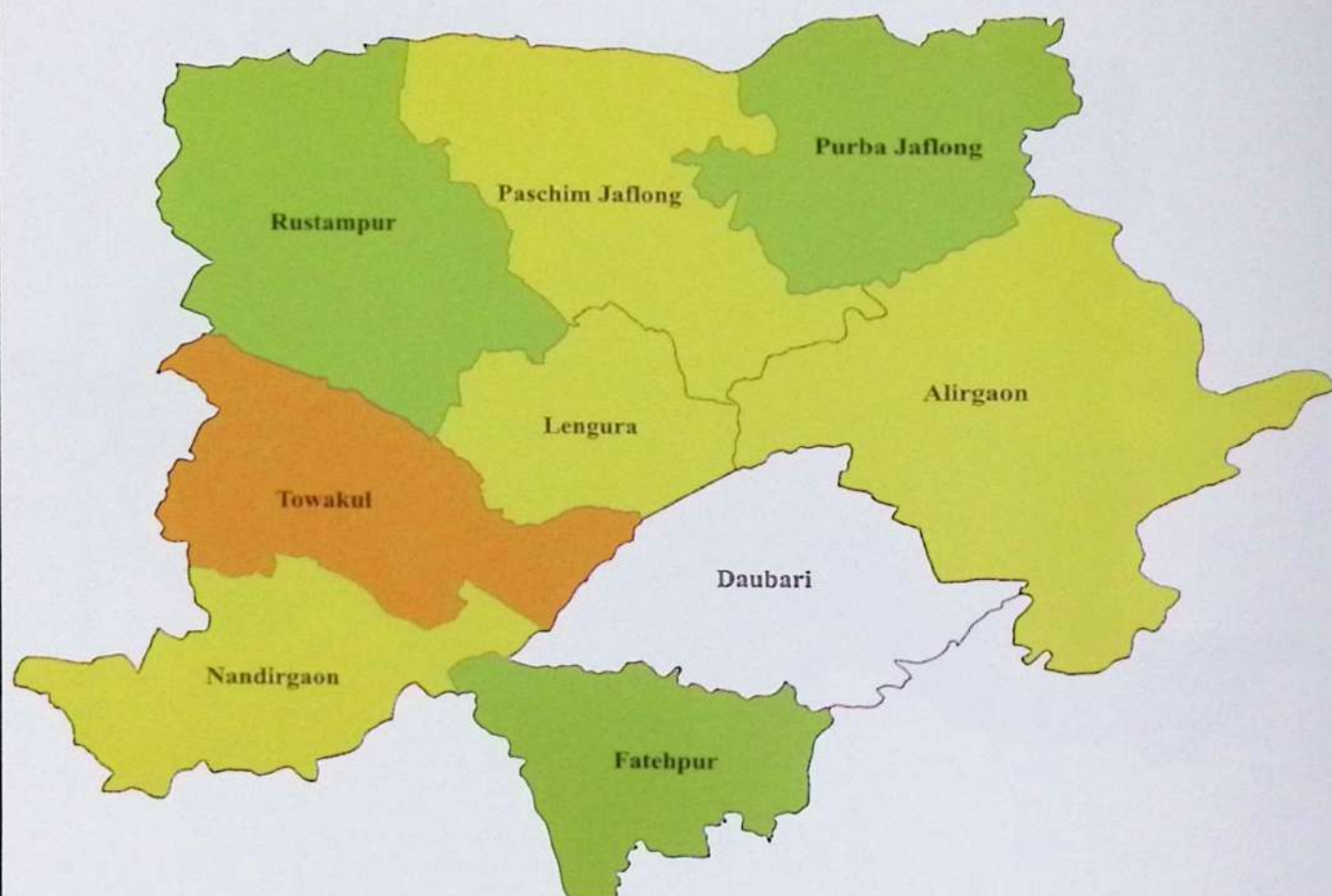
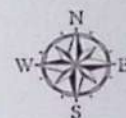
91°58'30"E

92°40"E

Arsenic Contamination Map - 1

District: Sylhet

Upazilla: Gowainghat



Legend

% of Arsenic Contaminated Water Points
(As per BAMWSP*)

- N/D
- <= 20%
- > 20% - <= 40%
- > 40% - <= 60%
- > 60% - <= 80%
- > 80% - <= 100%

*BAMWSP = Bangladesh Arsenic Mitigation Water Supply Project, 2003

0 2 4 8 12 16 Kilometers

91°53'0"E

91°58'30"E

92°40"E

Arsenic Contamination Map - 2

District: Sylhet

Upazila: Gowainghat



25°13'0"N

25°13'0"N

25°8'0"N

25°8'0"N

25°23'0"N

25°23'0"N

24°57'0"N

24°57'0"N

24°51'30"N

24°51'30"N

Legend

% of Arsenic Contaminated Water Points (As per NWMP*)

Shallow Aquifer (<150m)

N/D

<= 20%

> 20% - <= 40%

> 40% - <= 60%

> 60% - <= 80%

> 80% - <= 100%

Deep Aquifer (>150m)

N/D

<= 20%

> 20% - <= 40%

> 40% - <= 60%

> 60% - <= 80%

> 80% - <= 100%

0 1.75 3.5 7 10.5 14 Kilometers

*NWMP = Nationwide Water Public Point Mapping, 2006 - 2012

91°53'0"E

91°58'30"E

92°40"E



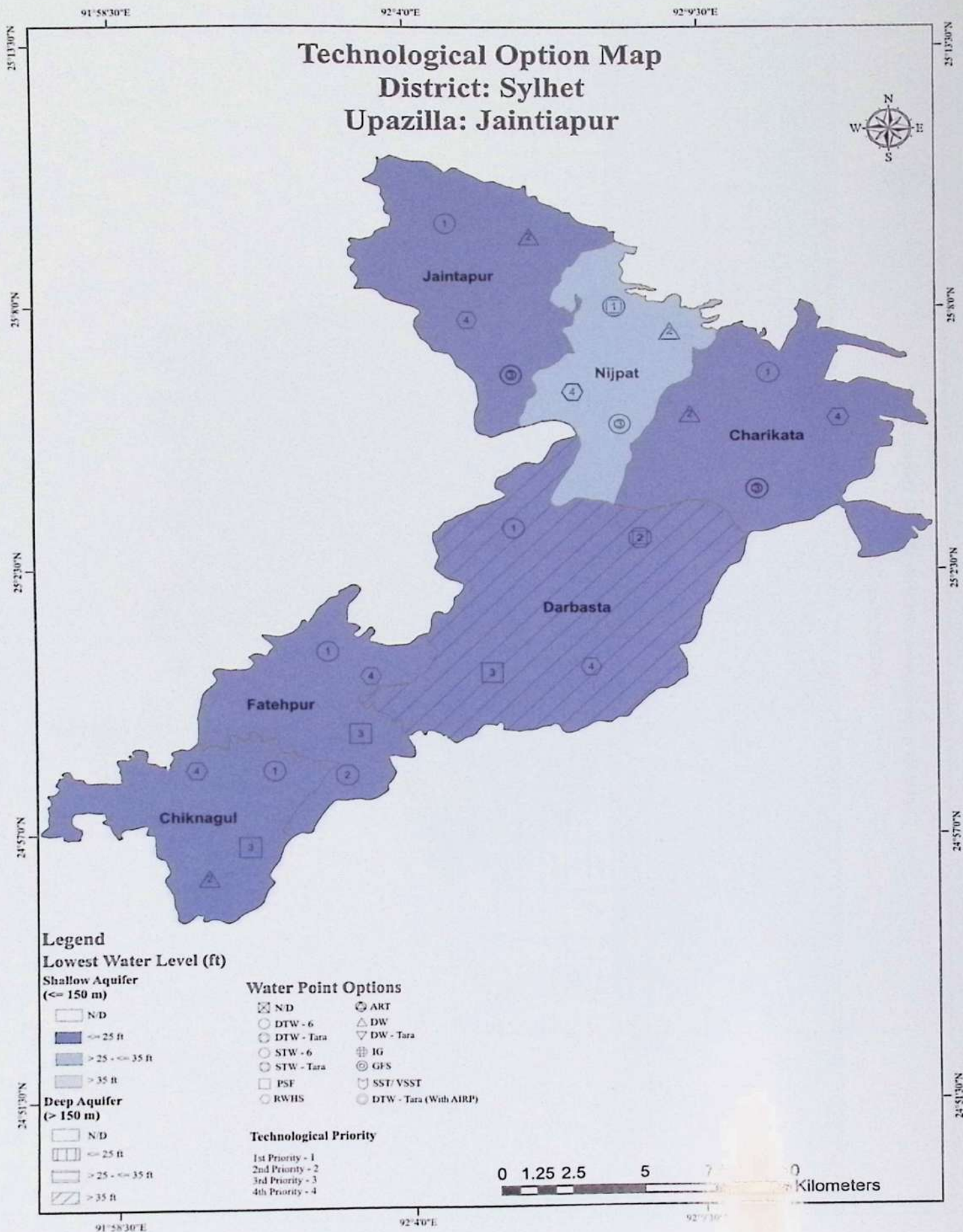
Table for mapping union wise Water Supply Technology

Jaintiapur, Sylhet

Sl.	District	Upazila	Union	5		6		7		8		9		10			11				Remarks
				STW	DTW	STW	DTW	STW	DTW	STW	DTW	STW	DTW	STW	DTW	DTW	1	2	3	4	
1																					
1			Nijpat	28	N/D	N/D	N/D	0	11.76	0	N/D	0	N/D	200	N/D	60	STW - Tara	DW	GFS	RWHS	
2			Jaintiapur	18	N/D	N/D	N/D	0	21.43	0	N/D	0	N/D	200	N/D	60	STW - 6	DW	GFS	RWHS	
3			Charikata	17	N/D	N/D	N/D	0	0	0	N/D	0	N/D	200	N/D	60	STW - 6	DW	GFS	RWHS	
4			Darbasta	12	45	N/D	N/D	0	14.29	0	0	0	0	200	N/D	N/D	STW - 6	DTW - Tara	PSF	RWHS	
5			Fatehpur	21	N/D	N/D	N/D	0	0	0	N/D	0	N/D	200	N/D	N/D	STW - 6	DTW - 6	PSF	RWHS	
6			Chiknagul	15	N/D	N/D	N/D	0	0	0	N/D	0	N/D	200	N/D	70	STW - 6	DW	PSF	RWHS	

Note: Iron and Chloride contamination derived based on people's perception, 2014

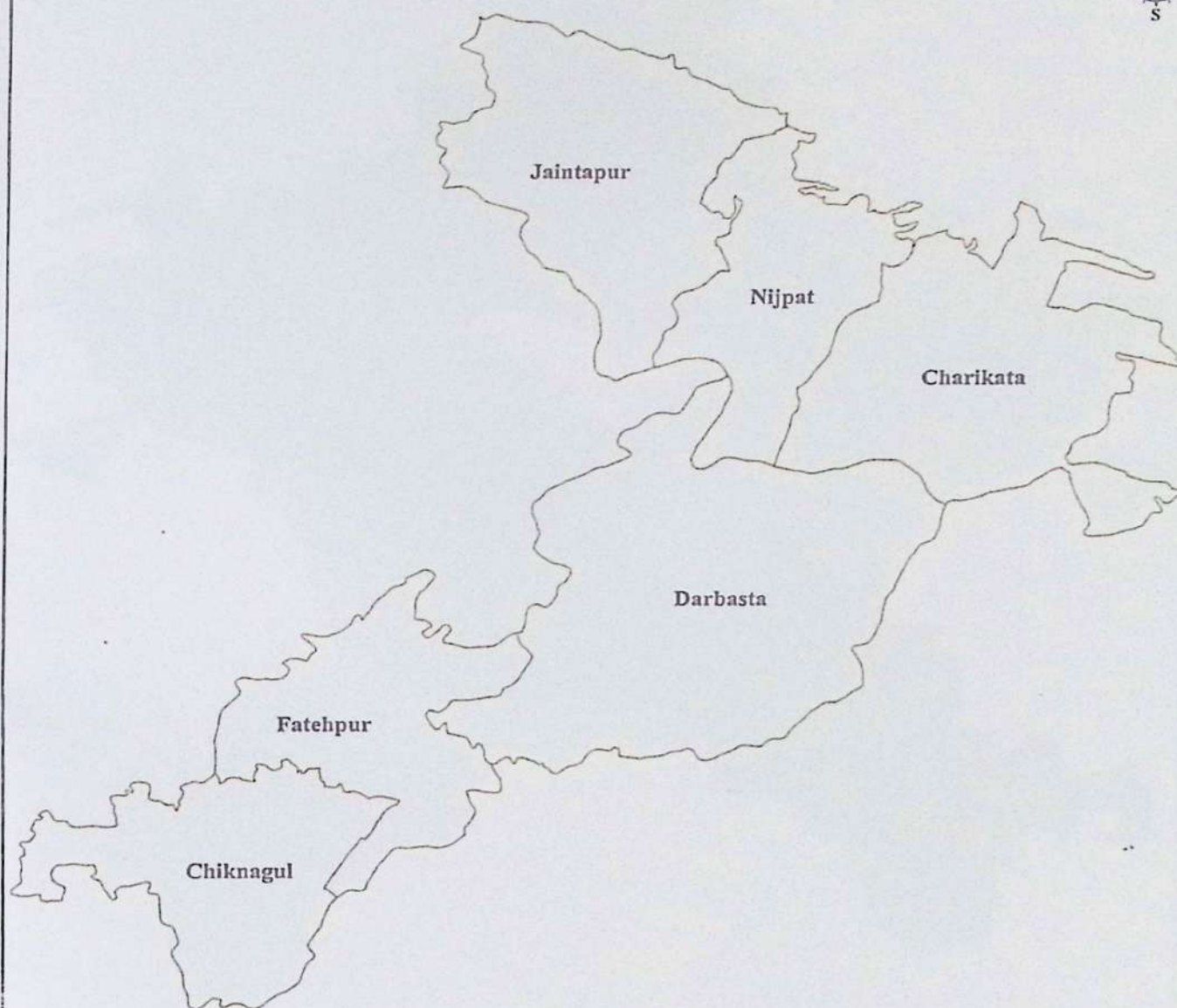
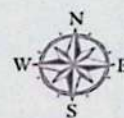
N/D = No Data



Arsenic Contamination Map - 1

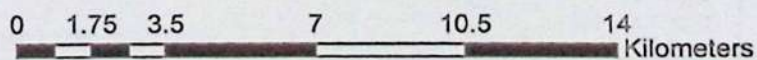
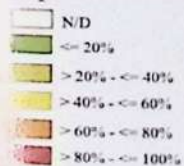
District: Sylhet

Upazilla: Jaintiapur

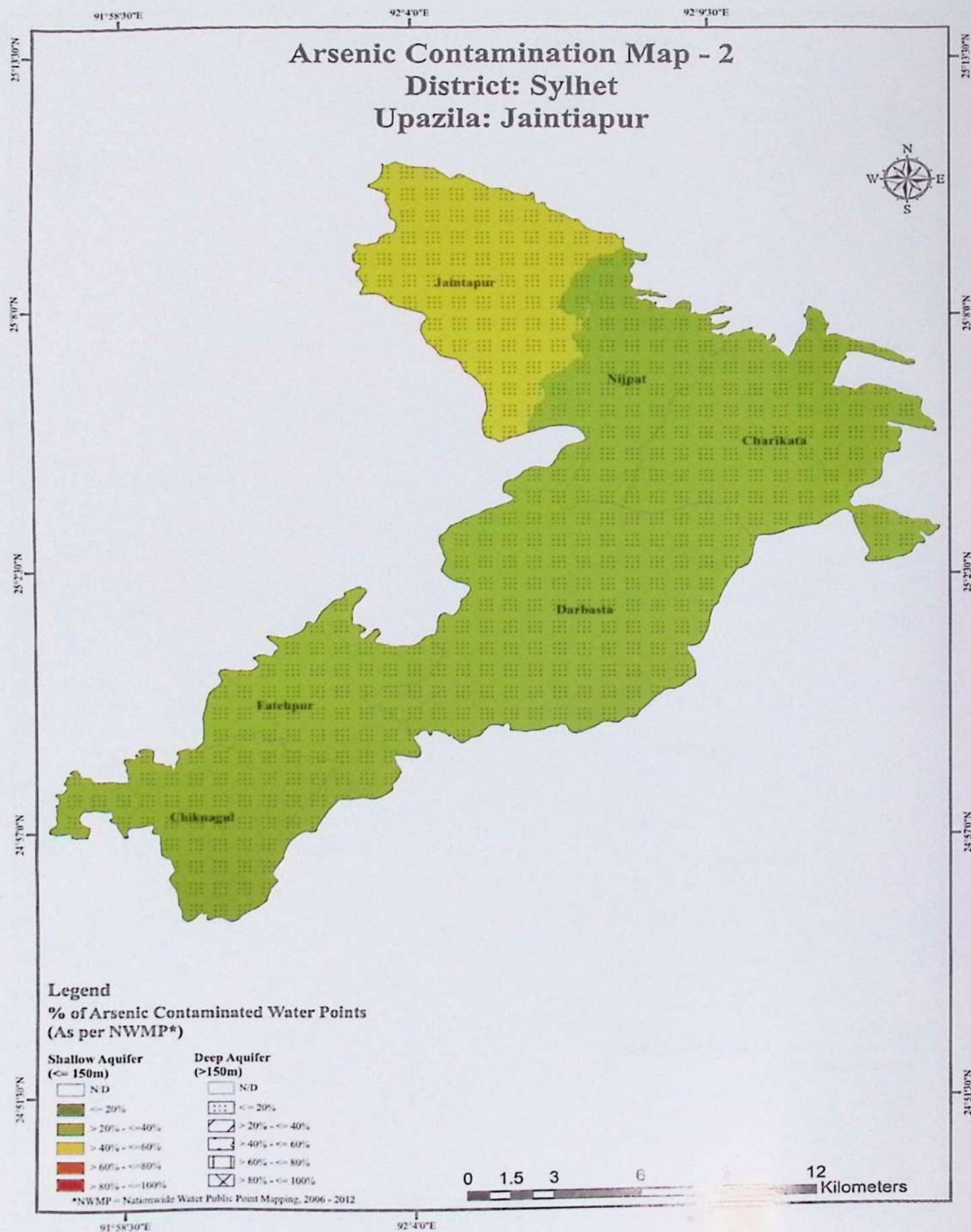


Legend

% of Arsenic Contaminated Water Points
(As per BAMWSP*)



*BAMWSP = Bangladesh Arsenic Mitigation Water Supply Project, 2003



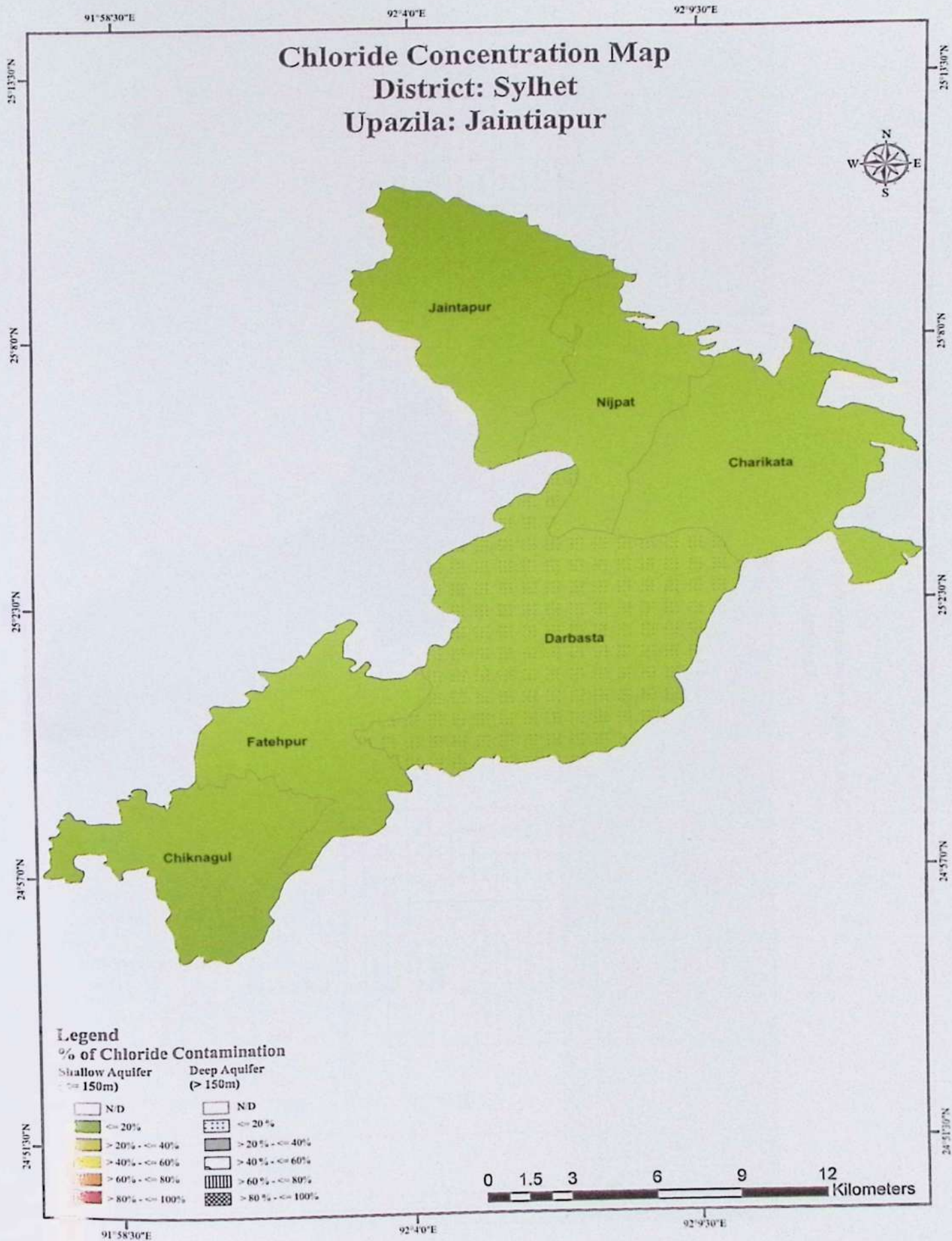
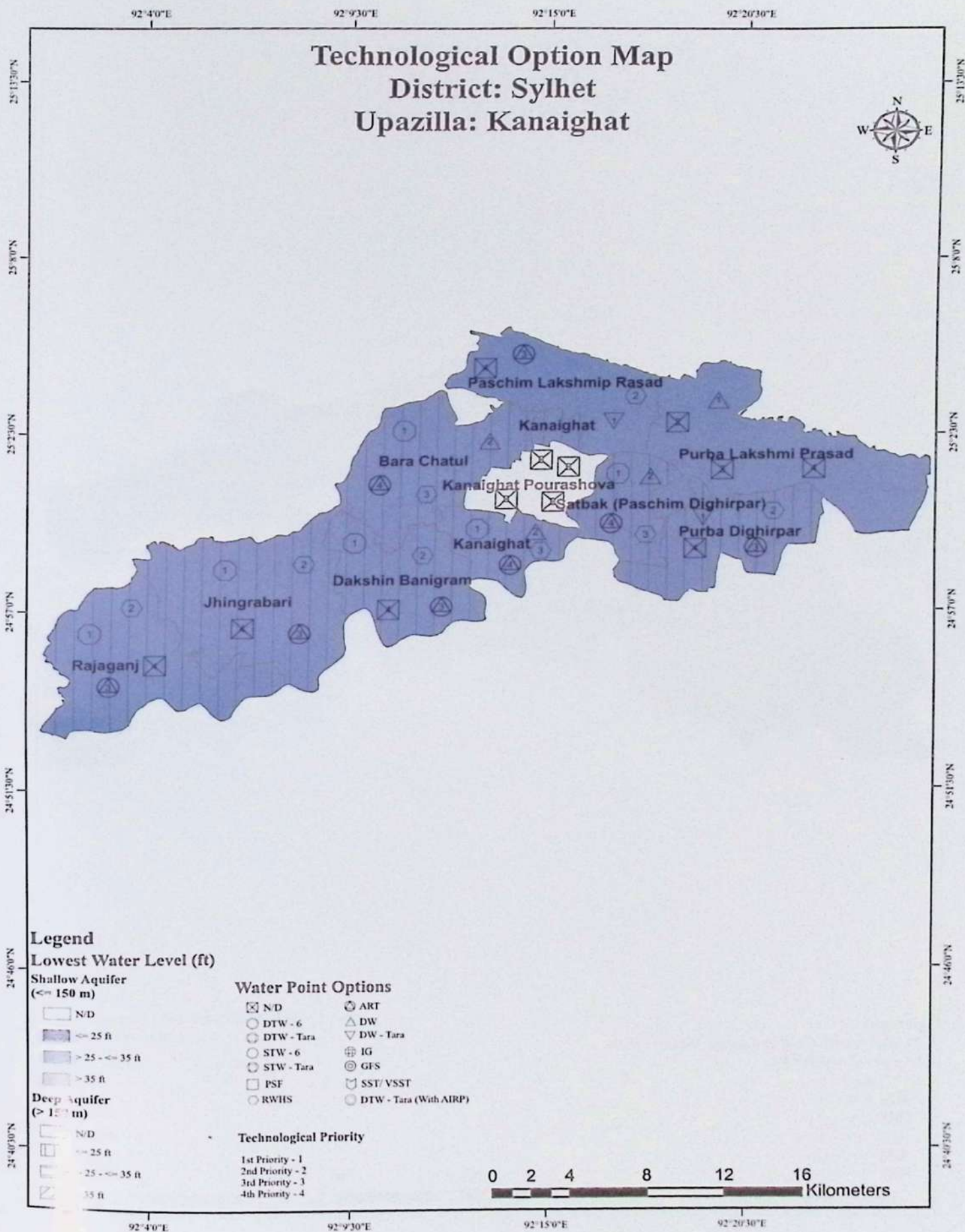


Table for mapping union wise Water Supply Technology
Kanniah, Sylhet

Sl.	District	Upazila	Union	Lowest Water Table of the Union in the year 2017, ft	As contamination Status (% of Contaminated TW as per SANITC, BANATSP 2003)	As Contamination Status (% of TW affected by DTHL Water Pollutants installed during 2006-12)	Fe Problem (% of DTWLE TW)	Cl Problem (% of DTWLE TW)	10				11				Remark							
									7		8		9		10			11						
									STW	DTW	STW	DTW	STW	DTW	STW	DTW		STW	DTW	1	2	3	4	
1	Syhet	Kanaighat	Purba Lakshmi Prasad Paschim Lakshmi Prasad Purba Dighirpar Satbak (Paschim Dighirpar) Bara Chatul Kanaighat Dakshin Banigram Jhingrabari Rajaganj	23	N/D	11.04	0	0	0	95	N/D	0	N/D	200	N/D	50	DW	DW	-	-	-	-	-	
2				23	N/D	31.58	0	0	0	95	N/D	0	N/D	0	N/D	200	N/D	50	DW - Tara	RWHS	ART	-	-	-
3				22	18	56.92	0	0	0	95	0	0	0	0	0	200	600	50	DW - Tara	RWHS	ART	-	-	-
4				23	18	N/D	0	0	0	95	0	0	0	0	0	200	700	50	DTW - 6	DW	RWHS	ART	-	-
5				20	16	61.01	0	0	0	95	0	0	0	0	0	200	800	N/D	DTW - 6	DW	RWHS	ART	-	-
6				23	17	63.69	0	0	0	95	0	0	0	0	0	200	750	N/D	DTW - 6	DW	RWHS	ART	-	-
7				22	18	21.68	0	0	0	95	0	0	0	0	0	200	750	N/D	DTW - 6	RWHS	ART	-	-	-
8				22	20	26.66	25	0	0	95	0	0	0	0	0	200	750	N/D	DTW - 6	RWHS	ART	-	-	-
9				21	18	0.63	0	0	0	95	0	0	0	0	0	200	750	N/D	DTW - 6	RWHS	ART	-	-	-

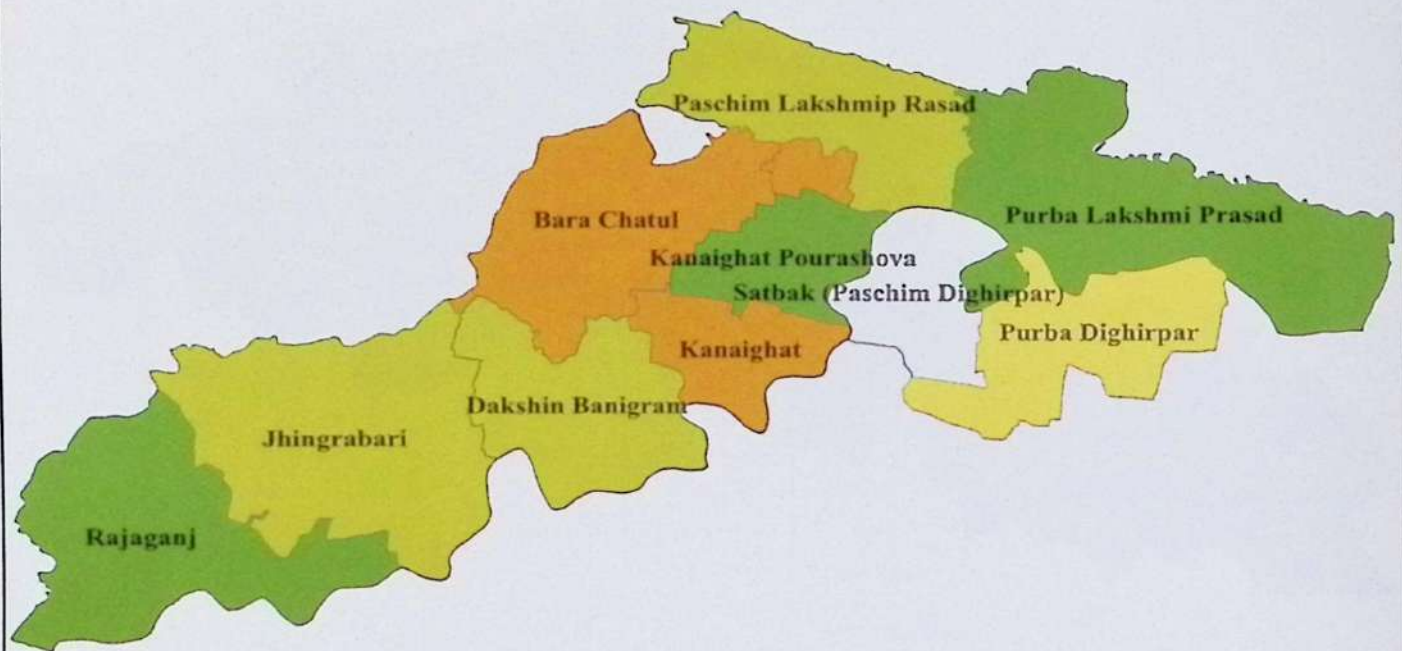
Note: Iron and Chloride contamination derived based on people's perception, 2014
N/D = No Data



Arsenic Contamination Map - 1

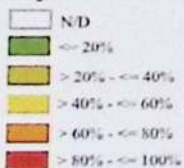
District: Sylhet

Upazilla: Kanaighat

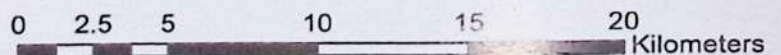


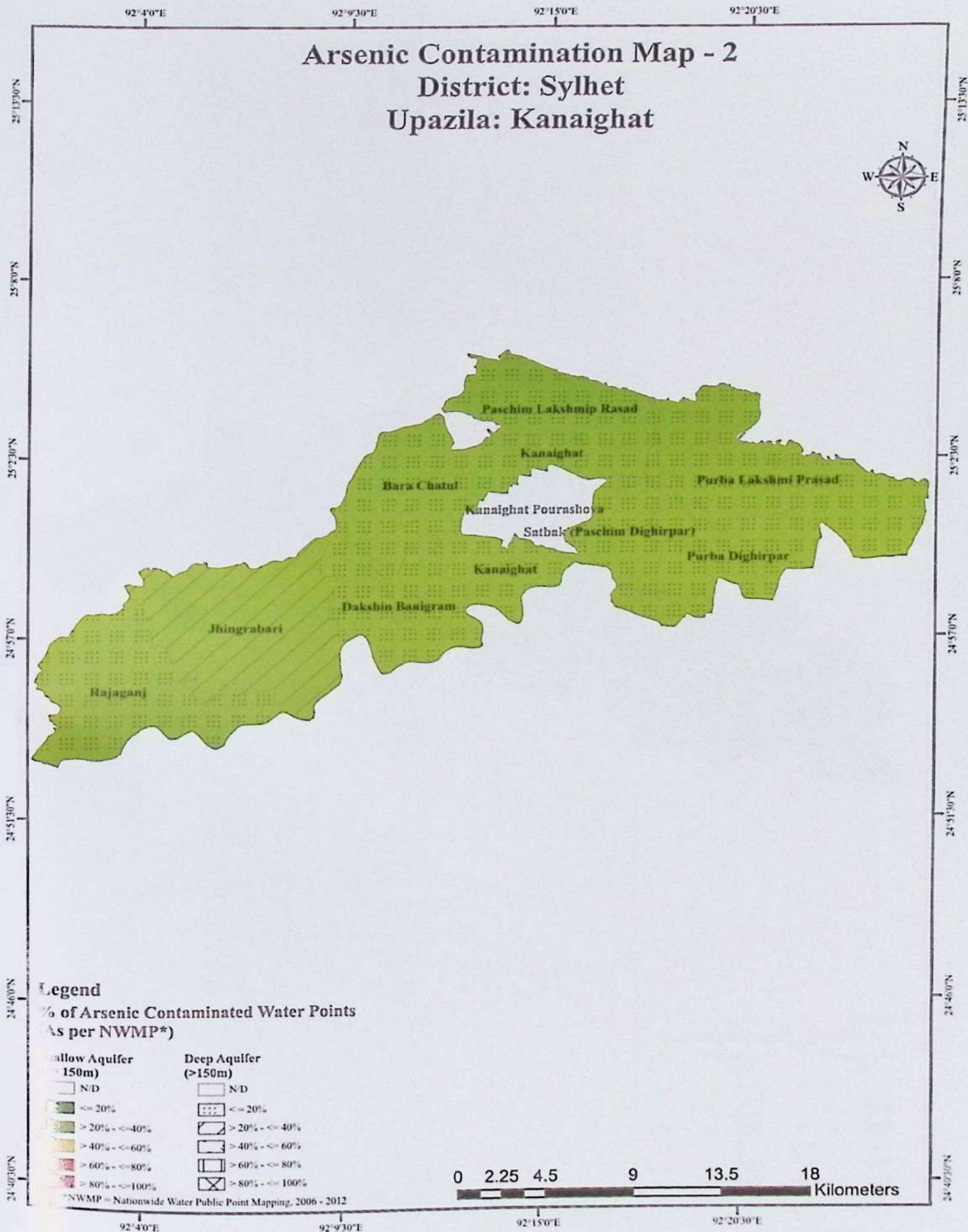
Legend

% of Arsenic Contaminated Water Points (As per BAMWSP*)



*BAMWSP = Bangladesh Arsenic Mitigation Water Supply Project, 2003





Chloride Concentration Map

District: Sylhet

Upazila: Kanaighat

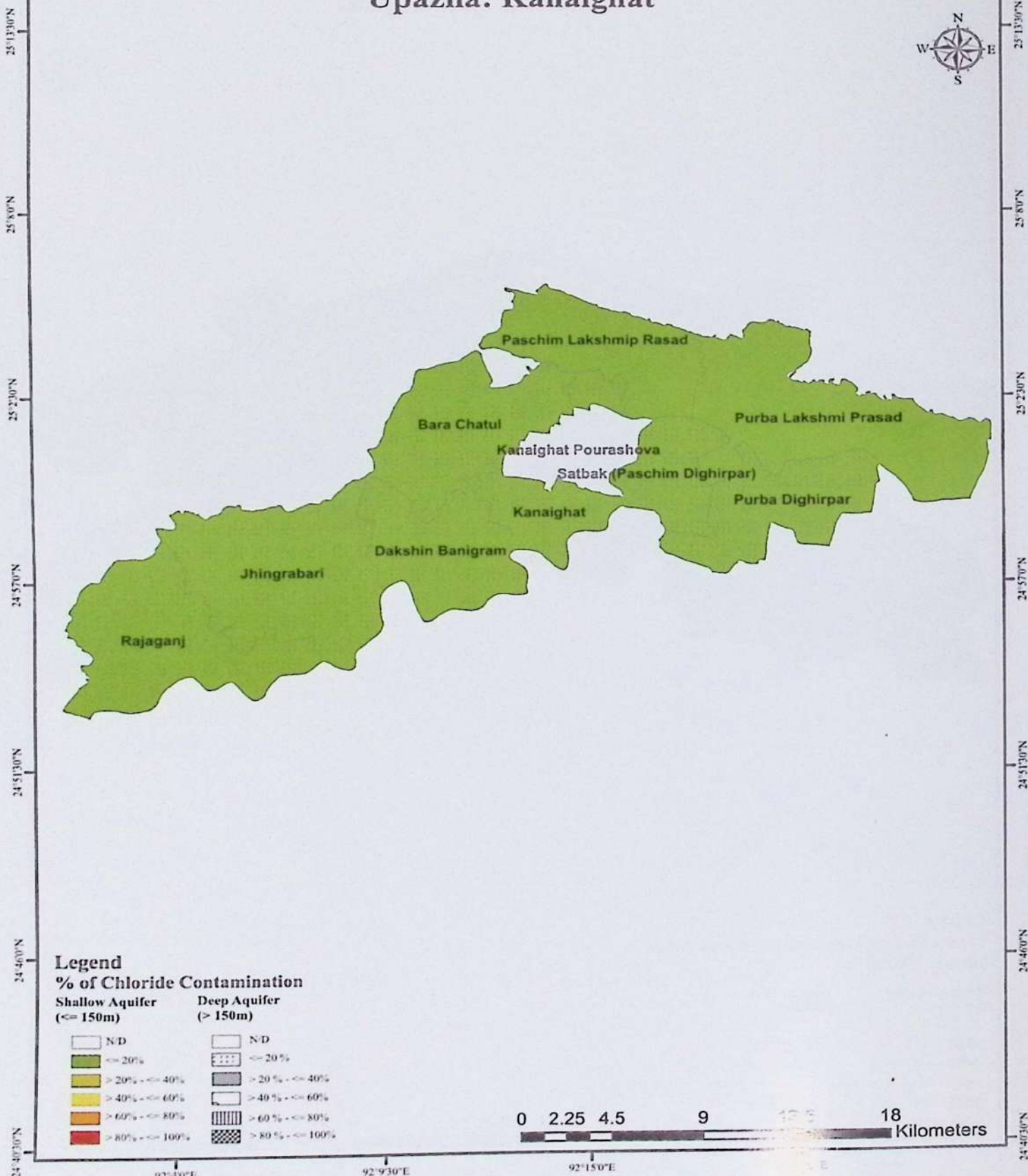
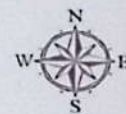
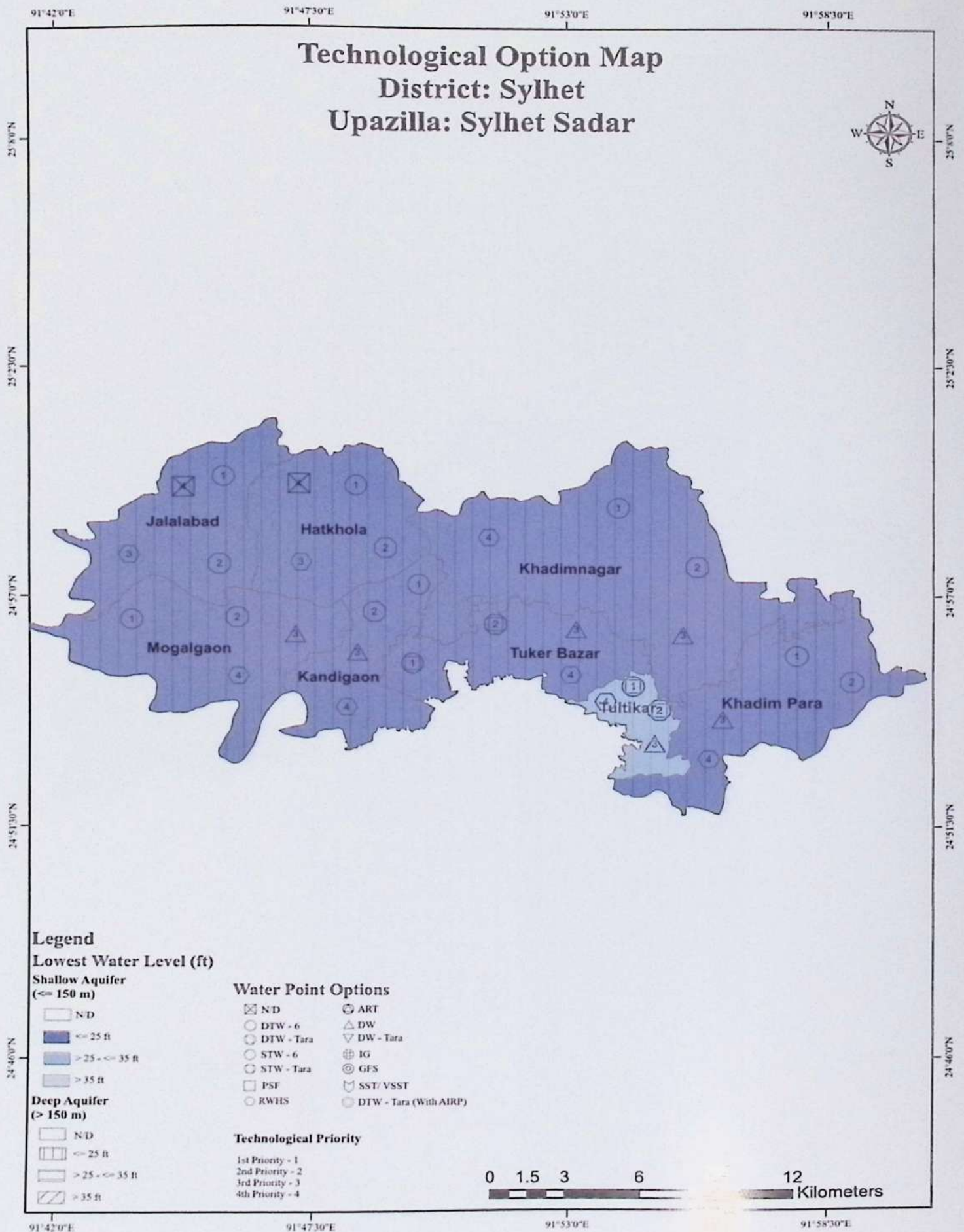


Table for mapping union wise Water Supply Technology

Sylhet Sadar, Sylhet

Sl.	District	Upazila	Union	5		6		7		8		9		10		11				Remarks
				STW	DTW	STW	DTW	STW	DTW	STW	DTW	STW	DTW	STW	DTW	1	2	3	4	
1																				
1			Jalalabad	21	15	N/D	12.5	21.43	15	0	0	0	0	400	650	STW - 6	DTW - 6	RWHS	.	
2			Hakholia	20	17	N/D	12.5	9.09	15	25	0	0	0	400	650	STW - 6	DTW - 6	RWHS	.	
3			Khadimnagar	19	15	N/D	0	9.09	30	0	0	0	0	200	700	STW - 6	DTW - 6	DW	RWHS	
4			Khadim Para	19	16	N/D	0	0	50	0	0	0	0	200	700	STW - 6	DTW - 6	DW	RWHS	
5			Tultikar	28	23	N/D	0	0	25	0	0	0	0	200	700	STW - Tara	DTW - Tara	DW	RWHS	
6			Tuker Bazar	22	22	N/D	0	5.56	10	0	0	0	0	400	700	STW - Tara	DTW - Tara	DW	RWHS	
7			Mogalgaon	18	18	N/D	8.33	35.71	40	0	0	0	0	400	750	STW - 6	DTW - 6	DW	RWHS	
8			Kandgaon	19	18	N/D	N/D	N/D	40	0	0	0	0	400	700	STW - 6	DTW - 6	DW	RWHS	

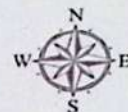
Note: Iron and Chloride contamination derived based on people's perception, 2014
N/D = No Data



Arsenic Contamination Map - 1

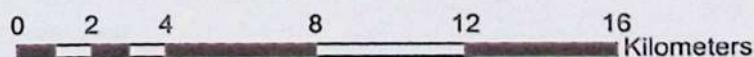
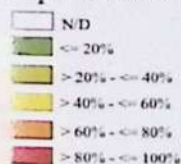
District: Sylhet

Upazilla: Sylhet Sadar

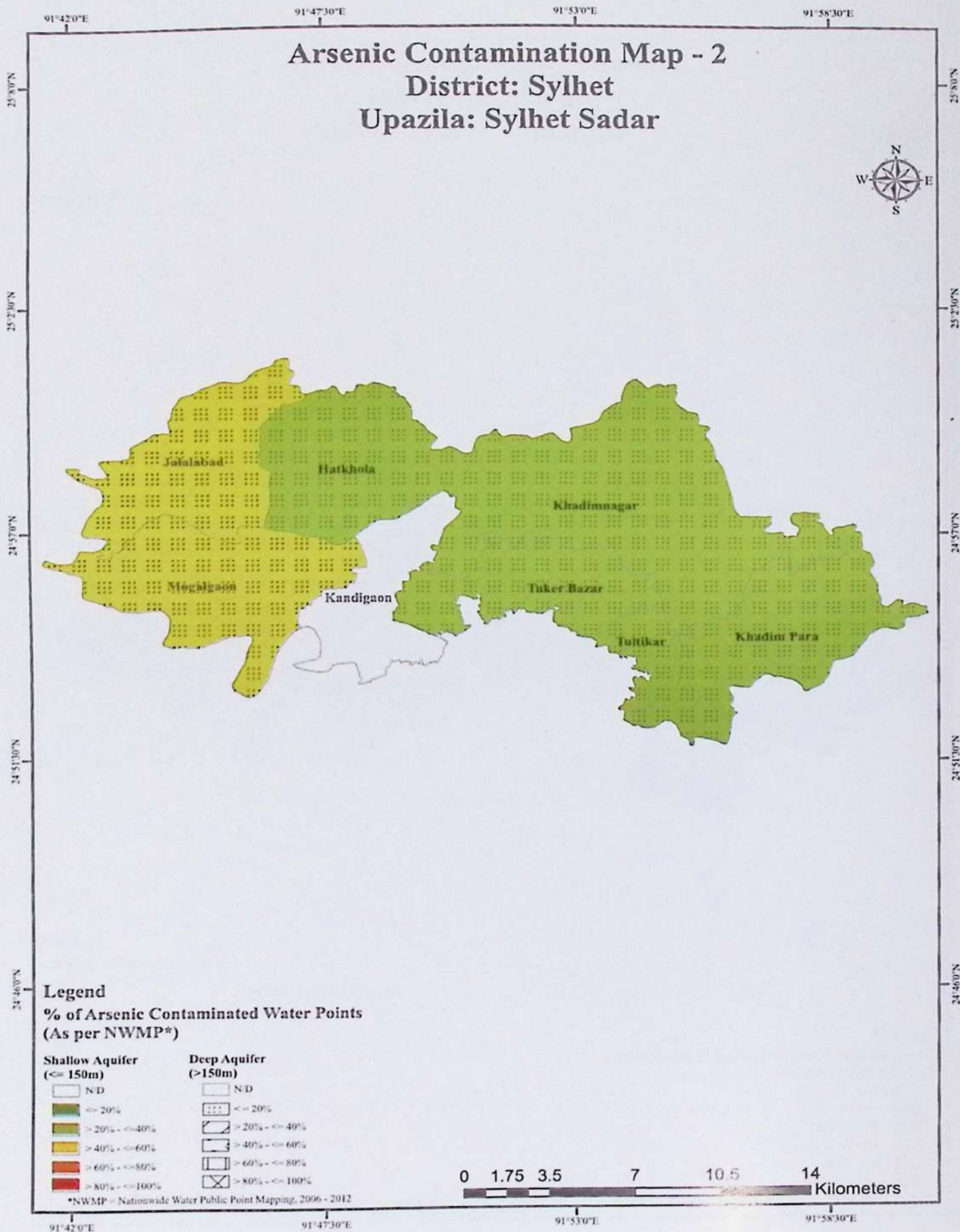


Legend

% of Arsenic Contaminated Water Points
(As per BAMWSP*)



*BAMWSP = Bangladesh Arsenic Mitigation Water Supply Project, 2003



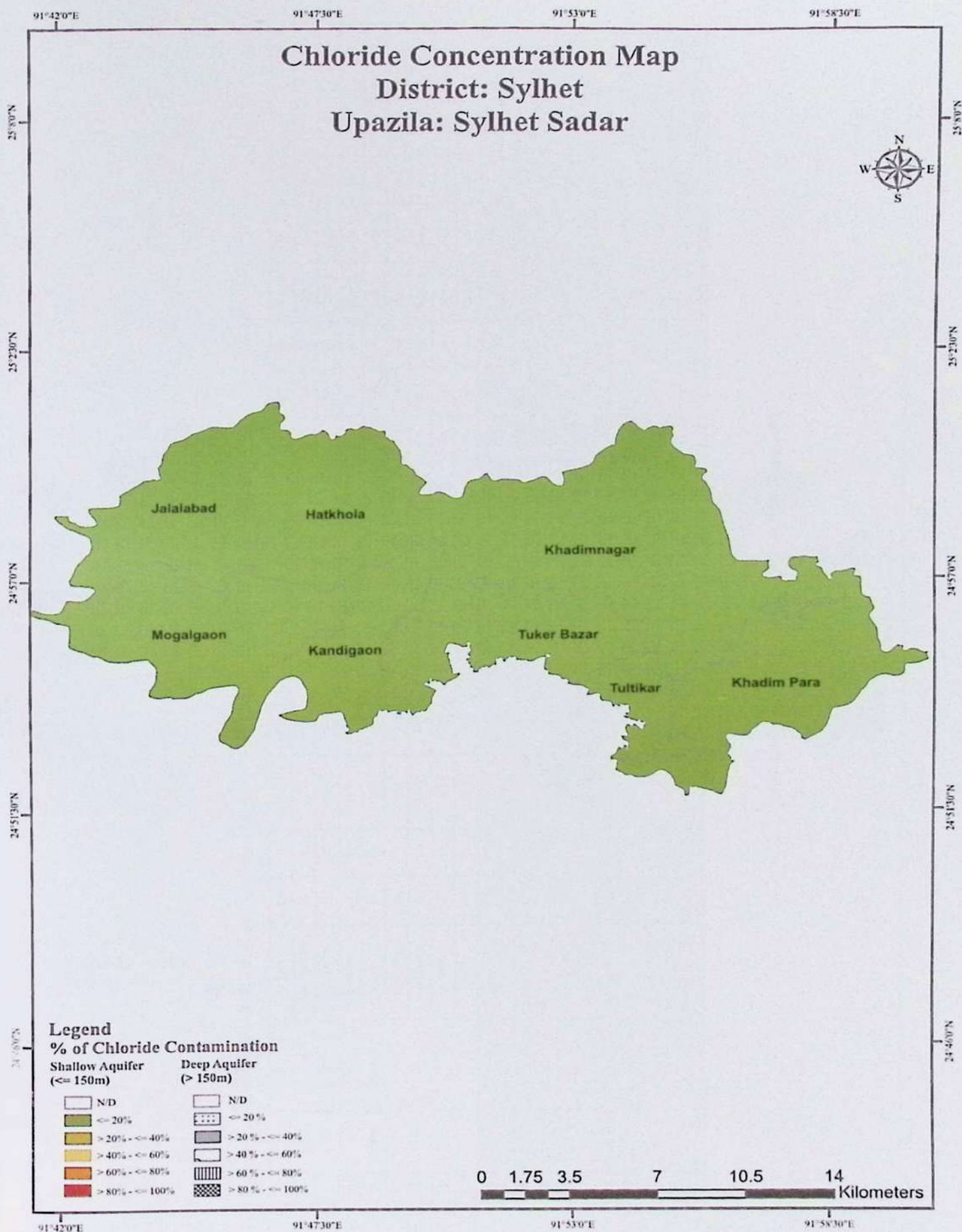


Table for mapping union wise Water Supply Technology
Zakiganj, Sylhet

Sl.	District	Upazila	Union	5		6		7		8		9		10			11				Remark
				STW	DTW	STW	DTW	STW	DTW	STW	DTW	STW	DTW	STW	DTW	DW	1	2	3	4	
1			4																		
1				18	15	20.42	0	0	0	30	40	0	0	200	900	40	DTW - 6	STW - 6	DW	-	
2				20	15	3.3	11.11	0	0	30	35	0	0	200	750	50	DTW - 6	STW - 6	DW	-	
3				18	12	28.54	40	50	0	40	15	0	0	220	750	50	DTW - 6	STW - 6	DW	-	
4				19	12	7.03	0	0	0	25	35	0	0	190	760	45	DTW - 6	STW - 6	DW	-	
5				20	14	1.56	0	33.33	0	60	50	0	0	250	760	40	DTW - 6	STW - 6	DW	-	
6				18	12	34.29	0	0	0	60	40	0	0	220	720	45	DTW - 6	STW - 6	DW	-	
7				17	11	8.84	0	11.11	0	60	60	0	0	200	800	50	DTW - 6	STW - 6	DW	-	
8				20	12	23.94	83.33	0	0	70	40	0	0	210	850	55	DTW - 6	STW - 6	DW	-	
9				20	14	37.17	26.67	0	0	80	50	0	0	220	900	60	DTW - 6	STW - 6	DW	-	

Iron and Chloride contamination derived based on people's perception, 2014

N/D = No Data

92°15'0"E

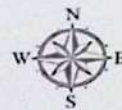
92°20'30"E

92°26'0"E

Technological Option Map

District: Sylhet

Upazilla: Zakiganj



25°2'30"N

25°2'30"N

24°57'0"N

24°57'0"N

24°51'30"N

24°51'30"N

24°46'0"N

24°46'0"N

Legend

Lowest Water Level (ft)

Shallow Aquifer (≤ 150 m)

- N/D
- ≤ 25 ft
- > 25 - ≤ 35 ft
- > 35 ft

Deep Aquifer (> 150 m)

- N/D
- ≤ 25 ft
- > 25 - ≤ 35 ft
- > 35 ft

Water Point Options

- N/D
- DTW - 6
- DTW - Tara
- STW - 6
- STW - Tara
- PSF
- RWHS
- ART
- DW
- DW - Tara
- IG
- GFS
- SST/VSST
- DTW - Tara (With AIRP)

Technological Priority

- 1st Priority - 1
- 2nd Priority - 2
- 3rd Priority - 3
- 4th Priority - 4

0 1.5 3 6 9 12 Kilometers

92°15'0"E

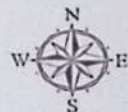
92°20'30"E

92°26'0"E

Arsenic Contamination Map - 1

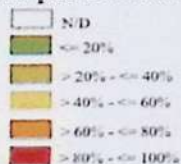
District: Sylhet

Upazilla: Zakiganj



Legend

% of Arsenic Contaminated Water Points
(As per BAMWSP*)



*BAMWSP = Bangladesh Arsenic Mitigation Water Supply Project, 2003



92°15'0"E

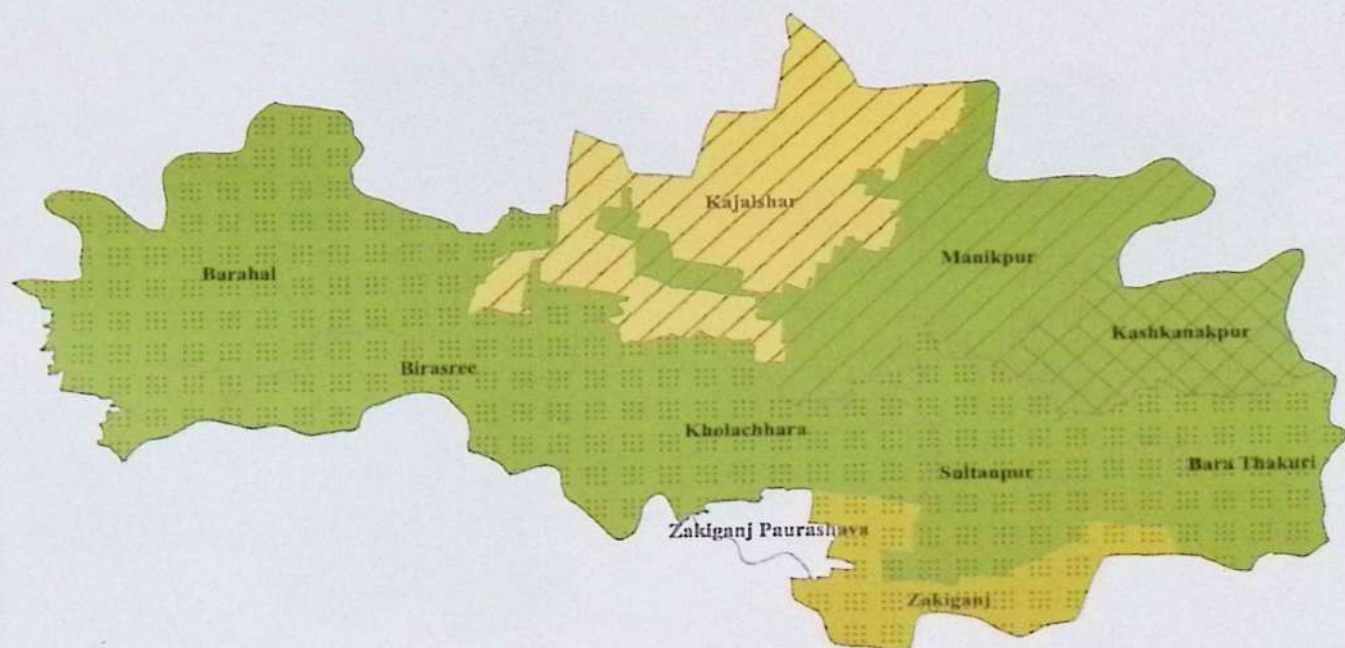
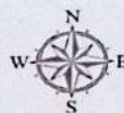
92°20'30"E

92°26'0"E

Arsenic Contamination Map - 2

District: Sylhet

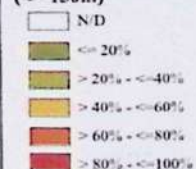
Upazila: Zakiganj



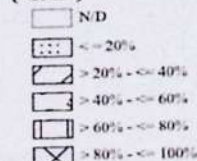
Legend

% of Arsenic Contaminated Water Points
(As per NWMP*)

Shallow Aquifer
(≤ 150m)



Deep Aquifer
(> 150m)



*NWMP = Nationwide Water Public Point Mapping, 2006 - 2012

0 1.5 3 6 9 12 Kilometers

92°15'0"E

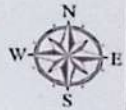
92°20'30"E

92°26'0"E

Chloride Concentration Map

District: Sylhet

Upazila: Zakiganj

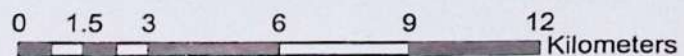
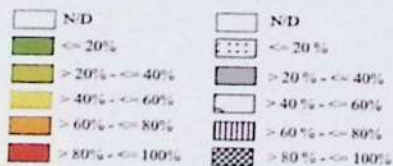


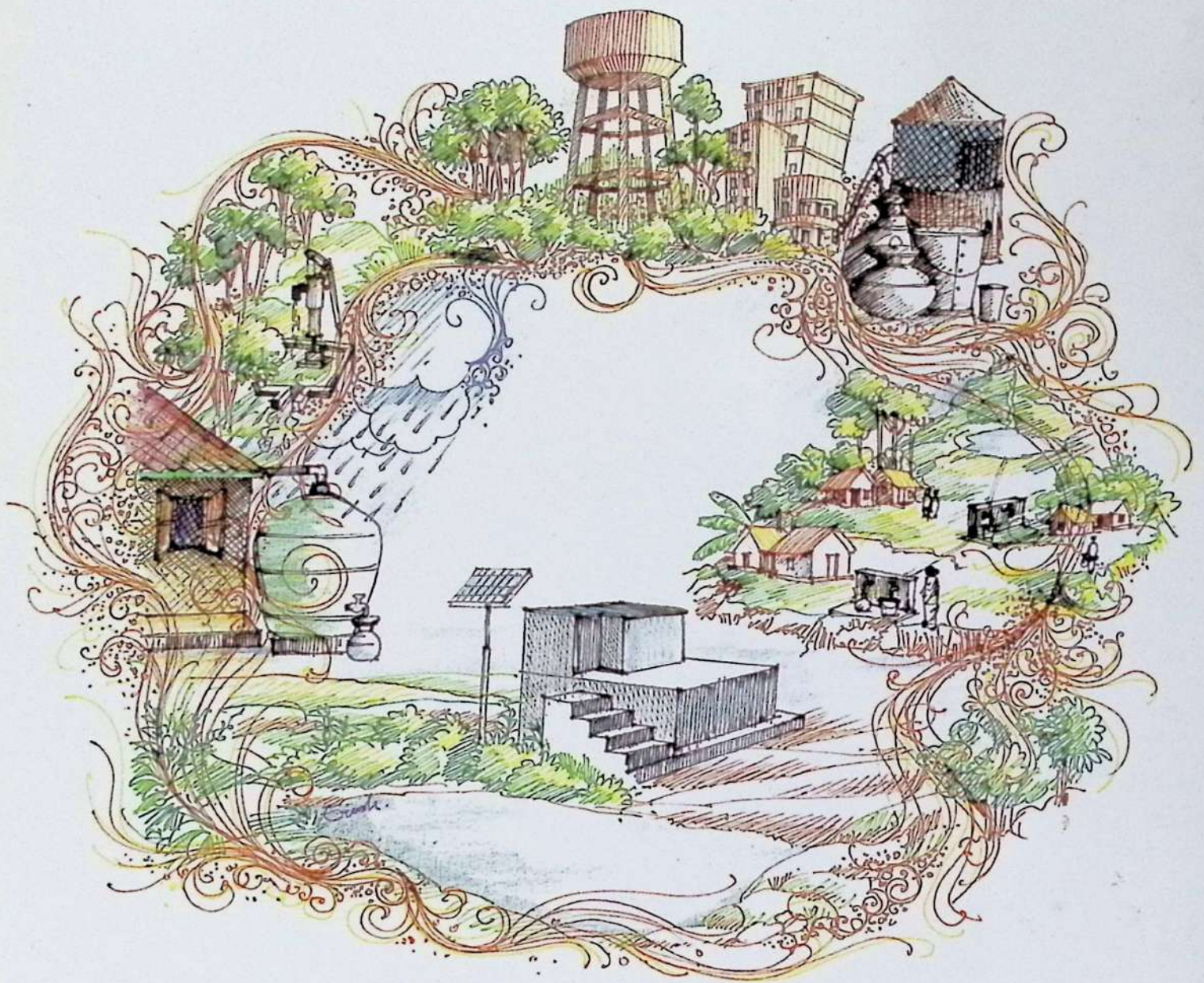
Legend

% of Chloride Contamination

Shallow Aquifer
($\leq 150\text{m}$)

Deep Aquifer
($> 150\text{m}$)





Ground Water Circle
Department of Public Health Engineering