The Effects of Climate Variability, Seasonal Variations and Environmental Events on Drinking Water Quality, Diarrhea Prevalence and Wash Behaviour in Bangladesh

Standard Operating Procedures & Data Collection Tools

IEDCR

August 2016

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1. Background

Bangladesh is at the highest risk of facing the adverse impact of climate change, which will lead to an increase in many climate-sensitive diseases. Climate change is predicted to increase intensity and frequencies of natural hazards including water scarcity and flooding events thereby further contributing to water stress. Climate change can also contribute to higher pathogen load, lower host immunity, and hamper WASH accessibility thereby hindering WASH effectiveness on providing sustainable safe water and promoting human health. However, measurements of climate change impacts would require long-term data collection period of a few decades. Given that, 30 years of data collection is beyond the scope of one research protocol, this study aims to assess the effects of climate variability, seasonality, and environmental events (flooding/water scarcity) causing water stress that are assumed to be indicative of climate change impacts, using these as proxy indicators as the length of the study is too short to address long-term changes in climate on the effectiveness of WASH interventions.

2. Objectives

The general objectiveof this project is to measure the effects of climate variability, seasonal variations and environmental events on the microbial quality of drinking water at point-of-use and at source in households with access to an improved focal drinking water source(s). This SOP will help to manage the project, development of data collection tools, train the field team members

The purpose of this Standard Operating Procedure (SOP) is as follows:

- To guide the field implemention team to select the study sites and clusters (urban,peri-urban and rural)
- To guide the field implementers in initial field setup, identification of study population and enrolment of clusters & households
- To conduct the field data collection at the enrolled households within the selected clusters
- To guide the field implementation for troubleshooting
- To ensure timely collection, storage, transportation and analyses of the collected water samples from selected improved water sources and from the enrolled HHs' point-of-use (POU)
- To guide and ensure timely collection, compilation and analysis of quantitative, qualitative, laboratory and meteorological data as per the protocol
- To ensure quality of the collevcted data and samples by guiding the field coordinators to adequately monitor and evaluate field data and sample collectioin teams

3. Target Population

Our target audience for this SOP: Field implemention team which includes field coordinators, quantitative, qualitative interviewers and water sample collectors.

4. SOP for Study Sites and Cluster Selection

We have 35 functional weather stations of Bangladesh Meteorological Department (BMD) across the country with validated data. Among these 35 districts, we randomly selected one flood-prone and one drought-prone district.

We selected one flood-prone and one drought-prone district where diarrheal disease prevalence had been high using data from the Control Room of Directorate General of Health Services and satisfied the following additional criteria:

- ☐ The districts were predicted to face higher severity in flooding or water scarcity - As identified by the published literature and by the experts from the Bangladesh Meteorological Department (BMD), Flood Forecasting and Monitoring Unit, and International Water Modeling (IWM).
- ☐ The environmental event under concern have been known to occur annually based on past data in the selected districts (from the local meteorological office and Flood forecasting and monitoring unit)
- ☐ The districts were among those that had faced the highest temperature increase from the past decadal mean temperature based on long-term temperature deviation. Not affected by multiple climate concerns – salinity and floods. Therefore, specifically avoiding hoar areas, hill tracts and the coastal belts

- Using this method, Faridpur district was selected as the flood-prone sub-district and Rajshahi as the drought-prone sub-district.
- We then listed all the sub-districts within each district. In the next stage, we selected all the sub-districts within 20 kilometres radial distance of the weather station. Since Bangladesh is a triangular delta plain, the mean temperature may be expected not to vary within 25 Kilometres. However, cumulative rainfall, which is also an important determinant of diarrhea, may be expected to vary frequently at a much smaller grid area, so we assumed a 10 Kilometre radial distance acceptable for the purpose of the protocol. In this way, two sub-districts are selected in each district

Procedure for selection of Primary and Secondary Sampling Units (PSUs and SSUs):

- In order to get the primary sampling unit (PSUs), at first we used the population database to stratify the four selected sub-districts into urban, peri-urban and rural thanas/paurashavas/ unions. These were considered as the PSUs. We used PPS to select the necessary number of clusters from each primary sampling unit. We then identified the city wards (for urban area) in municipalities or paurashavas, wards within the union of the upazila as peri-urban and the unions of the upazila (for rural areas) of both selected districts. We found out the distribution of the urban city wards within the four thanas of the Rajshahi city corporation and Faridpur municipality/paurashava, peri-urban (wards within the unions of Sadar upazila) and rural unions within the two selected sub-districts. We used the database from Bangladesh Bureau of Statistics (BBS) 2011 and also from the Geo Location Registry of Directorate General of Health Services (DGHS). The number of clusters per Thana and paurashava and union were selected by probability proportionate to size (PPS).

Rajshahi District (*Annex: 3*):

- In Rajshahi municipality, there are four thanas: Boalia, Rajpara, Matihar and Shahmakhdum. We selected urban and peri-urban clusters from each of the four thanas and Noahata Paurashava respectively.
- There are several city wards within each Thana. By using random number sampling, we selected the city wards from each Thana and Noahata Paurashava.
- Peri urban clusters are located in Noahata Pourashova. There are 9 wards in the Pouroshova. We will

randomly selected 1 cluster from each ward.

- We need 80 rural clusters from rural Paba upazilla to reach the sample size. There are 8 unions in Paba Upazilla.
- So we selected the number of clusters per unions using PPS from the eight unions of Paba Upazilla. We randomly selected 11 city wards from Boalia thana (city ward# 9,11,13,15,16,19,20,21,23,25,26), seven city wards from Rajpara Thana (1,3,5,7,8,10,14), three city wards from Matihar thana (28,29,30) and two city wards from Shahmakhdum thana (17,18) ***Annex 3***.

In each selected city wards/wards/unions/Paura wards):

- We selected landmark identification from each randomized selected city ward of Rajshahi sadar and Noahata Paurashava wards.
- We will list all the water sources around approximately 01 km radial distance of that selected landmark.
- Then we will select the eligible water source according to our protocol. Among the eligible water sources we will randomly select the required number of clusters.
- In urban area (Rajshahi Sadar and Noahata Paurashava), we identified an eligible cluster in which 5 or more households shared drinking water from the same improved source (piped networks) and in rural areas (Unions of Paba upazilla) we identified the eligible clusters as those where 3 or more households shared drinking water from the same improved source (Bore hole/modified bore hole).
- We will select total 55 urban and peri-urban clusters and 80 rural clusters. Total 515 households will be enrolled from Rajshahi site.

Distribution of Urban and rural clusters in Rajshahi:
Rajshahi Sadar (Urban): Piped/Tap water network

Thana	Ward Number	Required number of cluster per ward	Number of households
Rajpara	1	2	2*5=10
Rajpara	3	2	2*5=10
Rajpara	5	2	2*5=10
Rajpara	7	2	2*5=10
Rajpara	8	2	2*5=10
Boalia	9	2	2*5=10
Rajpara	10	2	2*5=10
Boalia	11	2	2*5=10
Boalia	13	2	2*5=10
Rajpara	14	2	2*5=10
Boalia	15	2	2*5=10
Boalia	16	2	2*5=10
Shahmakhdum	17	2	2*5=10
Shahmakhdum	18	2	2*5=10
Boalia	19	2	2*5=10
Boalia	20	2	2*5=10
Boalia	21	2	2*5=10
Boalia	23	2	2*5=10
Boalia	25	2	2*5=10
Boalia	26	2	2*5=10
Matihar	28	2	2*5=10
Matihar	29	2	2*5=10
Matihar	30	2	2*5=10
Total		**46**	**230**

Paba Pourashava Peri-urban: Piped/Tap water network

Name of the ward	Ward No	Required number of cluster per ward	Number of households
Naohata	1	1	1*5=5
Uttar pillapara	2	1	1*5=5
Maddho Putiapara	3	1	1*5=5
Bagdani	4	1	1*5=5
Duari	5	1	1*5=5
Thalta	6	1	1*5=5
Sontoshpur	7	1	1*5=5
Baroipara	8	1	1*5=5
Sotopaikpara	9	1	1*5=5
Total		**9**	**45**

Paba Upazilla (Rural): Borehole water source

Name of Unions	Required number of cluster per ward per union	Number of households
Parila	10	10*3=30
Borogachi	10	10*3=30
Horiaon	10	10*3=30
Hujuripara	10	10*3=30
Dorshona	10	10*3=30
Damkura	10	10*3=30
Horipur	10	10*3=30
Horogram	10	10*3=30
Total	**80**	**240**

Faridpur District (Annex: 3):

- In Faridpur paurashava, there are 9 available wards. We selected 5 urban clusters from each paurashava ward from 9 available wards.
- Char Vadrashan Upazila HQ, 10 peri-urban clusters were randomly selected from union HQ.
- In Faridpur Sadar, there are 11 available unions. Eight rural clusters per union from 9 unions out of 11 available unions were selected randomly.
- From Char Vadrason, 2 urban clusters per union were selected from 4 available unions
- We will select total 55 urban and peri-urban clusters and 80 rural clusters. Total 515 households will be enrolled from Faridpur site.

Distribution of urban, peri-urban and rural clusters in Faridpur:

1. Urban:

Faridpur Paurashava: Piped/Tap water network

Ward Number	Required number of cluster per ward	Number of households
1	5	5*5=25
2	5	5*5=25
3	5	5*5=25
4	5	5*5=25
5	5	5*5=25
6	5	5*5=25
7	5	5*5=25
8	5	5*5=25
9	5	5*5=25
Total	**45**	**225**

2. Peri-urban:
Char Vadrashan Upazila HQ: Piped/Tap water network

Name of the Upazila	Required number of cluster	Number of households
Char Vadrashan Upazila HQ	10	10*5=50
Total	**10**	**50**

3. **Rural:**
A. Faridpur Sadar- Upazilla unions: Borehole water source

Name of Unions	Required number of cluster per union	Number of households
Aliabad	8	8*3=24
Ambikapur	8	8*3=24
Decreer Char	8	8*3=24
Greda Union	8	8*3=24
Ishan Union	8	8*3=24
Kaijuri	8	8*3=24
Kanaipur	8	8*3=24
Krishna Nagar	8	8*3=24
Uttar Channel	8	8*3=24
Total	**72**	**216**

B.Char Bhadrasan Upazilla unions: Borehole water source

Name of Unions	Required number of cluster per union	Number of households
Char Bhadrasan	4	4*3=12
Gazirtek	4	4*3=12
Total	**8**	**24**

Procedure for selection of Tertiary Sampling Unit (TSU)

We identified and listed the source pumps (municipal/community level submersible pumps) in each selected SSU. We selected one source pumps randomly in each selected SSU as the landmark. We defined the tertiary sampling unit as the area within 1-kilometre radial distance taking the landmark as the centre.

Community survey for identification of eligible clusters within each TSU

Starting from the landmark, data collectors surveyed the TSU. Using the community survey form, they visited each household within the TSU to identify and list the community and household level drinking water sources. (Community Survey form)

5. Form for Initial Community (TSU) Survey

TO IDENTIFY ELIGIBLE CLUSTERS WITH IMPROVED DRINKING WATER SOURCES AND ENROLMENT OF CLUSTERS

Name of the interviewer:..... ID of the Interviewer:.....
Date:..... District:..... Upazila/Thana:.....
Union/City Ward/Paurashava:.....
Landmark Identification:.....
GPS of the landmark:.....

TO BE COMPLETED BY SURVEYOR								TO BE COMPLETED BY FIELD COORDINATOR	
Sl number	Name of owner of source	Cell number of owner of the water source	Distance of the water source in Foot from landmark	Direction from Landmark	Type of water source*:	Number of households (HH) share the water source	Type of facility**	Remarks: 1=Eligible water source 2=Ineligible 3=Unknown	Mark and number the eligible household

*1. **Type of water source**: (Cross Check with photographs and FC/DPHE if confused)*
Municipal Piped/Tap water (with Overhead Reservoir Tank) =1
Municipal Piped/Tap water (without Overhead Reservoir Tank)=2
Municipal Piped/Tap water with Shared Water Point= 3
Municipal Piped/Tap water from Stand pipe fitted with tap=4
Municipal Piped/Tap water from Stand pipe fitted with soft pipe=5
Municipal Piped/Tap water from Stand pipe fitted without tap=6
Municipal/DPHE/NGO Deep tube well with mechanized pump/Submersible pump=7
Municipal/DPHE/NGO/Community Deep tube well without mechanized pump/Submersible pump=8
Independent Submersible pump or Deep tube well with mechanized pump/Submersible pump connect to piped network=9
Independent Submersible pump or Deep tube well with mechanized pump/Submersible pump not connect to piped network=10
Source pump connected with a Tap=11
Municipal Stand pipe with tap=12
Municipal Stand Pipe without Tap=13
Municipal Stand pipe fitted with soft pipe=14
Independent Bore Hole/Tube well=15
Modified bore hole (TARA/Raised/Fitted with protected/unprotected chlorinator/ionizer/reservoir)=16
Rain water Harvesting=17
Protected Dug well=18
Canal/River/Ditch =19
Others (SPECIFY)= 20

***Type of facility:**
Individual HH=1
HH with shared water source=2
Institution (other than school)=3
Mosque/Temple etc=4
School =5
College=6
Others=7 (Please specify)

Table A: Cluster selection from Rajshahi (Rajshahi Sadar, Noahata Paurashava and Paba)

District	Upazila/Thana	Rural/Urban /Peri-urban	Clusters necessary to be enrolled per PPS	Number of Wards/Unions/Citywards available	Number of clusters per city wards/ unions/wards/paura wards
Rajshahi	Boalia	Urban	22	18	2 urban clusters per city ward from 11 city wards
Rajshahi	Matihar	Urban	6	3	2 urban clusters per city ward
Rajshahi	Rajpara	Urban	14	10	2 urban clusters per city ward from 7 city wards
Rajshahi	Shahmakhdum	Urban/City wards	4	2	2 urban clusters per city ward
Rajshahi	Paba Paurashava - Noahata	Peri-urban/ Paurashava wards	9	9	1 urban cluster per ward
Rajshahi	Paba upazila	Rural/Union	--------	8	Rural clusters per union according to PPS
Total clusters	135				
Total Households	515				
Additional source pumps in urban areas	10				
Total water samples from rajshahi	660				

Table B: Cluster selection from Faridpur (Faridpur Sadar, Paurashava and Char Vadrashan)

District	Upazila /Thana	Rural/Urban /Peri-urban	Clusters necessary to be enrolled per PPS	Number of Wards/Unions/ City wards available	Number of clusters per city wards/unions/wards/paura wards
Faridpur	Paurashava	Urban	45	9	5 urban clusters per paurashava ward from 9 available wards
Faridpur	Sadar Upazila - Unions	Rural	72	11	8 rural clusters per union from 9 unions out of 11 available unions
Faridpur	Char Vadrashan	Rural	8	4	2 urban cluster per union from 4 unions
Faridpur	Char Vadrashan Upazila HQ	Peri-urban	10	1	10 urban clusters per union HQ
Total clusters	135				
Total Households	515				
Additional source pumps in urban areas	10				
Total water samples from Faridpur	660				

Annex: 3

For Picture Below (CLUSTERS SELECTED):

- Yellow = Urban cluster
- Green underline = Peri-urban
- Rectangle selection= Rural cluster

10 - Bagha Upazila
21- Arani Union
22 - Bajubagha Union
23 - Bausa Union
55 - Gargari Union
63 - Manigram Union
79 - Pakuria Union

Bagha Paurashava
01 - Ward No – 01
02 - Ward No – 02
03 - Ward No – 03
04 - Ward No – 04
05 - Ward No – 05
06 - Ward No – 06
07 - Ward No – 07
08 - Ward No – 08
09 - Ward No – 09

Arani Paurashava
11 - Ward No – 01
12 - Ward No – 02
13 - Ward No – 03
14 - Ward No – 04
15 - Ward No – 05
16 - Ward No – 06
17 - Ward No – 07
18 - Ward No – 08
19 - Ward No – 09

12- Baghmara Upazila
20- Auch para Union
22- Bara Bihanail Union
24- Basupara Union
31- Dwippur Union
37-Goalkandi Union
44- Gobinda Para Union
50- Ganipur Union
56- Hamir Kutsha Union
63- Jhikra Union
69- Jogipara Union
72- Kachhari Kayail Para Union
75- Marfa Union
82- Nardas Union
85- Sonadnaga Union
88- Sreepur Union
94-Subhadanga Union

Bhawaniganj Paurashava
01 - Ward No – 01
02 - Ward No – 02
03 - Ward No – 03
04 - Ward No – 04
05 - Ward No – 05
06 - Ward No – 06
07 - Ward No – 07
08 - Ward No – 08
09 - Ward No – 09

Tahirpur Paurashava
11 - Ward No – 01
12 - Ward No – 02
13 - Ward No – 03
14 - Ward No – 04
15 - Ward No – 05
16 - Ward No – 06
17 - Ward No – 07
18 - Ward No – 08
19 - Ward No – 09

22- Boalia Thana
09 - City Ward No – 09
10 - City Ward No – 10 (Part)
11 - City Ward No – 11
12 - City Ward No – 12
13 - City Ward No – 13
14 - City Ward No – 14 (Part)
15 - City Ward No – 15
16 - City Ward No – 16
18 - City Ward No – 18 (Part)
19 - City Ward No – 19
20 - City Ward No – 20
21 - City Ward No – 21
22 - City Ward No – 22
23 - City Ward No – 23
24 - City Ward No – 24
25 - City Ward No – 25
26 - City Ward No – 26
27 - City Ward No – 27 (Part)

25 - Charghat Upazila
31 - Bhaya Lakshmipur Union
39 - Charghat Union
47 - Yusufpur Union
71 - Nimpara Union
87 - Salua Union
94 - Sardah Union

Charghat Paurashava
01 - Ward No – 01
02 - Ward No – 02
03 - Ward No – 03
04 - Ward No – 04
05 - Ward No – 05
06 - Ward No – 06
07 - Ward No – 07
08 - Ward No – 08
09 - Ward No – 09

31 - Durgapur Upazila
11 - Deluabari Union
23- Dharmapur (Pananagar) Union
35 - Jhaluka Union
47 - Joynagar Union
59 – Kismat Gankair Union
71 - Marfa Union
83 - Noapara Union

Durgapur Paurashava
01 - Ward No – 01
02 - Ward No – 02
03 - Ward No – 03
04 - Ward No – 04
05 - Ward No – 05
06 - Ward No – 06
07 - Ward No – 07
08 - Ward No – 08
09 - Ward No – 09

40- Matihar Thana
28 - City Ward No – 28
29 - City Ward No – 29
30 - City Ward No – 30

53-Mohanpur Upazila
13 - Bakshimail Union
27 - Dhurail Union
40 - Ghasigram Union
54 - Jahanabad Union
67 - Maugachhi Union
81 - Rayghati Union

Kesharhat Paurashava
01 - Ward No – 01
02 - Ward No – 02
03 - Ward No – 03
04 - Ward No – 04
05 - Ward No – 05
06 - Ward No – 06
07 - Ward No – 07
08 - Ward No – 08
09 - Ward No – 09

72 - Paba Upazila
27 - Baragachhi Union
35 - Damkur Union
43– Darshan Para Union
51 - Haragram Union
54- Harian Union
61- Haripur Union
65 - Hujuri Para Union
87 - Parila Union

Katakhali Paurashava
01 - Ward No – 01
02 - Ward No – 02
03 - Ward No – 03
04 - Ward No – 04
05 - Ward No – 05
06 - Ward No – 06
07 - Ward No – 07
08 - Ward No – 08
09 - Ward No – 09

Noahata Paurashava
11 - Ward No – 01
12 - Ward No – 02
13 - Ward No – 03
14 - Ward No – 04
15 - Ward No – 05
16 - Ward No – 06
17 - Ward No – 07
18 - Ward No – 08
19 - Ward No – 09

82- Puthia Upazila
13 - Baneshwar Union
27 - Belpukuria Union
40 - Bhalukgachhi Union
54 - Jeopara Union
67 - Puthia Union
81 - Silmaria Union

Puthia Paurashava
01 - Ward No – 01
02 - Ward No – 02
03 - Ward No – 03
04 - Ward No – 04
05 - Ward No – 05
06 - Ward No – 06
07 - Ward No – 07
08 - Ward No – 08
09 - Ward No – 09

85-Rajpara Thana
01 -CityWard No – 01
02 - CityWard No – 02
03 - CityWard No – 03
04 - CityWard No – 04
05 - CityWard No – 05
06 - CityWard No – 06
07 - CityWard No – 07
08 - CityWard No – 08
10 - CityWard No – 10 (Part)
14 - CityWard No – 14 (Part)

90- Shahmukhdun Thana
17 - City Ward No – 17
18 - City Ward No – 18 (Part)

94- Tanore Upazila
27 - Badhair Union
40-Chanduria Union
54 - Kalma Union
57 - Kamargaon Union
70 - Pachandar Union
77 - Saranjai Union
81 - Talanda Union

Tanore Paurashava
01 - Ward No – 01
02 - Ward No – 02
03 - Ward No – 03
04 - Ward No – 04
05 - Ward No – 05
06 - Ward No – 06
07 - Ward No – 07
08 - Ward No – 08
09 - Ward No – 09

Mundumala Paurashava
11 - Ward No – 01
12 - Ward No – 02
13 - Ward No – 03
14 - Ward No – 04
15 - Ward No – 05
16 - Ward No – 06
17 - Ward No – 07
18 - Ward No – 08
19 - Ward No – 09

34 - Godagari Upazila
22 - Basudebpur Union
25 - Char Ashariadaha Union
28 - Deopara Union
38 - Godagari Union
47 - Gogram Union
57 - Matikata Union
66 - Mohanpur Union
76 - Pakri Union
85 - Rishikul Union

Godagari Paurashava
01 - Ward No – 01
02 - Ward No – 02
03 - Ward No – 03
04 - Ward No – 04
05 - Ward No – 05
06 - Ward No – 06
07 - Ward No – 07
08 - Ward No – 08
09 - Ward No – 09

Kakanhat Paurashava
11 - Ward No – 01
12 - Ward No – 02
13 - Ward No – 03
14 - Ward No – 04
15 - Ward No – 05
16 - Ward No – 06
17 - Ward No – 07
18 - Ward No – 08
19 - Ward No – 09

29 – Faridpur Zila
Upazila and Union/Ward with Geo-code 2011

03-Alfadanga Upazila
- 10-Alfadanga Union
- 21-Bana Union
- 31-Buraich Union
- 42-Gopalpur Union
- 52-Panchuria Union
- 84-Tagarbanda Union

10-Bhanga Upazila
- 13-Algi Union
- 15-Azimnagar Union
- 25-Chumurdi Union
- 31-Chandra Union
- 39-Gharua Union
- 47-Hamirdi Union
- 55-Kalamridha Union
- 63-Kaolibera Union
- 71-Manikdaha Union
- 79-Nasirabad Union
- 87-Nurullaganj Union
- 94-Tuzarpur Union

Bhanga Paurashava
- 01-Ward No. 01
- 02-Ward No. 02
- 03-Ward No. 03
- 04-Ward No. 04
- 05-Ward No. 05
- 06-Ward No. 06
- 07-Ward No. 07
- 08-Ward No. 08
- 09-Ward No. 09

18-Boalmari Upazila
- 15-Boalmari Union
- 20-Chandpur Union
- 25-Chatul Union
- 30-Dadpur Union
- 35-Ghoshpur Union
- 40-Gunbaha Union
- 60-Moyna Union
- 75-Parameshwardi Union
- 85-Rupapat Union
- 90-Satair Union
- 95-Shekhar Union

Boalmari Paurashava
- 01-Ward No. 01
- 02-Ward No. 02
- 03-Ward No. 03
- 04-Ward No. 04
- 05-Ward No. 05
- 06-Ward No. 06
- 07-Ward No. 07
- 08-Ward No. 08
- 09-Ward No. 09

21-Char Bhadrasan Upazila
- 19-Char Bhadrasan Union
- 38-Char Harirampur Union
- 57-Char Jhaukanda Union
- 76-Gazirtek Union

47-Faridpur Sadar Upazila
- 13-Aliabad Union
- 15-Ambikapur Union
- 23-Char Madhabdia Union
- 31-Decreer Char Union
- 39-Greda Union
- 47-Ishan Gopalpur Union
- 55-Kaijuri Union
- 63-Kanaipur Union
- 71-Krishnanagar Union
- 79-Majh Char Union
- 87-Uttar Channel Union

Faridpur Paurashava
- 01-Ward No. 01
- 02-Ward No. 02
- 03-Ward No. 03
- 04-Ward No. 04
- 05-Ward No. 05
- 06-Ward No. 06
- 07-Ward No. 07
- 08-Ward No. 08
- 09-Ward No. 09

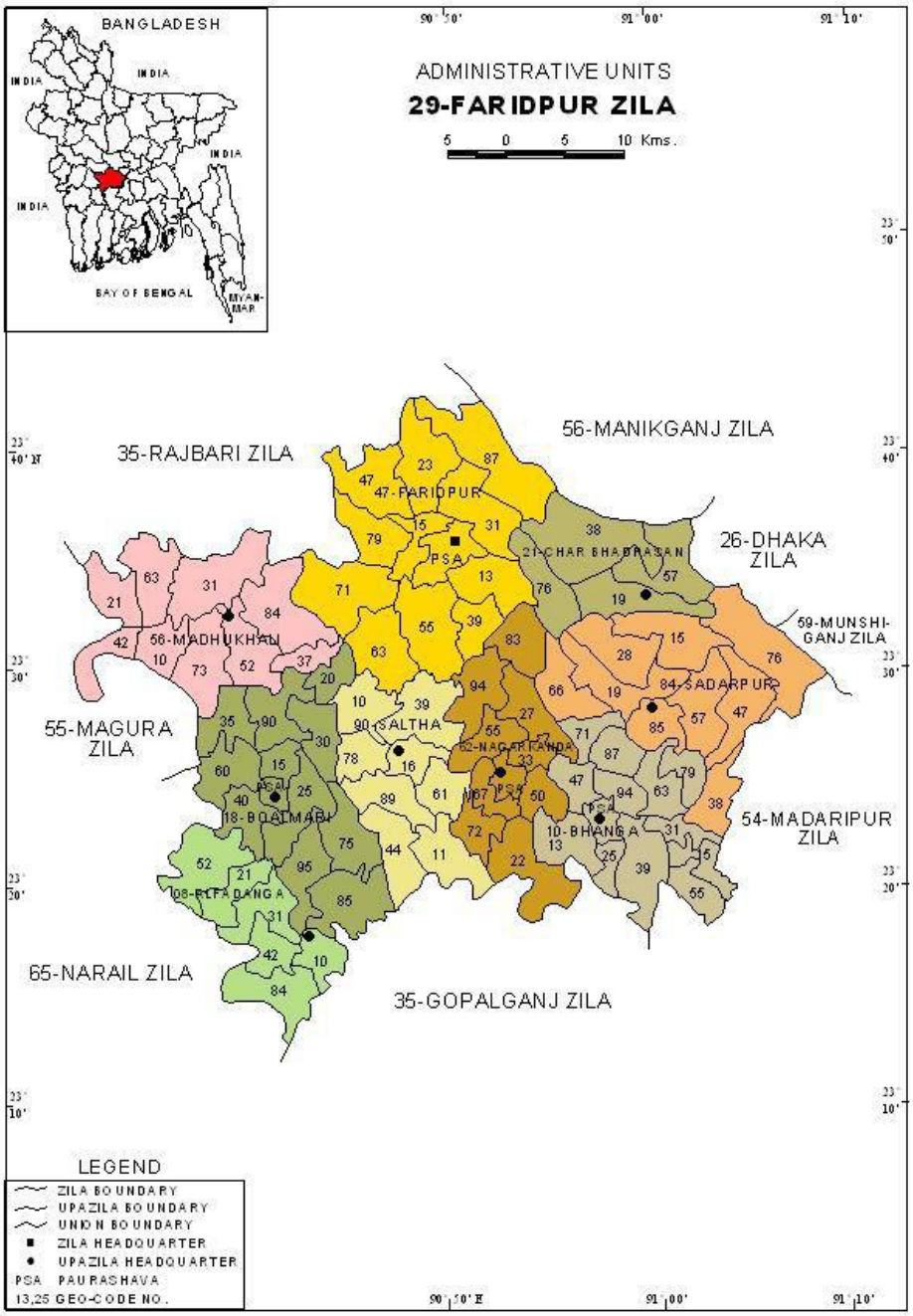
56-Madhukhali Upazila
- 10-Bagat Union
- 21-Dumain Union
- 31-Gajna Union
- 37-Jahapur Union
- 42-Kamarkhali Union
- 52-Madhukhali Union
- 63-Megchami Union
- 73-Noapara Union
- 84-Raipur Union

62-Nagarkanda Upazila
- 22-Char Jasordi Union
- 27-Dangi Union
- 33-Fulsuti Union
- 50-Kaichail Union
- 55-Laskardia Union
- 67-Kodalia Shaheed Nagar Union
- 72-Pura Para Union
- 83-Ramnagar Union
- 94-Talma Union

Nagarkanda Paurashava
- 01-Ward No. 01
- 02-Ward No. 02
- 03-Ward No. 03
- 04-Ward No. 04
- 05-Ward No. 05
- 06-Ward No. 06
- 07-Ward No. 07
- 08-Ward No. 08
- 09-Ward No. 09

90-Saltha Upazila
- 10-Atghar Union
- 11-Ballabhdi Union
- 16-Bhawal Union
- 39-Gatti Union
- 44-Jadunandi Union
- 61-Majhardia Union
- 78-Ramkantapur Union
- 89-Sonapur Union

84-Sadarpur Upazila
- 15-Aktar Char Union
- 19-Bhashan Char Union
- 28-Char Bishnupur Union
- 38-Char Manair Union
- 47-Char Nasirpur Union
- 57-Dheuakhali Union
- 66-Krishnapur Union
- 76-Narikelbaria Union
- 85-Sadarpur Union



Procedure for enrolment of clusters and households within each TSU:

- After Community Survey at each TSU and Water Source identification (Using photographic Aid) and listing by Surveyor, Field Coordinator identified and gave random numbers to all eligible clusters with improved water sources within the TSU
- Then, the necessary number of clusters were selected by lottery method from among the eligible clusters within each Tertiary Sampling Unit
- The field team approached each selected cluster and sought Informed Consent from the owner of the improved sources and Heads of households to be enrolled
- Took GPS reading of all enrolled sources and households if owner and household heads gave consent to participate.
- If a cluster or household did not give consent, the next nearest cluster source and households were approached

6. SOP for Quantitative Data Collection

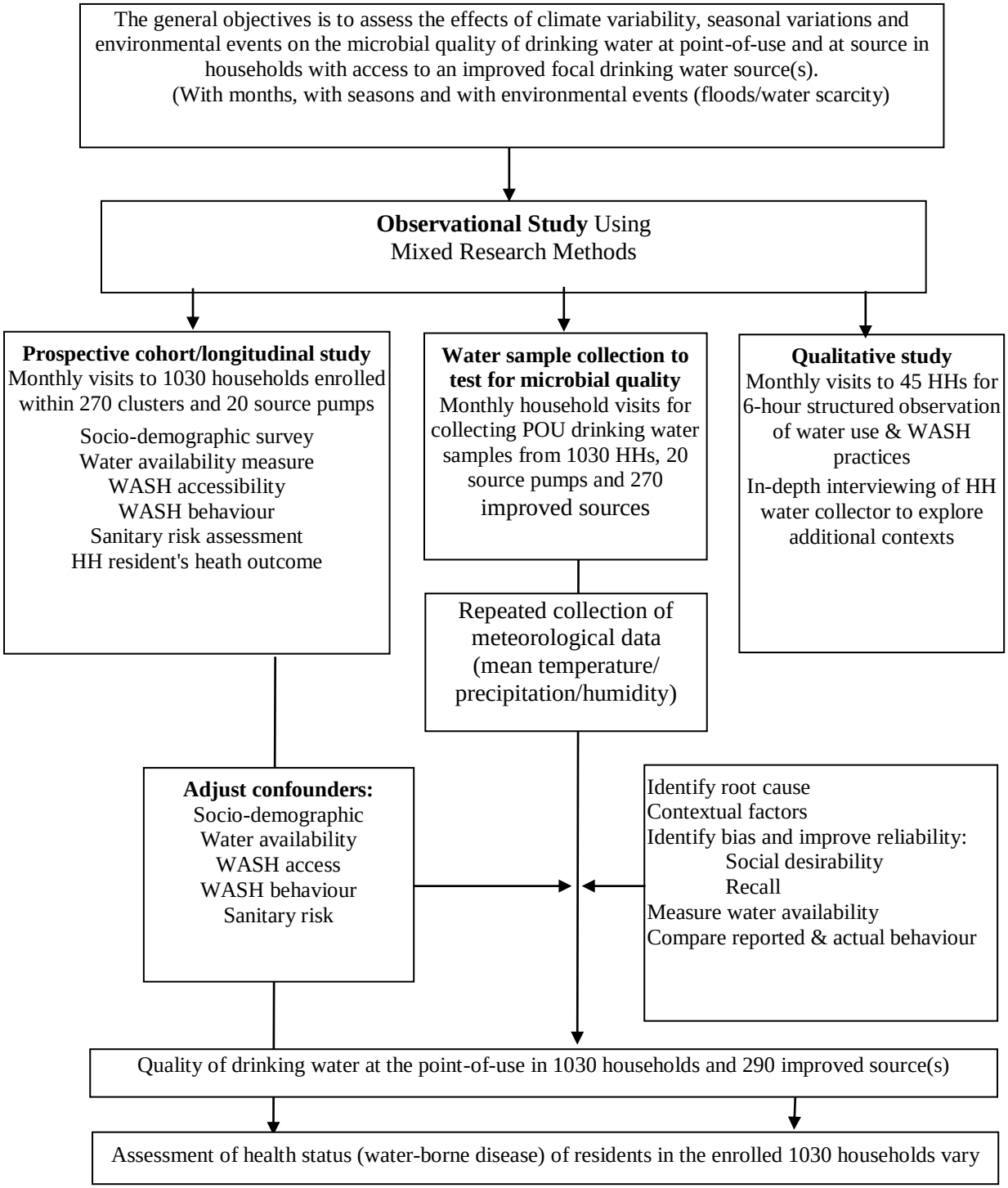
- A number of tools and techniques developed considering Bangladesh Perspective for quantitative data collection by following the general guideline and appendixes and showed in the box. It need to noted that the research will work in geographic location namely flood and drought area. Each of the geographic location will be consisted of 135 clusters (55 piped water and 80 tube well user) using PPS.
- All data will be collected on papers. The field team will undergo at least two weeks of rigorous training to become familiar with the survey instruments and to learn sterile technique for collecting water samples.
- Interviews will be conducted with the primary drinking water collector of the household and/or the female caretaker of the youngest child in the household.
- Diarrhea among children under-five (and all household members) will be assessed during each of the 18 short survey rounds according to the World Health Organization case definition of diarrhea (3 or more loose/watery stools in 24 hours).
- We will use a 7-day recall period to measure diarrheal at each month household visit. At each household, we will also determine 7-day period prevalence of diarrheal among all age groups as a secondary outcome.
- All enrolled households will be visited on a monthly basis and at each visit, trained field data collectors will use structured questionnaire (Format D-H) to collect WASH practice, health outcome, sanitation inspection, and water usage form to explore total amount of water available for drinking, cooking, washing, bathing and sanitation purposes.
- Approximately 25% of the households in low-income urban communities may be expected to relocate per year, so there is some risk of attrition in urban areas. However households that are vacated are usually soon filled with new tenants. To account for this, we will follow the disease experience of all households with children under five served by selected water points, even if it may be a different family than was present at the initial of the study.
- We will measure socioeconomic, demographic, and educational attainment of household heads and respondents at the initial research visit as well as at the end of the study to understand if there are any differential compositional changes among households present at baseline versus those that move into the study population.
- As a secondary analysis we will compare the disease experience of people who stayed in their households throughout the duration of the evaluation and so control for any impact this might have on our assessment. Since nutritional status is an important determinant of any childhood disease including diarrheal.
- At the first and last survey round, trained data collectors in anthropometric assessments will collect the child's weight, height and mid-upper arm circumference (MUAC) to calculate weight-for age at initial visit and at end line (last visit) using WHO recommended equipments (digital scales and arm bands). All measurements will be taken three times to reduce human error. Trained data collectors in anthropometric assessments will be standardized during extensive training and field practice (at least two weeks).
- We will also track mortality related to diarrhoea if any. Caretakers will be asked if they have sought treatment or advice at a health care facility for their children in the past one month, and in the past month (since the field team's previous visit). Follow up questions will be asked regarding symptoms and diagnosis to classify illnesses as gastrointestinal.

Format A: HH Socio-demographic Survey at Initial/Last visit
Format B: HH Child Anthropometry at Initial/Last visit
Format C: HH Child Vaccination Survey at Initial/Last visit
Format D: HH Water Usage Questionnaire
Format E: HH Water, Sanitation and Hygiene Behaviour Survey
Format F1: HH Diarrheal Diseases Assessment Questionnaire
Format F2: HH Additional Gastro-intestinal Syndrome Assessment Questionnaire
Format G: HH Sanitation Assessment Form
Format H: HH POU Water Sampling Form
Format I: Sanitary Inspection & Source Water Sampling
Format J: Water Sample Collection Procedure
Format K: Daily temperature, rainfall and humidity from BMD data repository
Format L: Local health data collection form

7. SOP for Qualitative Data Collection

We will purposively select one household per enrolled cluster for qualitative exploration. A total of 45 households in 45 clusters will be selected for qualitative investigations per month from the enrolled 1030 households in 270 clusters for the qualitative study to complete the total 270 household qualitative study in one round within 6 months time.

- From the preliminary field exploration, we assume that we will find different categories of households based on different sources of water in the community- e.g municipal water supply (WASA), individual submersible pump, communal submersible pump, shallow tube well or hand pumps with borehole, TARA pumps and surface water (river, pond and well).
- We will categorize the study population based on different sources to cover differences in community residents' perception and practices that may attribute to differences in water sources and availability as well as health outcomes in the households.
- We will purposively select five households and clusters per category in each district.We will also conduct in-depth interviews to explore respondent's perceptions if the amount of water available could meet household demand and if water stress had led them to seek alternative sources. We will also ask specifically if availability and water stress varied with any flooding or environmental events.
- After building a good rapport with the community and study households and gaining their trust, the researchers will roam in the entire community for the first few days and conduct several small group and individual informal discussions to become acquainted with the community and gain an understanding of the existing water usage and management structure and practices.
- They will spend as much time as possible every day in the community for the first one to two weeks and visit study households to collect information through participant observation and informal conversation.
- These information will inform and shape the guidelines. The researchers will carry a small notebook all the time to jot down the field notes instantly on the spot, especially during observation and informal conversations. They will also carry a digital recorder to record informal conversations, but may not use it every time, since it might disrupt the natural flow of conversation. In each field, one of the researchers will capture interesting moments relevant for the research in their camera.
- We will deploy in-depth interviews (Appendix-5) and direct observations (Appendix-6) guidelines to collect qualitative data. We will conduct in-depth interviews at three time points during the 18 month duration of data collection from each household. In this way, we will be able to understand perception and perceived practices on individual and domestic water use as well as water stress and coping strategies at the beginning, middle and end of the study to compare across seasons. Moreover, one additional round will be made in the event of any flood.
    - During in-depth interview, we will also collect information about changes in practices across and within different seasons.
- We will also conduct observation in the households in every six months over the course of 18 months to measure the quantity of water use for each type of household and personal purposes. We will observation to understand the difference in availability of water and change in reported hygiene practices at different seasons.



A schematic flow diagram is inserted in the following to reflect the whole research

7.1 PHOTOGRAPHS FOR IDENTICATION OF IMPROVED WATER SOURCES

Borehole-Tube Well

Modified Boreholw Tube Well

Raised Tube well in flood Area

Modified Borehole Tara Pump

Boreholw with Protected Chlorinator Ionizer

Stand Pipe with Tap

Tap Water

Stand Pipe without Tap

Stand pipe fitted with Soft Pipe

Common Community Water Source

Filtered Tap Water without Piped Network

Community filtered water without piped network

Rainwater Harvesting Unit

Piped Networkm from independent submercible pump

7.2 PHOTOGRAPHS FOR IDENTICATION OF UNIMPROVED WATER SOURCE

-
-

Un-protected Dug Well

POU Water

Deep Tube Well with Unprotected reserviour

Dheki Call

Pond/ditch

8. SOP for Child Anthropometry Assessment

8.1 PURPOSE

This document is intended to serve as a guide and training manual for climate change field staff who will be measuring maternal and child anthropometric data, including length/height, weight mid-upper arm circumference (MUAC) and head circumference measurements. As to be detailed below, measurements will be recorded on the study index children and their mothers at selected time points. Therefore, anthropometry is a critical measurement for the project.

Anthropometry Overview

8.2 DEFINITION

ANTHROPOMETRY is the science that defines physical measures of a person's size, form, and functional capacities. The field of anthropometry encompasses a variety of human body measurements. Several indexes and ratios can be derived from anthropometric measurements that are used to predict health, survival, and physical performance of individuals and populations. Anthropometry is a key component of nutrition status assessment in children and adults. Anthropometric measurements also provide an indication of child growth and development. Anthropometric data for infants and children reflect general health status and dietary adequacy and are used to track trends in growth and development over time.[1]

8.3 MEASUREMENTS

For our project, we will be measuring four primary indicators: length/height, weight, mid-upper arm circumference (MUAC), and head circumference. The specific measurements vary somewhat by age of the target individual and are listed below in Table 1.

Table 1. Body measurements by age category

Birth to 2 yr	**> 2 yr**	**Mothers**
-Weight -Recumbent length -Head circumference -MUAC	-Weight -Standing height -Head circumference -MUAC	- Weight - Standing height - MUAC

Collection of anthropometry data requires two or more active trained data collectors: the examiner and the recorder. Typically, the examiner will position the participant and take all measurements and the recorder will assist and write or enter these values. Some measurements (ex: child recumbent length) require two staff trained in anthropometry to collect the measurement – one to position the child's head and the other to keep the body straight, and focus on the feet where the measurement is captured.

Another important duty of the recorder is to help the examiner position the participants during their examination. In this role the recorder also alerts the examiner if the respondent needs to be repositioned. Also, the recorder participates in taking recumbent length measurements on infants and young children. Lastly, the recorder marks body sites that are measured by the examiner and hands equipment and supplies to the examiner when needed.

[1] Cogill B., Anthropometric Indicators Measurement Guide. Food and Nutrition Technical Assistance (FANTA) Project, USAID. March 2003. Available online: http://www.fantaproject.org/sites/default/files/resources/anthropometry-2003-ENG.pdf

8.4 MEASUREMENT TIMELINE

The anthropometric measurements will be collected at two time-points during the study: At each of these visits, the weight, length/height, MUAC and head circumference of the index child will be recorded.

8.5 EQUIPMENT AND SUPPLIES

EQUIPMENT

MEASURING TAPE

Purpose: For measurement of MUAC and head circumference
Model: Shorr Tape measuring tape 65 cm
Description: Accurate, high quality, durable, flexible, non-stretch, non-tear, weather-resistant, synthetic tape. Measuring range: Metric Units: 6 - 65 cm x 1 mm White tape with black numerals.
Special care instructions: Store tapes in a protective case. Old film canisters or small plastic bottles work well. Inspect tapes regularly for cracks, kinks, or worn/faded ink. Damaged tapes should be discarded.

DIGITAL STANDING SCALE

Purpose: For measurement of maternal weight and index child weight
Model: SECA 874; Digital Floor Scale with Mother/Child Function
***Description*:** This lightweight digital floor scale is extremely versatile since it weighs infants, children and adults. With its special Mother/Child Tare Feature, a mother/adult steps on the scale and she can be weighed (or not), then after pressing a button, the display goes to zero, the mother takes the child in her arms and only the weight of the child appears in the display panel. The side-by-side, opposite facing dual display makes it easy reading for the professional and the subject.

Capacity: 200 kg
Graduation: 0 - 150 kg : 50 g
150 - 200 kg : 100 g
Power: 6 AA batteries included
Display: LCD
Weight: 8 lb / 3.6 kg
Features: Tip-on Automatic switch-on, Automatic switch-off, Auto-HOLD, mother/child tare, lbs/kg switch-over

Special care instructions:

Handle the scale carefully:

- Store and transport scale in carrying case.
- Do not drop or bump the scale.
- Do not weigh loads with a total weight of more than 150 kg.
- Do not store the scale in direct sunlight or other hot places.
- Protect the scale against excess humidity or wetness.
- Do not use the scale at temperatures below 0 degrees C or above 45 degrees C.

Cleaning the scale: To clean the scale, wipe surfaces with a damp cloth. Never put the scale into water.

HEIGHT/LENGTH BOARD (STADIOMETERS)

Purpose: For measurement of infant length, young child height, or maternal height
Model: ShorrBoard® Infant/Child/Adult Portable Height-Length Measuring Board
Description: Made of high quality hardwoods with a weather-resistant finish. The versatile Infant/Child/Adult ShorrBoard (0-200 cm X 0.1 cm) is convertible since the same board is used to measure the recumbent length of infants less than 2 years of age laying down and the standing height of children 2 years of age, older children and adults. This is a three-piece measuring board that collapses and is secured to a compact unit of 75 cm (29.5 in) where the three panels are held together with self-contained spring-loaded hand-turned bolts.

They are portable, lightweight (6.7 kg), extremely strong and durable, accurate, easy to assemble and use, and have an adjustable, removable two-inch wide, very strong braided nylon shoulder strap for easy carrying.

The **Auto-Lock** ShorrBoards have a moveable head/footpiece that slides smoothly up and down the measuring board and instantly locks automatically in position where it is placed on the board above the subject's head for standing height (there are no knobs to turn) or at the child's feet when taking recumbent length measurements, leaving the user's hands free to position the subject.

Special care instructions: Store and transport stadiometer in the carrying case. Clean with water and mild detergent. Do not immerse length board in water. Be sure the stadiometer is placed on a stable, level surface to avoid tipping over and cracking the wood. Inspect the stadiometer between each use. If wood is cracked or broken, if measuring tape is worn or illegible, or if the head/footpiece becomes unstable discontinue use and request repair or replacement.

CALIBRATION WEIGHTS AND MEASURES

Purpose: To ensure that the scales and stadiometers are functioning properly and providing accurate and reliable data.
Model: . Avery 2013-5 kg calibration weight (Locally Purchased)
Description: Standard weights are to be used **daily** to check the calibration of scales. The weights are stored together with the equipment.
A standard length metal pole should be used to calibrate the stadiometers **weekly.**

SUPPLIES

- **Pencils**: The recorder will use water based markers to make markings that are clearly visible on the subjects' skin
- **Alkaline AA batteries** (spares): The digital scales are battery powered. Each team should carry spare batteries with them to the field daily.
- **Bleach disinfectant spray**: Bleach is provided for cleaning the surfaces of instruments that require disinfection in case of a significant soiling.
- **Lubrication oil**: Is used to lubricate the aluminium track of the height board when sliding the head/foot piece becomes difficult
- **Screw drivers**: Used to open the digital measuring devices when changing the batteries, the screws are stored in the cabinet drawers.

8.6 EQUIPMENT MALFUNCTIONS

-All equipment or repair needs must be reported to the technologists or logistics manager immediately.
-All equipment issues should be documented in the unusual occurrences field log
- Under no circumstances should scales be opened by field staff if they malfunction

8.7 REGULAR QUALITY CONTROL PROCEDURES

Before leaving the office each morning, the field teams should do a series of inventory and equipment checks using the anthropometry equipment checklist (checklists are specific to the teams that do anthro measurement).
For each piece of anthropometric equipment, the following checks should be made daily:

DIGITAL SCALES

- Remove the cover from the scale
- Check that all four feet of the scale base lie on the metal platform adjust if needed
- Check that batteries are operational and that spare batteries are enclosed in carrying case.
- Calibrate the scale daily using the calibration weights in 5 kg, 10 kg, and 15 kg increments. Record data on the Seca Scale calibration log that is unique to each scale.
- Return cover on the scale

STADIOMETER

- Check that the adjustment knobs are secure and firm.
- Check that the stadiometer is in good condition. If wood is cracked or broken, if measuring tape is worn or illegible, or if the head/footpiece becomes unstable discontinue use and request repair or replacement.

MUAC TAPES

Have the correct type of measuring tapes and ruler.
If the measuring tape is stretched, cracked, or damaged in any way it should be replaced.

OTHER SUPPLIES

Ensure that supplies are packed the anthropometric bag using the anthropometry equipment checklist provided for each team.

8.8 FIELD ACTIVITIES

PRE EXAMINATION PROCEDURES

These are a few preparatory procedures and decisions that the anthropometrists should address prior to obtaining measurements to make the experience easier:

- If possible, prepare the room or designated measurement site in the community for the examination before the participant enters the room/measurement site.
- Confirm that all supplies needed for the exercise are available and accessible: marker pens for marking mid-upper arm, measuring tape for mid-upper arm circumference (MUAC), head circumference tape, length board, weight trays, scales, data collection sheets and absorbent pads/baby wipes, etc.
- There will usually be several choices on where to place the measuring board or scale, but the choice should be made carefully. Be sure that you have a sturdy, flat surface for measuring boards, a flat place to set the scales and adequate light so the measurements can be read accurately. When the stadiometer is used in the upright position (for adults or children >2 y), be sure that it is set-up against a wall, post, or tree to prevent it from accidently tipping over and falling.

- When the participant enters the room, introduce yourself and your assistant (recorder)
- The recorder will open the anthropometry component in the electronic data entry system, or will have the appropriate form available
- The measurer should provide a brief introduction to the exercise such as: What measurements are going to be conducted e.g. weight and height etc., what is expected of the participant before taking the measurements e.g. minimising the clothing on subject's body, to ensure that the procedures are as comfortable as possible.

REMINDERS FOR MEASURING AND RECORDING

ETHICALLY HANDLING ANTHROPOMETRIC DATA IN SURVEYS

Informed consent from the primary caregiver is necessary. Confidentiality of the information collected must be assured and maintained. Sharing results and referral in situations where measurements indicate severe acute malnutrition of the child is also protocol.

REQUIRED TRAINING

All interviewers' anthropometrists will go through a rigorous training, which includes a standardization activity before each new data collection

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ONE CHILD AT A TIME

You should complete the questions and measurements for one child at a time. This avoids potential problems with mix-ups that might occur if you have several children to measure. Always start with the target child.

CONTROL THE CHILD

When you are taking weight and length/height measurements, the child needs to be as calm as possible. A child who is excited or scared can make it difficult to get an accurate measurement. Work with the mother to get her to try to soothe an upset child.

SETTING UP SCALE AT THE EXAMINATION SITE

The scale should be placed on a hard-floor surface. It should not be placed on a floor which is carpeted or otherwise covered with soft material. If there is no such floor available, a hard wooden platform should be placed under the scale. A carpenter's level should be used to verify that the surface on which the scale is placed is horizontal.

STANDING WEIGHTS

Job aid: Checklist for weighing mothers and infants

Weighing the Mother

1. Prepare mother for weighing:

- Mothers should be asked to remove any heavy outer clothing, sweater, etc.
- Mothers should also be asked to remove shoes before they step on the scale.
- If mother has any hair ornaments these should also be removed

2. Prepare the scale:

- Ensure that the scale is still on level ground.
- Check that the scale is reading "zero" before the mother steps on the scale.

3. Weigh the mother:

- Assess the mother's clothing and record on the form.
- Ask the mother to step on the scale and hold still.

- The anthropometrist reads the weight out loud, exactly as shown on the electronic scale.
- The assistant repeats the weight out loud and records weight on the form.
- Ask the mother to step off the scale.

4. **Repeat** the measurement process two more times; be sure the scale reads "zero" each time before the mother steps back on the scale.

WEIGHING THE INFANT IN MOTHER'S ARMS

The 2 in 1 function of the Seca 874 scale enables the body weight of babies and small children to be measured. The child is held in the adult's arms

1. Prepare infant and mother for weighing:

- Infants should be weighed naked.
- The mother should be weighed in the same clothing as used to measure her weight alone.
- Infants should be kept warm by holding them wrapped in a blanket or cloth until they are measured.
- After 18 months, infants can be weighed in light weight underpants if the mother prefers.
- Never weigh an infant of any age with a wet or full diaper.
- If length will be measured after weight (suggested), undo braids and remove hair ornaments before weighing, to avoid delays while the child is naked/ undressed.

2. Prepare the scale:

- Ensure that the scale is still on level ground.
- Check that the scale is reading "zero" before the mother steps on the scale.

3. Weigh the infant and mother:

- Assess the infant's clothing and record on the form.
- Ask the mother to step on the scale without the child (if she has not been measured previously) and hold still.
- The anthropometrist reads the weight out loud, exactly as shown on the electronic scale.
- The assistant repeats the weight out loud and records weight on the form.
- The measurer can press the 2 in 1 key to activate the function. The scale will store the weight of the mother and display "zero" and "NET" below
- The child can now be given to the mother while she is still standing on the scale and record the weight on display.
- If the mothers elects to get off the scale to pick the child, the display will show "-----" She should step on the scale again with child in had to record the weight of the child
- The scale will display the weight of the child. The display will show HOLD and NET in addition to weight
- Ask the mother to step off the scale.

4. **Repeat** the measurement process 2 more times; be sure the scale reads "zero" each time before the mother steps back on the scale.

NB: If several children are to be weight consecutively, it is important that it is always the same adult who performs the measurement and that this person's weight does not change (e.g. due to a piece of cloth being removed)

NOTE; only the biologic mother's weight is recorded. However, any caretaker can stand on the scale and hold the baby for the baby's weight measurement.

FIGURE 1: TAKING CHILD WEIGHT USING MOTHER/CHILD SCALE

Source: *How to Weigh and Measure Children: Assessing the Nutritional Status of Young Children, United Nations*

TAKING MID-UPPER ARM CIRCUMFERENCE

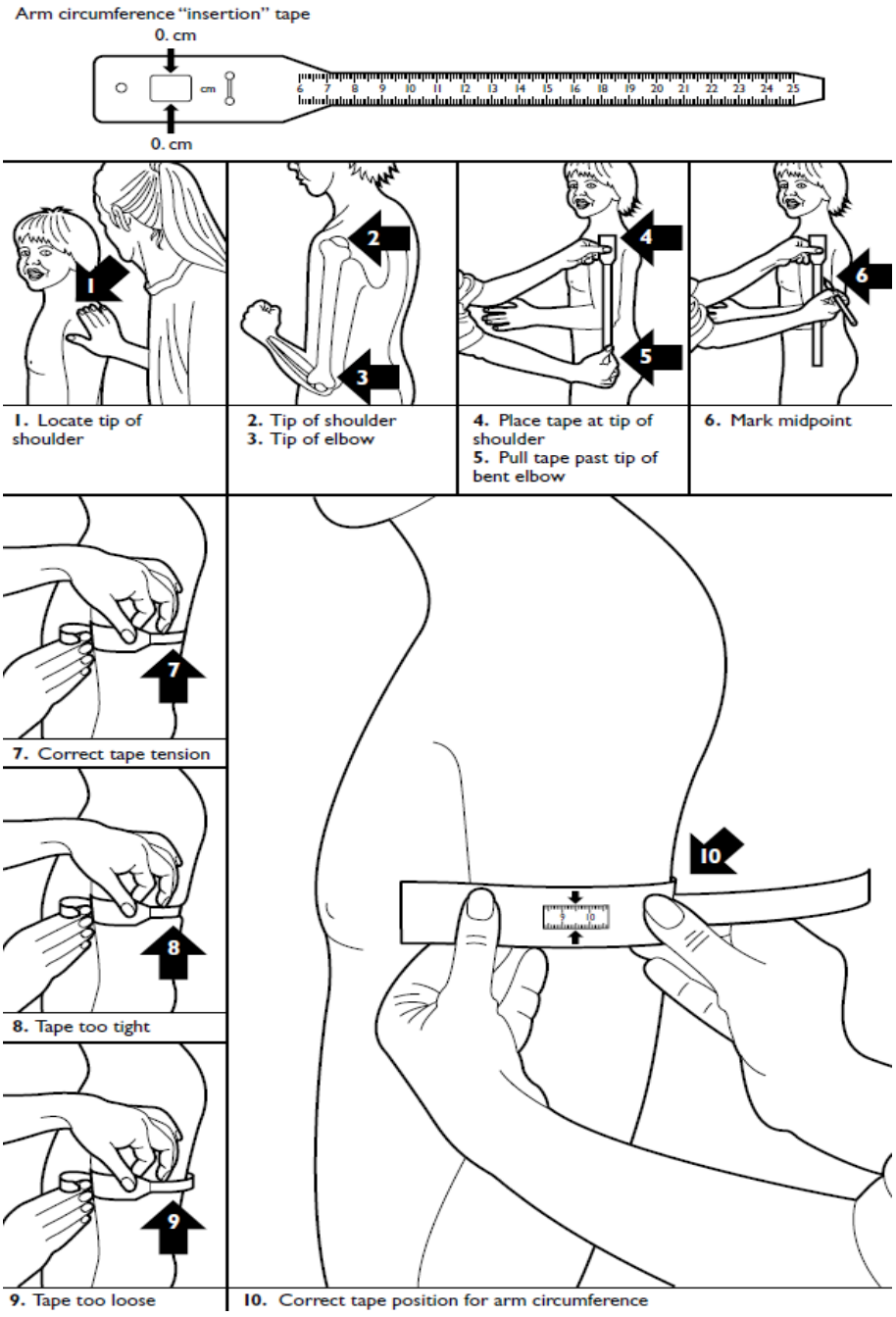
Job aid: Checklist for MUAC of mothers or children

1. Preparing subject for measuring Mid Upper Arm Circumference:

- Keep your work at eye level. Sit down when possible. Very young children can be held by their mother during this procedure.
- Ask the mother to remove clothing that may cover the child's left arm.

2. Measuring the child:

- Calculate the midpoint of the child's left upper arm which is between the tip of the child's shoulder and the elbow and mark the midpoint with a pen on the arm s point. Ensure that the arm is bent at right angle with palm facing up when identifying the midpoint.
- Mark the midpoint with a pen/marker
- Straighten the child's arm and wrap the tape around the arm at the midpoint.
- Make sure the numbers are right side up and that the tape is flat around the skin.
- Inspect the tension of the tape on the child's arm. Make sure the tape has the proper tension so that it's neither too tight nor too loose. Ask the assistant to verify on the side that is away from the measurer.
- When the tape is in the correct position on the arm with the correct tension, record the measurement to the nearest 0.1 cm.
- Remove the tape from the child's arm.



3. Repeat the measurement process a total of three times

FIGURE 2: TAKING CHILD'S MID-UPPER ARM CIRCUMFERENCE (MUAC)

Source: *How to Weigh and Measure Children: Assessing the Nutritional Status of Young Children, United Nations*

Job aid: Checklist for length of infants/children

1. Prepare the infant for measuring length:

- Undo braids and remove hair ornaments.
- Infants should be measured without shoes or socks.
- Remove clothing except for underwear or other very light clothing. If possible, infants should be measured right after they are weighed, and without clothing.
- Remove any diaper; diapers can interfere with straightening the legs.
- Infants should be kept warm by holding wrapped in a blanket or cloth until they are placed on the length board.

2. Prepare the length board:

- Place the measuring board on a hard flat surface, i.e., ground, floor, or steady table.
- Place a clean soft cloth on the board.
- Place data collection form nearby within easy reach

3. Measure the child:

- It is important to work quickly but calmly, so that the child remains as calm as possible.
- The mother or the assistant can place the infant on the board, with his/her head against the headboard. Then ask the mother to move aside.
- ***The assistant:***
  - Moves into position above the infant's head, at the "top" (head end) of the length board.
  - Positions of head. Position the head so that the infant's eyes are looking straight up. The crown of the head is touching the head board, with hair compressed. The imaginary vertical line from the ear canal to the lower boarder of the eye socket is perpendicular to the board. (Position 4 in the figure below)
  - Holds the infant's head in position with both hands. Hands are over the ears. With some infants it may be possible for the assistant to stabilize the shoulders with thumbs.
- ***The anthropometrist:***
  - Checks that the assistant is holding the head in the correct position before working with legs/feet.
  - Stands to one side of the board, on the side where he/she can read the measurement.
  - Checks that the infant is lying straight along the board (Arrow 7), with shoulders and hips on the board and at right angles to the length of the body.
  - Applies gentle but firm pressure to straighten the legs with one hand (Arrow 8)
  - Moves the footboard against the infant's feet with the other hand (Arrow 9). The soles of the infant's feet must be flat on the board and the toes pointing upwards. If the infant bends toes or arches feet, softly scratch the soles and slide the footboard when the toes/feet straighten.
- The anthropometrist reads the length to the last completed unit (last visible line on the tape). Do not attempt to round to the nearest line.
- The anthropometrist reads the length out loud.
- The assistant repeats the length out loud and records on the form.
- Either the anthropometrist or the mother can lift the infant off the board and comfort him/her.

4. **Repeat** the measurement process a total of 3 times.

If the child is very upset and active and you cannot hold both legs in position, you can take the measurement with only one leg (and foot) in good position.

NOTE; If the child has skeletal deformity, don't take this measurement. Children with physical disabilities require specialized measurements.

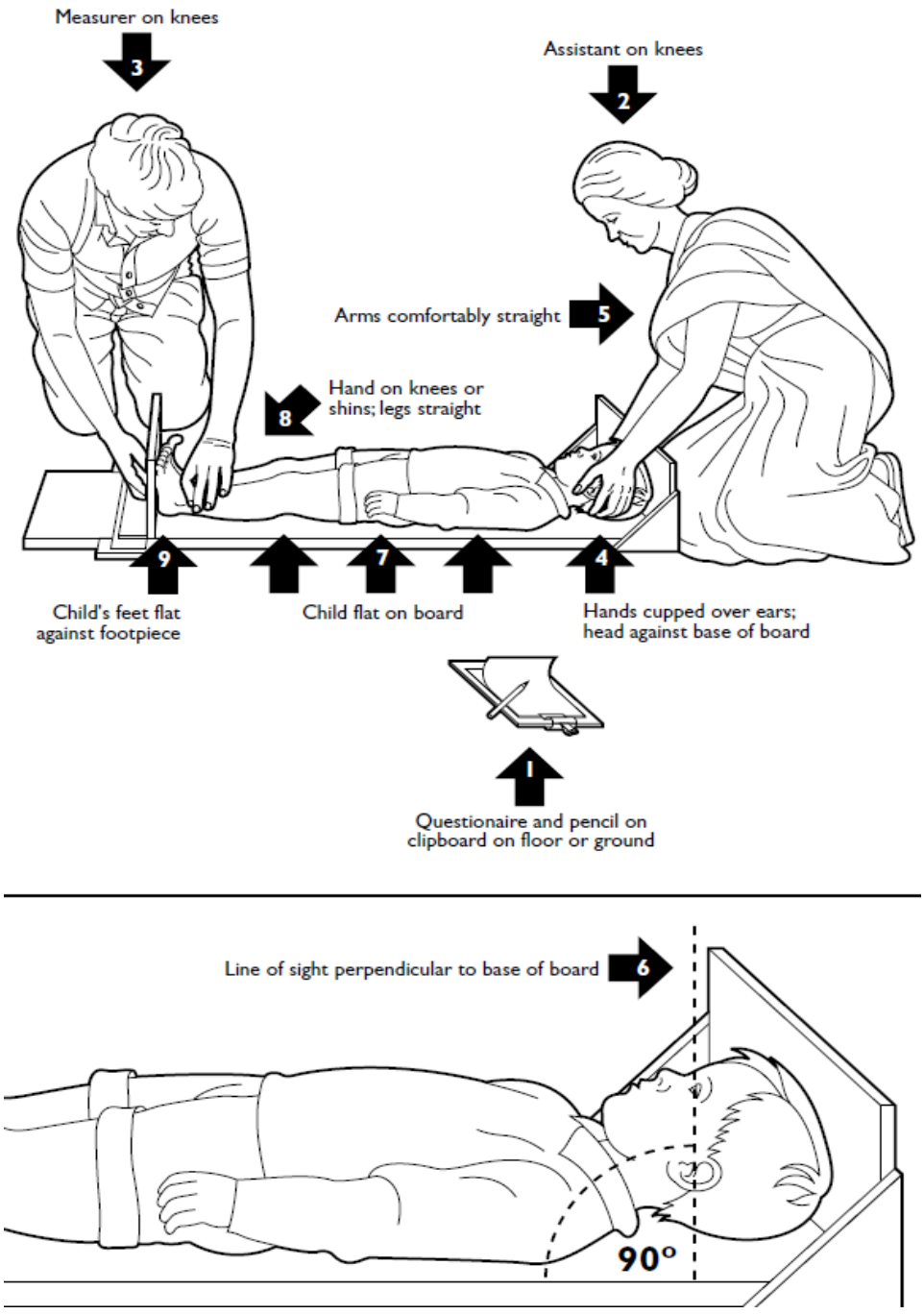


FIGURE 3: TAKING LENGTH OF CHILDREN 0-23 MONTHS OR BELOW 85 CM.

Source: *How to Weigh and Measure Children: Assessing the Nutritional Status of Young Children, United Nations*

Job aid: Checklist for height of children

NOTE: This job aid is only relevant for the final visit when children may be older than 24 months old. Children < 24 months should be measured in a reclined position.

1. Prepare the child for measuring standing height:

- Undo braids and remove hair ornaments.
- The child should be measured without shoes or socks.
- Remove any heavy clothing that may make it difficult to position child against the stadiometer.
- If children are undressed for weighing (before measuring height) be sure they are kept warm and comfortable until height is measured.

2. Prepare the stadiometer:

- Check set-up of stadiometer per set-up checklist (on flat surface near wall; use the spacer against the wall to stabilize the board).

3. Measure the child:

- It is important to work quickly but calmly, so that the child remains as calm as possible.
- The mother or the assistant can ask the child to stand against the stadiometer with feet slightly apart. Then ask the mother to move aside.
- ***The assistant:***
  - Kneels on the child's right-hand side and helps position the child so that the child's head, shoulder blades, buttocks, calves and heels are touching the stadiometer (see picture below).
  - Holds the child's knees and ankles to keep the legs straight and the feet flat.
- ***The anthropometrist:***
  - Kneels on the child's left-hand side, at face-to-face level with the child and in good position to see the measuring tape.
  - Positions the child's head so that an imaginary horizontal line from the child's ear canal to the lower edge of the eye socket runs parallel to the floor (see picture below).
  - Pushes gently on the tummy to get the child to stand to full height.
  - With left hand, holds the child's chin to hold head in position.
  - With right hand, pulls the headpiece of the stadiometer down to rest on the child's head, compressing the hair.
- The anthropometrist reads the height to the last completed unit (last visible line on the tape). Do not attempt to round to the nearest line.
- The anthropometrist reads the height out loud.
- The assistant repeats the height out loud and records on the form.
- Release the child briefly before repositioning.

4. **Repeat** the measurement process a total of three times and average the three readings.

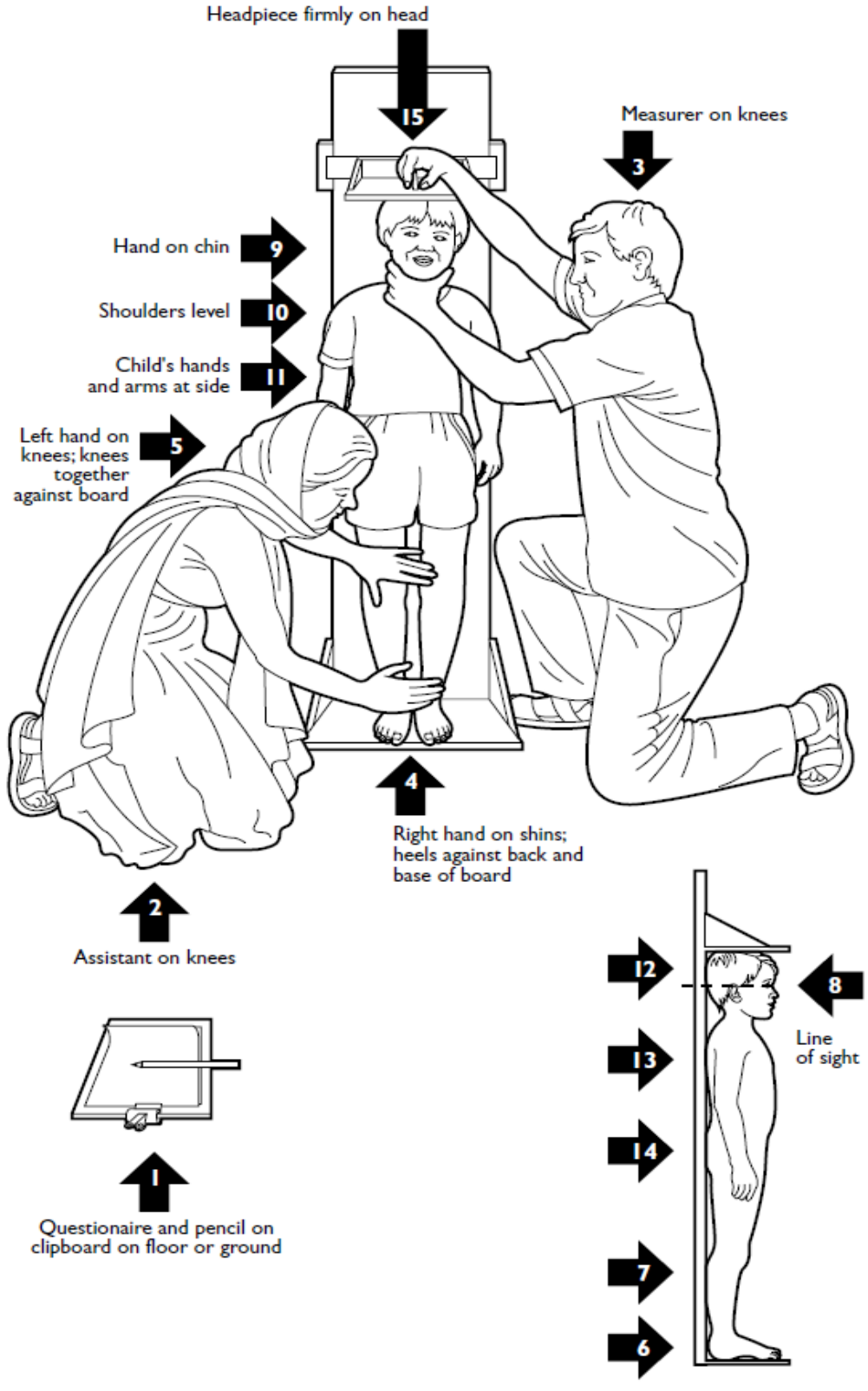


FIGURE 4: TAKING HEIGHT OF CHILDREN ABOVE 24 MONTHS

Source: *How to Weigh and Measure Children: Assessing the Nutritional Status of Young Children, United Nations*

TAKING CHILD'S HEAD CIRCUMFERENCE

Job aid: Checklist for head circumference for infants/children

1. Preparing child for measuring head circumference:

- Ask mother to remove any cloth covering on the child's head.
- Undo braids and remove hair ornaments
- Older children can stand; infants under 24 months should be held in the mother's lap

2. Measuring the child:

- Sit or kneel on the left side of the child, to keep your work at eye level
- Pass the tape around the head and anchors it just above the eyebrows and over the fullest protuberance of the skull at the back of the head.
- Position the tape correctly on the side of the head, them tighten the tape to compress the hair and skin
- Read the circumference to the last completed unit (last visible line on the tape). Do not attempt to round to the nearest line.
- Records the measurement on the form
- Remove the tape briefly before repositioning

3. Repeat the measurement process 3 times.

When measuring head circumference, the lower edge of the tape should be just above the eyebrows and ears, around the occipital prominence of the head, tight enough to compress the hair.

FIGURE 5: TAKING CHILD'S HEAD CIRCUMFERENCE

9. SOP for Water Sample Collection and Transportation

1. Collect sterile container from the Environmental Microbiology Laboratory of icddr,b.
2. Do not open/mishandle the sterile container before sample collection.

Tube well:

1. Wear gloves.
2. Clean the tube well outlet with fresh tissue paper to remove dirt/debris/rust.
3. Discard water for 1 min to remove remaining dirt/debris/rust.
4. Use a piece of clean tissue paper to dry the tube well outlet.
5. Soak a piece of tissue paper/cotton with 100% alcohol holding with big forceps.
6. Set fire on the soaked tissue paper.
7. Sterilize the tube well outlet using the flame.
8. Wait until smoke comes out of the upper open end of the tube well.
9. Discard water from the tube well for 1-2 mins.
10. Label the water collection bottle as stated in the procedure.
11. Open the container cap and collect the water into the container up to the brim. Remember not to touch the container mouth with the tube well outlet.
12. Do not touch inside of the container with hands.
13. Close the container tightly.
14. Place the container in a cool box containing sufficient number of ice packs to keep the temperature inside the container between 4-10°C.

Distribution tap/faucet:

1. Wear gloves.
2. Remove hose/strain (if any) attached to the faucet.
3. Clean the faucet with tissue paper to remove dirt/debris/rust.
4. Discard water for 1 min to remove remaining dirt/debris/rust.
5. Use a piece of clean tissue paper to dry the tap/faucet. If the tap/faucet is made with plastic then clean it with 70% alcohol, do not flame.
6. If the tap is made with metal then soak a piece of tissue paper/cotton with 100% alcohol holding with big forceps.
7. Set fire on the soaked tissue paper.
8. Sterilize the faucet using the flame.
9. Discard water from the faucet for 1-2 mins.
10. Label the water collection bottle as stated in the procedure.
11. Open the container cap and collect the water into the container up to the brim. Remember not to touch the container mouth with the tap outlet.
12. Do not touch inside of the container with hands.
13. Close the container tightly.
14. Place the container in a cool box containing sufficient number of ice packs to keep the temperature inside the container between 4-10°C.

Point of Use Water:

1. Label the water collection bottle as stated in the procedure.
2. Ask the respondent to provide water sample as if s/he is serving water to a family member.
3. Open the container cap and collect the water into the container up to the brim. Remember not to touch the container mouth with the water holding pot from where you will pour the water.
4. Do not touch inside of the container with hands.
5. Close the container tightly.
6. Place the container in a cool box containing sufficient number of ice packs to keep the temperature inside the container between 4-10°C.

9.1 FIELD BLANK/DUPLICATE SAMPLE COLLECTION

1. Each day one of the sample collector will carry a ‘field blank’ to control for field sampling conditions. The field blank will have lab water in the sterile container. The selected sample collector will just carry the blank container in their cooler box and open the cap of the blank container once in the field and then close the cap of the container tightly and then send back the blank sample together with other samples in the Environmental Microbiology Laboratory.
2. Each day the sample collector will collect a duplicate sample from one of every ten households. This sample will be collected along with the source as well as point of use water sample at the same time. The procedure should be the same, and the sample collector will write ‘duplicate’ on the label in addition to the normal household code.

9.2 REQUIRED SUPPLIES

1. pH Meter: 6 piece
2. Turbidity Meter: 6 piece
3. Gloves: 30 box (Medium size)
4. Cool Box: 4 small coolbox and 4 large size cool box
5. Ice packs: 50 piece
6. Forceps: 12 piece
7. Tissue paper-toilet tissue, facial/Kimwipe tissue: Kimwipe: 30 packets and Toilet Tissue: 60 piece
8. Cotton: 12 rolls
9. Alcohol-100%, 70%:
10. Squeeze bottles: 16 piece
11. Clear tape: 12
12. Marker pen: 12 (slim)
13. Pen: 12 piece
14. Writing pad: 12 piece
15. Data record sheet:
16. Gas lighter: 8 piece
17. Masking tape: 20
18. Hand sanitizer: 30

9.3 COMPOSITION OF FIELD IMPLEMENTATION TEAM

SL	Name	Designation
1	Dr. Sadia Afreen	Central Project Coordinator (CPC)
2	Lutfun Nahar	Field Coordinator
3	Shuchata Hasin	Field Coordinator
4	Md.Ferdous Hossain	Field Coordinator
5	Md. Akteruzzaman	Qualitative Interviewer
6	Md. Shahinur Alam	Qualitative Interviewer
7	Arzina Khatun Shimu	Qualitative Interviewer
8	AQM Abdullah Al Baker	Qualitative Interviewer
9	Mostafa Ahmed	Quantitative Interviewer
10	Md. Abdul Quddus Howlader	Quantitative Interviewer
11	Md.Shamim Mia	Quantitative Interviewer
12	Ashik Ilahi Sefat	Quantitative Interviewer
13	Md. Humayun Kabir	Quantitative Interviewer
14	S.M. Hasan Al Mahmud	Quantitative Interviewer
15	Md. Shohel Rana	Quantitative Interviewer
16	Sakib Mahmud	Quantitative Interviewer
17	Sarwar Alam Khan	Quantitative Interviewer
18	Mohammed Eusuf (Rashed)	Quantitative Interviewer
19	Md. Sazzad Hossain Khan	Quantitative Interviewer
20	Md. Altafur Rahman	Quantitative Interviewer
21	Md. Nazrul Islam	Medical Technologist
22	Md.Masud Rana	Medical Technologist
23	Md.Masudur Rahman	Medical Technologist
24	Md. Rashedul Islam	Medical Technologist
25	Md. Touhidur Rahman	Data Enterer(Qualitative)
26	Auju Ara Khan	Data Enterer(Qualitative)
27	Md.Shahadat Hossian	Data Enterer (Quantitative)
28	Arman Sarkar	Data Enterer(Quantitative)
29	Abul Bashar	Sample Transporter
30	Md.Humayun kabir	Local Sample Transporter
31	Md. Siddiqur Rahman	Local Sample Transporter

10. Roles and Responsibilities of the Field Implementation Team

10.1 FIELD COORDINATOR

- Implement the specific field activities according to the Standard Operating Procedures.
- Liaise with the Central Project Coordinator, Local stakeholders both respondents site and other government agencies.
- Supervise the field staffs and data collection procedures.
- Field data and sample management eg, data rechecking, storing and sample rechecking, packaging, transport processing and timely transferring to IEDCR or ICDDR,B
- Manage field staff and resources, monitor quality.
- Encourage staff to report frankly on fieldwork, highlighting problems and possible solutions plus lessons learned. Reward innovation in critical reflection and learning.

10.2 MONITORING TOOLS/ METHODS

- Spot Check.
- Field visit (planned and/or surprise)
- Re-Interview.
- Cross check.
- Questionnaire review.
- Frequent team meeting about (filed problems and field update).

10.3 INTERVIEWER (QUANTITATIVE)

- Preparation of field visit plan
- Collect quantitative field data
- Interviewing the HH
- Collect data from the respondent.
- In each site there will be 6 Interviewers they will visit 515 HH in every month.
- They will fill-up Form- A, Form- B, and Form- C in the 1st (initial visit) and 18th (last visit) visit.
- They will fill up Form- D, Form- E, Form- F(A), Form- F(B), Form- G in every month

10.4 INTERVIEWER (QUALITATIVE)

- Preparation of field visit plan
- Collect qualitative field data
- Interviewing and observing the HH
- In-depth interview
- 6-hours structured observation
- There are two interviewers in each field site they will have 45 in-depth interviews and 45 6hrs structured observation in each month.

10.5 MEDICAL TECHNOLOGIST

- Collect water samples from water source of 135 and 515 HH POU in every month.
- Testing different water quality physical parameters.
- Planning for timely sample collection.
- Collection of microbiological samples, storage and transferring to the IEDCR/ICDDR,B laboratory

10.6 DATA ENTERER

- Entry of quantitative data, and transcription of qualitative data

11. Data Collections Tools

1(A): INFORMED CONSENT FORM FOR ADULT RESPONDENTS (ENGLISH)

English version

Protocol Title: The effect of climate variability, seasonal variations and environmental events on drinking water quality, diarrhea prevalence and WASH practices in Bangladesh.
Principal Investigator's name: Professor Dr. Meerjady Sabrina Flora
Purpose of the research

(Assalamualaikum/Nomoshkar/Greetings)
My name is_____ and I work with the institute of Epidemiology, Disease Control and Research (IEDCR), Mohakhali, Dhaka. We are interested in conducting a research to see the effect of climate variability, seasonal variations and environmental events on drinking water quality, diarrhea prevalence and WASH practices in Bangladesh.

Background:
Climate change have a significant influence on health via different pathways, including through changes in the distribution of diseases, direct health impacts, water scarcity, and reduced access to water supply and sanitation facilities.

Why are we inviting you to participate in the study?

We have selected our study sites randomly from the unions vulnerable to climate change. Your household has been selected randomly for data collection. Because you are residing in an area where we expect climate conditions will affect your livelihood and surrounding and thus affect health. So, we would like to invite you to participate in this study.

Methods and procedures
What is expected from the participants of the research study?

The study will last for eighteen months. Following your permission we will enroll your household into the study. We will monitor your household on certain health conditions to obtain information on specific diseases, your water supply and use of hand hygiene practices in this household and collect samples from your source of water supply. If your household is selected, then we will monitor your daily activities and use of WASH facility over 8 hours. We will visit once in every month for the next eighteen months and collect information for this study.

Qualitative data: methods and course of action

If you agree to participate in our current study, we will talk to you approximately for 30-45 minutes about water use, your understanding of water stress, coping strategies, your exposure to Water, Sanitation and Hygiene (WASH) intervention and how WASH intervention change your behaviour and practices. We will take notes on your responses. We will also tape record these sessions to ensure that we do not miss any important information from this session. This tape recording will not be shared with anyone outside of our study group.

With your permission, I would also like to take photographs from your household. The audiotapes and photographs, as well as the transcriptions will be stored securely at the Institute of Epidemiology, Disease Control and Research. The photographs will be used to present our research at various conferences and scientific meetings.

Risks & Benefits

There are no major risks involved in this study. We will not interfere your daily household chores and will occupy a limited time each month for collecting data. We will not provide you any payment for taking part

in this study. We cannot and do not guarantee or promise that you will receive any direct benefit from this study. However, by participating in our study you could help us in generating information.

Privacy, anonymity and confidentiality

Confidentiality of the data and test results will be strictly maintained. All the interview data will be kept confidential even after the completion of data analysis. We will use the information only for the purpose of the study, and we will not use your name in sharing and publishing the results of this study. All data and tests results of the water samples collected will be kept confidential as allowed by the law of this country. The samples and the test results will be coded without your name or personal information, and stored separately for analysis by the researchers. None of these researchers will be able to identify you. Other persons who may have access to your test results include research groups that oversee the safety of the study including institutes such as the Institutional Review Board.

If you sign this form, you permit us to release information to authorized researchers and the safety committee. There is no expiration date to this permission. This information will be coded and it is unlikely that anyone will be able to trace it to you, protecting your privacy.

We assure that the privacy, anonymity and confidentiality of data/information identifying you, or your family, will be strictly maintained. We will keep all information and results of the laboratory tests performed on your water confidential, under lock and key. None other than the investigators of this research; possible study monitor; the Ethical Committee; and any law-enforcing agency in the event of necessity would have any access to the information. We will not use your name in sharing and publishing the results of this study.

Future use of information

The information collected from this study may be shared with other researchers if needed, but we will strictly maintain your confidentiality and privacy. In the future during the implementation of the study, the relevant research team members may wish to perform additional tests (including testing for faecal cooliforms, heavy metals etc) on the water samples on the samples that will have been already collected. No further consent will be taken from you. If you change your mind about having your water sample tested, you may contact us and the sample will be discarded immediately.

Right not to participate and withdraw

Taking part in the study is completely voluntary. The enrolled members of the households may choose not to answer any or all of the questions asked. We request to complete the study. However, you can drop yourself from the study any time, even in the middle of an interview. In that case, we will delist you and your household's water samples will be destroyed.

Principle of compensation

You need not to pay us take part in this study, and similarly we will not pay you money for attending in the study. Participation in this study is free and we will not offer any kind of compensation for your participation in this study.

Persons to contact:

If you have additional questions about the survey, or if you have questions about your rights as a participant of a research study, or if you think some harm has been done to you because of the survey, you may contact or meet her personally at following address: Dr. Farhana Haque, IEDCR, Mohakhali, Dhaka. Phone: 9898691, 9898796; Ext 219

If you have questions about being part of a research study or you think some harm has been done to you because of the study, you may contact: Dr Md Sohel Samad, IRB Co-ordinator, IEDCR. Tel: +880-2-9898796, Ext. 219.

If you agree to our proposal of enrolling your household in our study, please indicate that by putting your signature or your left thumb impression at the specified space below:

Thank you for your cooperation.

_____ _____

Signature or left thumb impression of respondent Date

_____ _____

Signature or left thumb impression of Parent/ Guardian/ Attendant Date

_____ _____

Signature or left thumb impression of the witness Date

_____ _____

Signature of the PI or his/her representative

1(B): INFORMED CONSENT FORM FOR PARENT/GUARDIAN OF MINOR CHILDREN AGED BETWEEN 0-17 YEARS

Protocol Title: The effect of climate variability, seasonal variations and environmental events on drinking water quality, diarrhea prevalence and WASH practices in Bangladesh.

Principal Investigator's name: Professor Dr. Meerjady Sabrina Flora

Purpose of the research
(Assalamualaikum/Nomoshkar/Greetings)
My name is _____ and I work with the institute of Epidemiology, Disease Control and Research (IEDCR), Mohakhali, Dhaka. We are interested in conducting a research to see the effect of climate variability, seasonal variations and environmental events on drinking water quality, diarrhea prevalence and WASH practices in Bangladesh.

Background:
Climate change have a significant influence on health via different pathways, including through changes in the distribution of diseases, direct health impacts, water scarcity, and reduced access to water supply and sanitation facilities.

Why are we inviting you to participate in the study?
We have selected our study sites randomly from the unions vulnerable to climate change. Your household has been selected randomly for data collection. Because you are residing in an area where we expect climate conditions will affect you and your family's livelihood and the surrounding and thus affect health outcome. So, we would like to invite your child to participate in this study.

Methods and procedures
What is expected from the participants of the research study?
The study will last for eighteen months. Following your permission we will enroll your household into the study. We will monitor your household on certain health conditions to obtain information on specific diseases, your water supply and use of hand hygiene practices in this household and collect samples from your source of water supply. If your household is selected, then we will monitor your daily activities and use of WASH facility over 8 hours. We will visit once in every month for the next eighteen months and collect information for this study and also talk to you and your.

Qualitative data: methods and course of action
If you agree to participate in our current study, we will talk to you regarding your child's health conditions approximately for 30-45 minutes about water use, your understanding of water stress, coping strategies, your exposure to Water, Sanitation and Hygiene (WASH) intervention and how WASH intervention change your behaviour and practices. We will take notes on your responses. We will also tape record these sessions to ensure that we do not miss any important information from this session. This tape recording will not be shared with anyone outside of our study group.

With your permission, I would also like to take photographs from your household. The audiotapes and photographs, as well as the transcriptions will be stored securely at the Institute of Epidemiology, Disease Control and Research. The photographs will be used to present our research at various conferences and scientific meetings.

Risks & Benefits
There are no major risks involved in this study. We will not interfere your daily household chores and will occupy a limited time each month for collecting data. We will not provide you any payment for taking part in this study. We cannot and do not guarantee or promise that you will receive any direct benefit from this study. However, by participating in our study you could help us in generating information.

Privacy, anonymity and confidentiality
Confidentiality of the data and test results will be strictly maintained. All the interview data will be kept confidential even after the completion of data analysis. We will use the information only for the purpose of the study, and we will not use your name in sharing and publishing the results of this study. All data and tests results of the water samples collected will be kept confidential as allowed by the law of this country. The samples and the test results will be coded without your name or personal information, and stored separately for analysis by the researchers. None of these researchers will be able to identify you. Other

persons who may have access to your test results include research groups that oversee the safety of the study including institutes such as the Institutional Review Board.

If you sign this form, you permit us to release information to authorized researchers and the safety committee. There is no expiration date to this permission. This information will be coded and it is unlikely that anyone will be able to trace it to you, protecting your privacy.

We assure that the privacy, anonymity and confidentiality of data/information identifying you, or your family, will be strictly maintained. We will keep all information and results of the laboratory tests performed on your water confidential, under lock and key. None other than the investigators of this research; possible study monitor; the Ethical Committee; and any law-enforcing agency in the event of necessity would have any access to the information. We will not use your name in sharing and publishing the results of this study.

Future use of information
The information collected from this study may be shared with other researchers if needed, but we will strictly maintain your confidentiality and privacy. In the future during the implementation of the study, the relevant research team members may wish to perform additional tests (including testing for faecal cooliforms, heavy metals etc) on the water samples on the samples that will have been already collected. No further consent will be taken from you. If you change your mind about having your water sample tested, you may contact us and the sample will be discarded immediately.

Right not to participate and withdraw
Taking part in the study is completely voluntary. The enrolled members of the households may choose not to answer any or all of the questions asked. We request to complete the study. However, you can drop yourself from the study any time, even in the middle of an interview. In that case, we will delist you and your household's water samples will be destroyed.

Principle of compensation
You need not to pay us take part in this study, and similarly we will not pay you money for attending in the study. Participation in this study is free and we will not offer any kind of compensation for your participation in this study.

Persons to contact:

If you have additional questions about the survey, or if you have questions about your rights as a participant of a research study, or if you think some harm has been done to you because of the survey, you may contact or meet her personally at following address: Dr. Farhana Haque, IEDCR, Mohakhali, Dhaka. Phone: 9898691, 9898796; Ext 219

If you have questions about being part of a research study or you think some harm has been done to you because of the study, you may contact: Dr Md Sohel Samad, IRB Co-ordinator, IEDCR. Tel: +880-2-9898796, Ext. 219.

If you agree to our proposal of enrolling your household in our study, please indicate that by putting your signature or your left thumb impression at the specified space below:

Thank you for your cooperation.

_____ _____
Signature or left thumb impression of respondent Date

_____ _____
Signature or left thumb impression of Date
Parent/ Guardian/ Attendant

_____ _____
Signature or left thumb impression of the witness Date

_____ _____
Signature of the PI or his/her representative Date

APPENDIX 1(C): ENGLISH INFORMED CONSENT FORM FOR HOUSEHOLD ENROLMENT

PRIMARY RESPONDENT: HOUSEHOLD HEAD AT ENROLMENT

Protocol Title: The effect of climate variability, seasonal variations and environmental events on drinking water quality, diarrhea prevalence and WASH practices in Bangladesh.
Principal Investigator's name: Professor Dr. Meerjady Sabrina Flora

Purpose of the research
(Assalamualaikum/Nomoshkar/Greetings)
My name is _____ and I work with the institute of Epidemiology, Disease Control and Research (IEDCR), Mohakhali, Dhaka. We are interested in conducting a research to see the effect of climate variability , seasonal variations and environmental events on drinking water quality, diarrhea prevalence and WASH practices in Bangladesh.

Background:
Climate change have a significant influence on health via different pathways, including through changes in the distribution of diseases, direct health impacts, water scarcity, and reduced access to water supply and sanitation facilities.

Why are we inviting you to participate in the study?
We have selected our study sites randomly from the unions vulnerable to climate change. Your household has been selected randomly for data collection. Because you are residing in an area where we expect climate conditions will affect your livelihood and surrounding and thus affect health. So, we would like to invite you to participate in this study.

Methods and procedures
What is expected from the participants of the research study?
The study will last for eighteen months. Following your permission we will enroll your household into the study. We will monitor your household on certain health conditions to obtain information on specific diseases, your water supply and use of hand hygiene practices in this household and collect samples from your source of water supply. If your household is selected, then we will monitor your daily activities and use of WASH facility over 8 hours. We will visit once in every month for the next eighteen months and collect information for this study.

Child anthropometry
If your household decides to join the study, trained field research assistants (FRAs) will initially visit your household to collect some information through interviews with the family members, observations and by taking some measurements of the children aged less than 5 years, if applicable. This will include demographic information and questions about everyday hygiene, water treatment and sanitation practices related information. With your permission, they will inspect your sanitation facilities as well. The team will also ask questions about each child regarding vaccination status, child development and weigh and measure the child if they are present or after they are born.They will also ask mothers or caregivers about their infant feeding practices, and whether the infant has been sick. This will be done 3 times during the 18-month study period (at visit #1, 10 and 18).

Additonal qualitative data : methods and course of action
If you agree to participate in our current study, we will talk to you approximately for 30-45 minutes about water use, your understanding of water stress, coping strategies, your exposure to Water, Sanitation and Hygiene (WASH) intervention and how WASH intervention change your behaviour and practices. We will take notes on your responses. We will also tape record these sessions to ensure that we do not miss any important information from this session. This tape recording will not be shared with anyone outside of our study group.

With your permission, I would also like to take photographs from your household. The audiotapes and photographs, as well as the transcriptions will be stored securely at the Institute of Epidemiology, Disease Control and Research. The photographs will be used to present our research at various conferences and scientific meetings.

Risks & Benefits
There are no major risks involved in this study. We will not interfere your daily household chores and will occupy a limited time each month for collecting data. We will not provide you any payment for taking part

in this study. We cannot and do not guarantee or promise that you will receive any direct benefit from this study. However, by participating in our study you could help us in generating information.

Privacy, anonymity and confidentiality

Confidentiality of the data and test results will be strictly maintained. All the interview data will be kept confidential even after the completion of data analysis. We will use the information only for the purpose of the study, and we will not use your name in sharing and publishing the results of this study. All data and tests results of the water samples collected will be kept confidential as allowed by the law of this country. The samples and the test results will be coded without your name or personal information, and stored separately for analysis by the researchers. None of these researchers will be able to identify you. Other persons who may have access to your test results include research groups that oversee the safety of the study including institutes such as the Institutional Review Board.

If you sign this form, you permit us to release information to authorized researchers and the safety committee. There is no expiration date to this permission. This information will be coded and it is unlikely that anyone will be able to trace it to you, protecting your privacy.

We assure that the privacy, anonymity and confidentiality of data/information identifying you, or your family, will be strictly maintained. We will keep all information and results of the laboratory tests performed on your water confidential, under lock and key. None other than the investigators of this research; possible study monitor; the Ethical Committee; and any law-enforcing agency in the event of necessity would have any access to the information. We will not use your name in sharing and publishing the results of this study.

Future use of information

The information collected from this study may be shared with other researchers if needed, but we will strictly maintain your confidentiality and privacy. In the future during the implementation of the study, the relevant research team members may wish to perform additional tests (including testing for faecal cooliforms, heavy metals etc) on the water samples on the samples that will have been already collected. No further consent will be taken from you. If you change your mind about having your water sample tested, you may contact us and the sample will be discarded immediately.

Right not to participate and withdraw

Taking part in the study is completely voluntary. The enrolled members of the households may choose not to answer any or all of the questions asked. We request to complete the study. However, you can drop yourself from the study any time, even in the middle of an interview. In that case, we will delist you and your household's water samples will be destroyed.

Principle of compensation

You need not to pay us take part in this study, and similarly we will not pay you money for attending in the study. Participation in this study is free and we will not offer any kind of compensation for your participation in this study.

Persons to contact:

If you have additional questions about the survey, or if you have questions about your rights as a participant of a research study, or if you think some harm has been done to you because of the survey, you may contact or meet her personally at following address: Dr. Farhana Haque, IEDCR, Mohakhali, Dhaka. Phone: 9898691, 9898796; Ext 214

If you have questions about being part of a research study or you think some harm has been done to you because of the study, you may contact: Dr. Sohel Samad, IRB Co-ordinator, IEDCR. Tel: +880-2-9898796, Ext. 219.

If you agree to our proposal of enrolling your household in our study, please indicate that by putting your signature or your left thumb impression at the specified space below:

Thank you for your cooperation.

_____ _____

Signature or left thumb impression of respondent Date

_____ _____

Signature or left thumb impression of Parent/ Guardian/ Attendant Date

_____ _____

Signature or left thumb impression of the witness Date

ID must be 14 digits.

- Type the two digit site code such as Rajshahi-01, and Faridpur-02
- Type one digit area code such as: 1=Urban, 2= Peri-urban, 3= Rural.
- Type the two digit ward's number such as City Ward No-28.
- Type the three digit cluster number. The number is 001 t0 135.
- Type the three digit HH number. The number is 001 to 515.
- Type two digit questionnaire format number. The number is 01 for format A
- Type two digit for survey round or visit. The number is 01 for visit number 1.

For an example:

Site	Area	Ward		Cluster			Household (HH)			Format No		Survey round	
1	1	2	8	0	0	1	0	0	1	0	1	0	1

FORMAT A: HOUSEHOLD SOCIO-DEMOGRAPHIC QUESTIONNAIRE (ENGLISH)

TO BE ADMINISTERED AT FIRST AND LAST VISIT ONLY
ADMINISTERED TO HOUSEHOLD HEAD AND/OR ADULT RESPONDENT

Note Time

Start of the interview: End of the interview:

Name of the FRA												
Date	d	d	/	m	m	/	y	y				
			/			/						
HH Identification No	Area		Cluster		Site			Household				
GPS Location	Lattitude						Longitude					
District												
Upazila												
Union												
Village												
Para												
Respondent's Name												
Telephone number												
Notes												

	Signature of the Respondent	Signature of the Field Data Collector	Checked By Supervisor	Data Entry by	Signature of Field Team Coordinator
Name					
Signature					

A1: How many members are living in this household? ☐

A2: **Please collect the details of the respondent and all household members**

SL. No.	Name	What is this person's sex?	How old is he/she? *(years/months)*	What is his/her relationship with the respondent?	D*iarrhea is defined as 3 or more loose stools in 24 hour periodor in any single day during the last 7 days*			Status in the Study
					Did he or she have diarrhea in any one day in the past 7 days?	Did he or she have diarrhea in the past 48 hours?	Did he or she have diarrhea in the past 48 hours?	
		Male = 1 Female=2		Father = 1 Mother = 2 Brother = 3 Sister = 4 Other = 5	Yes =1 No = 2 Unknown =3 Decline = 4 If yes note the exact date: ____	Yes =1 No = 2 Unknown =3 Decline = 4 If yes note the exact date: ____	Yes =1 No = 2 Unknown =3 Decline = 4 If yes note the exact date: ____	Respondent = 1 Non-Respondent = 2
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

A3: What is the education of the respondent?

Class 1- Class 8 = 1 SSC = 2 HSC = 3 Degree = 4
Masters = 5 Other = 6

Please Specify "other":

A4: What is the occupation of the respondent?

Farmer = 1 Business = 2 Service = 3 Day Labor = 4 Transport Worker = 5 Other = 6

Please Specify "other" :

A5: What is the total income of the household?

The total income of the house hold will the sum of all income of the members of the household if the household do not want answer please write 99999

A6: What is the total expenditure of the household?

The total income of the house hold will the sum of all income of the members of the household if the household do not want answer please write 99999

A7: What is the housing pattern of the household

Pucka = 1 Semi Pucka = 2 Tin = 3 Kutcha = 4 Jhupri = 5 Other 6

Please Specify "other"

A8: What is the Number of living rooms in your household?

A9: What is the main material of wall of your principal dwelling room?

Mud = 1 Bamboo Straw = 2 Wood = 3 Tin = 4 Cement + Brick = 5
Other = 6

Please Specify "other"

A10: What is the main material of floor of your principal dwelling room?

Mud = 1 Bamboo Straw = 2 Wood = 3 Tin = 4 Cement + Brick = 5
Other = 6

Please Specify "other"

A11: What type of fuel does your household mainly use for cooking?

Crop residue/grass = 1 Dung cakes = 2 Coal/charcoal = 3 Wood = 4 Kerosene = 5
Electricity = 6 Gas = 7 Other = 8

Please Specify "other"

A12: Does your household (or any member of your household) have any of the following?

Yes = 1 No = 2 (Multiple responses acceptable)

☐ Almirah or wardrobe, ☐ Table, Chair/bench, ☐ Watch/clock, ☐ Cot/khat, ☐ Radio (working), ☐ Television (working), ☐ Refrigerator, ☐ Motorcycle, ☐ Bicycle ☐ Telephone, ☐ mobile phone, ☐ Fan, ☐ Lep/toshak (mattress)

Signature of Interviewer (Quantitative) Checked by (Research Officer Signature)

Date: Date:

FORMAT B: CHILD ANTHROPOMETRY ASSESSMENT QUESTIONNAIRE

TO BE ADMINISTERED TO CHILDREN AGED 0-5 YEARS OF AGE IF AVAILABLE IN THE HOUSEHOLD AT INITIAL AND LAST SURVEY ROUND

Note Time

Start of the interview: End of the interview:

Name of the FRA	

Date	d	d	/	m	m	/	y	y
			/			/		

HH Identification No.	Area		Cluster		Site			Household			

Child ID				

Notes	

	Signature of the Respondent	Signature of the Interviewer	Checked By Supervisor	Data Entry by	Signature of Field Team Coordinator
Name					
Signature					

Child's Name:

Mother's/Father's Name:

Child's Age (month) :

H1: Weight of mother measurement.	Weight (Kg)	☐☐☐
H2: Is child wearing clothing during weight measurement?	No Clothes=1 Only Shirt/Dress=2 Only Pants=3 Both Shirt/Dress & Pants=4	☐
H3: Weight of mother + child Measurement	Weight (Kg)	☐☐.☐
H4: Length of Child Measurement	Length (cm)	☐☐.☐
H5: Length Measurement Method	Child was: 1= lying (recumbent) 2=standing	☐
H6: Head Circumference Measurement	Circumference (cm)	☐☐.☐
H7: Child Mid Upper Arm Circumference Measurement (MUAC)	MUAC (cm)	☐☐.☐

Signature of Interviewer (Quantitative)
Date:

Checked by (Research Officer Signature)
Date:

FORMAT C: CHILD VACCINATION HISTORY QUESTIONNAIRE

ADMINISTERED TO ALL CHILDREN, AGED 0-5 YEARS IN THE HOUSEHOLD AT FIRST AND LAST VISIT

Additional instructions: Use a separate sheet for each child

Note Time

Start of the interview: End of the interview:

Name of the FRA	

Date	d	d	/	m	m	/	y	y
			/			/		

HH Identification No	Area		Cluster		Site			Household			

Child ID				

Notes	

	Signature of the Respondent	Signature of the Social Surveyor	Checked By Supervisor	Data Entry by	Signature of Field Team Coordinator
Name					
Signature					

G1: Did [CHILD] ever receive any vaccinations to prevent him/her from getting diseases, including vaccinations received in a national immunization campaign?	Yes=1 No =2 Don't know/not sure=9	☐
G2: Do you have a card where [CHILD] vaccinations are written down? [If Yes: May I see it please?]	Card Present [Observed by interviewer]=1 Card Present [No observed by interviewer]==2 No card =3 ***IF G2 is 1 then Go TO G4 and IF G2 is 2 then GO TO G3***	☐
G3: For children without a vaccination card [please tell me if NAME received any of the following vaccination:		
1. BCG vaccination against tuberculosis, this is an injection in the arm or shoulder that usually causes a scar?	Yes=1 No =2 Don't know=9	☐
2. Polio vaccine that is (pink) drop in the mouth?	Yes=1 No =2 Don't know=9	☐
3. How many times was the polio vaccine received?	Don't know=9	☐
4. A DPT vaccination that is an injection given in the thigh or buttocks, sometimes at the same time as the polio drops?	Yes=1 No =2 Don't know=9	☐
5. How many times was the DPT vaccine received?	Don't know=9	☐

6. A measles injection or an MMR injection that is a shot in the arm at the age of 9 months or order to prevent him/her from getting measles?	Yes=1 No =2 Don't know=9	☐
7. A pneumococcal (PCV) vaccination that is a shot in the thigh sometimes at the same time as the polio drops to help prevent some kinds of pneumonia?	Yes=1 No =2 Don't know=9	☐
8. How many times was the PCV vaccine received?	Don't know=9	☐
9. Rotavirus vaccine, that is, drops in the mouth to prevent some kinds of diarrhea?	Yes=1 No =2 Don't know=9	☐
10. How many times was the Rotavirus vaccine received	Don't know=9	☐
11. Within the last six months, has [NAME] received a vitamin A dose(like this/any of these) SHOW COMMON TYPES OF AMPULES/CAPSULES/SYRUPS	Yes=1 No =2 Don't know=9	☐

G4: *For children with a vaccination card:*
Copy the vaccination date for each vaccine from the card.
Recode **"99"** in the DAY column if card shows that a vaccination was given, but no date is recorded.
Recode **"88"** in the DAY column if vaccination not given.

		DAY MONTH YEAR	Country's Schedule (Age)
1	BCG	☐☐☐☐☐☐	
2	POLIO 0	☐☐☐☐☐☐	
3	POLIO 1	☐☐☐☐☐☐	
4	POLIO 2	☐☐☐☐☐☐	
5	POLIO 3	☐☐☐☐☐☐	
6	DPT 1	☐☐☐☐☐☐	
7	DPT 2	☐☐☐☐☐☐	
8	DPT 3	☐☐☐☐☐☐	
9	MEASLES	☐☐☐☐☐☐	
10	VITAMIN A	☐☐☐☐☐☐	
11	PCV 1	☐☐☐☐☐☐	
12	PCV 2	☐☐☐☐☐☐	

G5: Vaccination Status ☐

Complete=1
Incomplete=2

Signature of Interviewer (Quantitative)
Date:

Checked by (Research Officer Signature)
Date:

FORMAT D: HOUSEHOLD WATER USAGE QUESTIONNAIRE

ADMINISTERED TO THE HOUSEHOLD RESIDENT PRIMARILY RESPONSIBLE FOR WATER COLLECTION AT EACH MONTHLY SURVEY ROUND

Note Time

Start of the interview: End of the interview:

Name of the FRA	

Date	d	d	/	m	m	/	y	y
			/			/		

HH Identification No	Area		Cluster		Site			Household			

Notes	

	Signature of the Respondent	Signature of the Interviewer	Checked By Supervisor	Data Entry by	Signature of Field Team Coordinator
Name					
Signature					

B1: From where/which of the technologies you have been collecting this water?
(Please marks the focal water supply options by providing identification number as per the instruction in the first visit and mark it in any location of the household. The focal water supply point may one or two of many list all in the following)

FWP 1	Focal Water Point (FWP) Identification No	Area	Cluster		Site			Focal Water Point No			Type	
FWP 2	Focal Water Point (FWP) Identification No	Area	Cluster		Site			Focal Water Point No			Type	
FWP 3	Focal Water Point (FWP) Identification No	Area	Cluster		Site			Focal Water Point No			Type	

B1.1: If the respondent of house hold has not been collecting water from the focal water supply options in the area then where else the respondent has been collecting water? (Please Specify)

_____

_____

B2 Breakdown/explore the total amount of water used in last 24 hours into the following categories in a family by discussing with the respondent					
Using pattern	Insert picture here	Issues at least to be considered during calculation	Amount (lit)	If possible Breakdon of water usage (lit)	
B31 Drinking		Plain water			
		Juice			
		Saline			

		Sherbet			
		Tea			
B32 Personal hygiene/cleaning		Bathing			
		Washing hands			
		Face			
		Legs			
		Washing genital and anus after urination and defecation			
		Ablution			
B33 Household hygiene/cleaning		Washing or wiping living/bed room			
		Washing toilet and bathroom			
		Washing water source point			
		Washing cloths			
		Washing kitchen and vegetable and meat cutting place			
		Washing rooms after defecation of child			
B34 Food and food preparation		Washing meat, fish, vegetable			
		Washing lentil, rice, fruit, betel leaf			
		Washing cooking utensil like glass, plate, etc			
		Adding water in leftover food			
B35 Child		Bathing			
		Washing hand after excretion			
		Cleaning face leg			
		Washing genital and anus after urination and defecation			
B36 Domestic animal		Bathing and cleaning			
		Leaning of the domestic animal shed			
		Drinking			
B37 Others (Specify)		_____			
Total					
B 3: How much water you need for your daily life? (Cooking, bath, wash, drink etc.)			☐ Liter		

B4: What is the distance of the focal water supply water points from your house (ft)	**Codes are from question B2**		
	FWP 1	FWP 2	FWP 3

B5: Do you get sufficient water round the year?	☐
Yes = 1 Intermediate = 2 No = 3 Do not know = 4	

B521: What is the respondent's explanation for not getting enough water?	☐	
The water point becomes non-functional due to unavailability of ground water = 1 The water point becomes non-functional due to unavailability of surface water = 2 The water point becomes non-functional due to unavailability of rain water = 3 The water point becomes hard to purge = 4 The water of the water point have bad physical odor/smell/taste = 5 The water of the water point has arsenic problem = 6 The water point become non-functional due to extreme events (flood or drought) = 7 The water point becomes non-functional due to man made reasons = 8 Others=9 Others (Please specify) _____	__	

B522: What activities of your house hold is affected due to not getting sufficient water?	☐	
Drinking = 1 Personal hygiene/cleaning = 2 Household hygiene/cleaning = 3 Food and food preparation = 4 Child = 5 Domestic animal = 6 Others =7 Others (Please specify) _____	____	

B5221: How you are managing the activity with less water

Doing the activities with inadequate water = 1 ☐
Doing the activities by reducing the frequency of the activity =2
Doing the activities by reusing the water which is bad quality for the intended use = 3
Doing the activities by colleting water from long distances (more than 10m) = 4
Others = 5
Others (Please specify) _____

B5222: If the answer is **4** then measure the distance of water point from the respondent's house. ☐ ft

B523: Who makes the decision of water management during not getting sufficient water? ☐

Head of the household (usually father) = 1
Mother =2
Others = 3
Others (specify) _____ _____

B524: From the affected activities due to not getting water what kind of losses you are experiencing? ☐

Financial = 1
Health = 2
Time = 3
Labor = 4
Others =5
Others (specify) _____ _____

B5241: Are you getting any support from anywhere including your family members regarding water management during not getting water? ☐

Government = 1
NGOs = 2
Project = 3
Family = 4
Other =5
Others (specify) _____ _____

B6: Do you spend any money for getting available safe water considering a year? ☐

Yes = 1
No = 2
Not sure = 9

Signature of Interviewer (Quantitative)
Date:

Checked by (Research Officer Signature)
Date:

FORMAT E: HOUSEHOLD WATER, SANITATION AND HYGIENE BEHAVIOUR QUESTIONNAIRE

ADMINISTERED TO THE RESPONDENT (HOUSEHOLD RESIDENT PRIMARILY INVOLVED IN HOUSEHOLD WATER COLLECTION AND USAGE) AT EACH MONTHLY HOUSEHOLD VISIT

Note Time
Start of the interview: End of the interview:

Name of the Interviewer	

Date	d	d	/	m	m	/	y	y
			/			/		

HH Identification No	Area		Cluster		Site			Household			

Notes	

	Signature of the Respondent	Signature of the Interviewer	Checked By Supervisor	Data Entry by	Signature of Field Team Coordinator
Name					
Signature					

C1: In which type of container you have been collecting drinking water in last 7 days? ☐

Earthen pitcher = 1 Metallic pitcher = 2 Bucket = 3 Other (specify) Jug = 4
A vessel with tap = 5 Plastic bottle = 6 Other = 7 _____

C11: Do you clean the container before collecting the drinking water? ☐

Yes = 1 No = 2 Occasionally = 3 If I think for cleaning = 4

C11a: How does the respondent clean it? ☐

Circling water inside the container with hand = 1
Circling water with soap or ash inside the container with hand = 2
Using a brush for cleaning the container = 3

C11a: Observe if container is easily cleanable? ☐

Cleanable = 1 Un-cleanable = 2 Hard to Clean = 3

C2: When do you collect drinking water? ☐

Every Morning = 1 Every Afternoon = 2 Every Evening = 3 Other (specify)
Any time as required = 4 Other =5 _____

C21: Do you store the water? ☐

Yes = 1 No = 2

C22: Where and how do you store the water? ☐

Storage container covered and placed in a high location in a room = 1 Other (specify)
Storage container un-covered and placed in a high location in a room = 2
Storage container un-covered and placed in a normal location in a room = 3
Storage container un-covered and placed in a high location outside a room = 4
Storage container covered and placed in a unhygienic location anywhere = 5
Storage container un-covered and placed in a unhygienic location anywhere = 6
Other = 7 _____

C221: Can you show me where you would go to fill a glass of drinking water or if you store drinking water, where you would fill the storage vessel? ☐

Hand pump from supply water = 1
Hand pump from ground water = 2
Household tap = 3
Household cistern = 4
Unable to determine = 5
Decline = 6

C3: What is physical quality of the collected drinking water? ☐

Good Smell + Good Color = 1 Bad Smell + Bad Color = 2
Good Smell + Bad Color = 3 Bad Smell + Good Color = 4

C31: What is your idea why this is happening? ☐

Temperature increase =1 Erratic rainfall = 2 Other (specify)
Drying of surface water = 3 Due to flood and drought = 4
Bad Management of the system = 5 Other (please specify) = 6 _____

C4: After collecting drinking water do you use any purification system? ☐

Yes = 1 No = 2

C41: What kinds of drinking water purification system you are following? ☐

Boiling = 1 Chlorination = 2 Filtering = 3 Fitkiri = 4 Other (specify
Combination of these = 5 Other = 6

_____

C41a: If the purification system is filtering device then what is the frequency of cleaning the filter? ☐

Clean regularly as per the instruction = 1 Never Cleans = 2 Other (specify
Occasionally Clean = 3 Clean when the water have bad taste, color or odor = 4 Other = 5

_____

C41b: If the purification system is filtering device then what is the type of the filter? ☐

Ceramic Filter = 1 Bio-sand filter = 2 Other = 3 Other (specify

_____

C42: What is frequency of purification? ☐

Everyday = 1 Other (specify
Each time after collecting water = 2
Occasionally = 3
Other = 4

_____

C43: Why you are using purification system? ☐

The collected water have bad smell and color = 1 Other (specify)
The collected water have arsenic contamination = 2
The collected water have iron contamination = 3
You know that purification of water will improve quality of any contaminated water = 4
Other = 5

_____

C44: How much money you spent in a month for water purification? (including filter, bills, management etc.) [ ] Taka (BDT)

C5: From where you are collecting cooking water? [ ]

Focal water supply technology = 1 Other water supply technology = 2
Pond = 3 River = 4 Rainwater = 5 Mixing of all = 5

C51: Do you reuse the vegetable and other materials cleaning water? [ ]

Yes = 1 No = 2

C52: If yes, then for what purposes? [ ]

Hand washing = 1 Domestic animal feeding = 2 Vegetable plants = 3 Other (specify)
Other = 4

C6: What water you generally use during flooding or drought? [ ]

Collect water from other safe sources and use = 1
Collect water from other safe source and chlorinating before use =2
Collect water from other safe source and filtering before use = 3
Use the water from the existing source what I used before without treatment = 4
Use the water from the existing source what I used before with (chlorination or filtering treatment = 5 Other (specify)
Other = 6 _____

C7: Do you wash your hands? [ ]

Yes = 1 No = 2

C71: Water material you usually use for washing hands? [ ]

Soap = 1 Ash = 2 Soil = 3 Only water = 4 Other = 5 Other (specify) _____

C72: if the answer of the C6 is 1 then ask can you show me where did you kept the hand washing materials? (go and see) [ ]

Toilet/Bathroom = 1 In a case anywhere = 2 Other (specify)
No specific location but material existed = 3
Not available during the survey time = 4
Other = 5 _____

C73: When do you generally wash your hands?
Yes = 1 No = 2

C83a: Before preparing food [ ]
C83b: Before eating [ ]
C83c: After eating [ ]
C83d: Before feeding a child [ ]
C83e: After cleaning child's anus [ ] Other (specify)
C83f: After disposal of child feces [ ]
C83g: After defecation [ ]
C83h: After handling cow-dung [ ]

C83i: After returning from outside compound

C83j: Other

C74: Please show me how do you wash your hands?

Washed hands correctly as per procedure of standard hand washing = 1
Washed hands incorrectly as per procedure of standard hand washing = 2

C741: Please show me generally where how do you wash your hands?

Inside toilet = 1 Inside kitchen = 2 Within 3 steps of toilet = 3 Other (specify)
More than 3 steps but less than 3 meters from toilet = 4
More than 3 meters from toilet = 5
In front of the tube well = 6 No specific place = 6
Other = 7 Decline = 7

C8: Will it become possible to do hand washing during flooding or drought?

Yes = 1 No = 2

C9: Do you think hand washing is costly?

Yes = 1 No = 2

C10: How much money you spent for hand washing in a month? (soap, water etc.)

Thank you.

Signature of Interviewer (Quantitative)
Date:

Checked by (Research Officer Signature)
Date:

FORMAT F (A): HOUSEHOLD HEALTH OUTCOME ASSESSMENT TOOL

ADMINISTERED AT EACH MONTHLY HOUSEHOLD VISIT TO THE ELIGIBLE CONSENTING CAREGIVER OF THE CHILD UNDER 5 YEARS WITH CARE-GIVER REPORTED DIARRHEA DURING THE PAST 7 DAYS
AND/OR
ADMINISTERED TO EACH ELIGIBLE CONSENTING MEMBER OF HOUSEHOLD WHO HAS ALREADY REPORTED DIARRHEA DURING THE PAST 7 DAYS

Additional instructions: Use a separate sheet for each diarrhea case

Note Time
Start of the interview: End of the interview:

Name of subject														
ID	match		prim. hh					person			visit		FRA	
Date	day				month				year					
Notes														

For Office Use Only	
Field Checked by:	**Office Edited by:**
Computer Entry by 1:	**Computer Entry by 2:**

NOTE: All text in **bold** should be read, and all text in *italics* are notes to the interviewer.

SECTION 1: ILLNESS HISTORY

1. **Have you had any diarrhea during the last 7 days?** ☐

(Defined by 3 or more loose stools in a single day)
Yes=1 No=2
Don't Know=9

→*Skip Note: If no, go to 32*

2. **Have you had any diarrhea during the last 48 hours?** ☐

(Defined by 3 or more loose stools in a single day)
Yes=1 No=2
Don't Know=9
→*Skip Note: If no, go to 32*

3. **How many days did the passage of loose stool lasted (during this episode)?** ☐

(Defined by 3 or more loose stools in a single day)
_____ days *unknown* ☐*decline* ☐

4. **What time of day did the first loose stool started?** ☐

(Defined by 3 or more loose stools in a single day)
Morning=1 Afternoon=2 Evening=3 Don't Know=9

5. **Do you still have loose stools?** ☐

Yes=1 No=2
Don't Know=9

→ *Skip Note: If no, go to 6*

→ *Skip Note: Only answer if 4is no*

6. **How many days ago did you last have diarrhea** ☐

(defined by 3 or more loose stools in a single day)
_____ days *decline* ☐

7. **Since your diarrhea started, were any stools clear or water-like?** ☐

Yes=1 No=2 Don't Know=9

8. **Since your diarrhea started, were any stools blood-colored or black?** ☐

Yes=1 No=2 Don't Know=9

9. **Since your diarrhea started, were any stools green or yellow colored?** ☐

Yes=1 No=2 Don't Know=9

10. **Since your diarrhea started, have you experienced any of the following?** ☐
(*Check all that apply)*

Fever=1 Vomiting=2 Fatigue=3
Fainting=4 Abdominal pain=5 Others=9
Others (Specify) .....

11. **Since the last time we interviewed you, how many times, if any, have you visited a Govt./Private Health facility in response to this diarrhea?** ☐

_____ times *decline* ☐

12. **Since the last time we interviewed you, how many times, if any, have you visited a NGO/private practitioner (MBBS) in response to this diarrhea?** ☐

_____ times *decline* ☐

13. **Since the last time we interviewed you, how many times, if any, have you visited a traditional healer/village doctor in response to this diarrhea?** ☐

_____ times *decline* ☐

14. **Since the last time we interviewed you, how many times, if any, have you visited an Upazila health complex in response to this diarrhea?** ☐

_____ times *decline* ☐

15. **Since the last time we interviewed you, how many times, if any, have you visited a General government hospital in response to this diarrhea?** ☐

_____ times *decline* ☐

16. **Since the last time we interviewed you, how many times, if any, have you visited a pharmacy or drug seller in response to this diarrhea?** ☐

_____ times *decline* ☐

17. **Did you take any ORS since our last interview with you?** ☐

Yes=1 No=2 *(→ skip to 22)*
Don't Know=9

→ Skip Note: Only answer the following if 17 was "yes"

18. **Was this ORS purchased or homemade?** ☐

Purchased=1
Homemade=2 *(→ skip to 22)*
Both=3
Don't Know=9

→ Skip Note: Only answer the following if 18 is "purchased" or " both"

19. **How many packets of ORS did you take during since our last interview with you?** ☐

_____ packets *unknown*☐ *decline*☐

20. **Did you get any intravenous rehydration therapy (Iv fluid) since our last interview with you?** ☐

(Intravenous rehydration is where a solution is injected into the patient's blood stream)

Yes=1 No=2 Don't Know=9

→ *Skip Note: If no, go to 24*

→ *Skip Note: Only answer the following if 23 was "yes"*

21. **Where did you receive this treatment?***(choose all that apply)* ☐

Pharmacy/drug seller=1
Hospital/clinic=2
Self-administered at home=3
Other (specify) _____

22. **Did you take any drug as treatment for diarrhea since our last interview with you?** ☐

Yes=1 No=2 Don't Know=9

→ *Skip Note: If no, go to 28*

→ *Skip Note: Only answer if 24was "yes"*

23. **Were any of these drugs purchased after you were sick?** ☐

Yes=1 No=2 Don't Know=9

24. **Can you show me the drugs box, bottle, or other packaging?** ☐

Yes=1 No=2 Don't Know=9

25. Write the name of the medicine below

(Write medicine generic drug name if possible)

Sl	Name of medicine
1.	
2.	
2.	
4.	
5.	

..

26. **Since our last interview with you, as a result of your diarrhea, were you unable to perform your daily activities such as school or work?** ☐

Yes=1 No=2 Don't Know=9

→ *Skip Note: If no, go to 30*

→ *Skip Note: Only answer if 28 is "yes"*

27. **On how many days were you unable to perform your daily activities?** ☐

_____ days *unknown* ☐ *decline*☐

28. **Since our last interview with you, how often did you defecate in a bedpan or bucket?** ☐

Never=1
1 to 2 times=2
Less than once a day but 3 or more times=3
At least once per day=4
Don't Know=9

29. **Since our last interview with you, how often did you defecate in the open?** ☐

Never=1 1 to 2 times=2
Less than once a day but 3 or more times=3 At least once per day=4
Don't Know=9

SECTION 2: EXPOSURE HISTORY

30. **Since our last interview with you, how often did you prepare food for your household?** ☐

Did not do this=1 One to two days=2
Three or more days but not every day=3 Everyday=4
Don't know=9

31. **Since our last interview with you, how often did you feed a child with your hand?** ☐

Did not do this=1 One to two days=2
Three or more days but not every day=3 Everyday=4
Don't know=9

32. **Since our last interview with you, did how often did you eat a meal that was prepared more than 2 hours before you ate it?** ☐

Did not do this=1
One to two days=2
Three or more days but not every day=3
Everyday=4
Don't know=9

→ *Skip Note: If "did not do this", go to 36*

→ *Skip Note: Only answer if 34 is NOT "did not do this"*

33. **Since our last interview with you, did you eat a meal that was prepared more than 6 hours before you ate it?** ☐

Did not do this=1
One to two days=2
Three or more days but not every day=3
Everyday=4
Don't know=9

34. **Since our last interview with you, on how many days did you drink water at the following locations?**

Home		☐
Did not do this=1 Three or more days but not every day=3 Don't know=9	One to two days=2 Everyday=4	
Work/School		☐
Did not do this=1 Three or more days but not every day=3 Don't know=9	One to two days=2 Everyday=4	
Elsewhere		☐
Did not do this=1 Three or more days but not every day=3 Don't know=9	One to two days=2 Everyday=4	

SECTION THREE: ADDITIONAL GASTRO-INTESTINAL ILLNESS SYNDROMIC INFORMATION

Read questions exactly as written below. Circle Y for "yes," N for "no" and DK for "don't know, can't remember, not sure" etc.

1. Did you or any of your household members have:

- Nausea Y N DK
- Vomiting Y N DK
- Bloody diarrhea Y N DK
- Abdominal cramps Y N DK
- Fever Y N DK
- Chills Y N DK
- Headache Y N DK
- Body aches Y N DK
- Fatigue Y N DK
- Constipation Y N DK
- Jaundice (Yellow coloration of eyes or sclera) Y N DK
- Other: Y N _____DK_____

2. Did you or your family member see a healthcare professional, such as a doctor or a nurse?

Y N

When? ____ /____/ ____

3. Were you or your family member hospitalized overnight?

Y N Where? _____

4. Did the healthcare provider tell you the diagnosis?

Y N DK If yes, mention the diagnosis:_____ _

5. Did anyone in your household have a similar illness?

Y N DK

6. Do you know of anyone else with a similar illness during the past week?

Y N DK

If yes, who? _____

When? ____ / ____ / ____

7. Did you attend a large gathering the week before your illness? (e.g., wedding reception, showers, church events, clubs, school events, athletic events, office parties or banquets, parties, festivals, fairs)

Y N If yes, what events?

Event 1: _____location:_____When? ____ / ____ / _

Event 2: _____location:_____When? ____ / ____ / ____

8. Do you know anyone else in your neighborhood/school/office/business/health club etc. with the same illness?

Y N *If yes*: Where?_____

How many people?_____

9. Did you travel anywhere during the seven days before your illness? Y N

If yes, where? _____

When? ____ / ____ / ____ to ____ / ____ / ____

10. Have you had contact with children in a childcare setting during the seven days before illness?

Y N If yes, when: ____ / ____ / ____

Are you aware of any other illness in the daycare? Y N DK

11. During the seven days before your illness, did you have any pets at home, have contact with household pets elsewhere, or visit a household with pets?

Y N

If yes, what type of pets animals?

12. Did you live on a farm, visit a farm, or visit a animal zoo in the seven days before your illness?

Y N *If yes*: what kind of animal(s) did you have contact with?____

When? ____ / ____ / ____ Where?_____

13. From what sources of water did you drink during the seven days before your illness?

Municipal tap water	Y	N	DK
Private well water	Y	N	DK
Untreated surface water (river, pond, lake)	Y	N	DK
Bottled water	Y	N	DK
Other _____			

14. Did you drink any untreated/raw water during the seven days before your illness?

Y N If yes, where? _____

15. Did you swim during the seven days before your illness?

Y N *If yes*, where?		
Lake	Y	N
Pond	Y	N
River	Y	N
Ocean/sea	Y	N
Pool	Y	N
Other	Y	N

Thank you for helping us with our study

Signature of Interviewer (Quantitative) Checked by (Research Officer Signature)

Date: Date:

FORMAT G: HOUSEHOLD SANITATION ASSESSMENT FORM

ADMINISTERED TO RESPONDENT AT EACH MONTHLY HOUSEHOLD VISIT

Note Time
Start of the interview: End of the interview:

Name of the Sanitation Surveyor												
Date	d	d	/	m	m	/	y	y				
			/			/						
HH Identification No	Area		Cluster		Site			Household				

Notes	

	Signature of the Respondent	Signature of the Interviewer	Checked By Supervisor	Data Entry by	Signature of Field Team Coordinator
Name					
Signature					

E1: Do you have any latrine? ☐

Yes = 1 No = 2

E1.1: If answer of the question **E1 is '2"** then ask where you defecate? ☐

Open Place = 1 Sharing with neighbor's latrine = 2

E111: If answer of the question **E1.1 is "2"** then observe the shared latrine and categorize. [Observation] ☐

Sanitary Latrine (Water Sealed or any other sealing mechanism) = 1
Unsanitary Latrine
(No Water Sealed or any other sealing mechanism)= 2
Hanging latrine = 3

E1.1.1: If answer of the question **E1.1 is "1"**then calculate by asking the respondent about the total number of open defecation by the respondent's family in last week. ☐

E1.2: If answer of the question E1 is "1" then categorize the latrine ☐

Sanitary Latrine (Water Sealed or any other sealing mechanism) = 1
Unsanitary Latrine
(No Water Sealed or any other sealing mechanism) = 2

E1.2.1: What is the infrastructure of the sanitary latrine looked like ☐

Bamboo works wall with latrine RCC slab = 1
Plastic works wall with latrine RCC slab = 2
Modern/septic tank = 3
Others = 9
Others (specify) _____ _____

E1.2.2: What is the infrastructure of the un sanitary latrine looked like ☐

Bamboo works wall latrine RCC slab = 1
Plastic works wall latrine RCC slab = 2
Others = 9
Others (specify) _____ _____

E1.2.3: What is the location of the location of the infrastructure of the sanitary? ☐

Attached with home = 1
Distant form home = 2

E2: What is the status of cleanliness of the surrounding environment sanitary latrine? ☐

Clean = 1
Unclean = 2

E3: How many water points including the focal water point existed within 30 m distance of the latrine ☐

E4: Do any other families share you latrine ☐

Yes = 1 No = 2

E4.1: If the question E4 is "1" then how many other families share you latrine ☐

E5: Do you have any children in your family ☐

Yes = 1 No = 2

E5.1: If the answer of the Question E5 is "1" then where do they defecate ☐

Latrine = 1 Inside house arena = 2 Outside house arena = 3

E5.2: If the answer of the Question E51 is "2 or 3" then what you usually do with feces after deification of the child? ☐

Collect and dispose into the latrine = 1
Collect and through into the surrounding environment = 2
Do not do anything the feces remain as it is = 1

E5.2.1: If the answer of the Question E5 is "1" then how many time your child/Childs defecated in last week? ☐

E6: Do you wash your hands after deification? ☐

Yes = 1 No = 2

E6.1: If the answer of the question E6 is "2" then the reason for not hand washing are? ☐

Less water to hand wash = 1
No habit of hand washing after deification = 2

E6.2: If the answer of the question E6 is "1" then where you mostly wash your hands after deification? ☐

Inside toilet = 1
Inside kitchen = 2
Within 3 steps of toilet = 3
> 3 steps but < 10 feet of toilet = 4
> 10 feet of toilet = 4
No specific place = 5

E6.3: If the answer of the question E6 is "1" then what materials use you for hand washing after deification? ☐

Soap = 1
Ash = 2
Soil = 3
Pond water = 4
Tue well water = 5
Others = 6
Others (specify) _____

Signature of Interviewer (Quantitative)
Date:

Checked by (Research Officer Signature)
Date:

FORMAT H: HOUSEHOLD POU WATER SAMPLE COLLECTION FORM

ADMINISTERED TO THE RESPONDENT AT EACH MONTHLY HOUSEHOLD VISIT

After completion of the consent, please ask the respondent household to give you a glass of water from where the respondents usually drinks/serves water

Information on water sample for storage and sending to Central icddr,b laboratory for testing					Information of Sample for Field Testing	
Sample ID No	Amount of Sample (ml)	Parameter	Sent to Laboratory Mention time and date	Result**	Parameter	Result
Sample ID+EC		E. Coli (cfu/100 ml)			Appearance	
Sample ID+Tu		Turbidity (NTU)			Turbidity (NTU)	
Sample ID+As		Arsenic* (mg/l)			pH	

* In every 10th sample

** To be included later from laboratory and noted

Signature of Interviewer (Quantitative)
Date:

Checked by (Research Officer Signature)
Date:

FORMAT I: SANITARY INSPECTION AND SAMPLE COLLECTION FORM FOR FOCAL IMPROVED WATER SOURCE(S)

ADMINISTERED TO CARETAKER OF THE FOCAL IMPROVED WATER SUPPLY SOURCE IN THE AREA, IF DIFFERENT FROM THE RESIDENTS OF THE ENROLLED HOUSEHOLD AT EACH MONTHLY SURVEY ROUND

Name of the Sanitary Inspector	

Name of the Caretaker	

Date	d	d	/	m	m	/	y	y
			/			/		

Focal Water Point (FWP) Identification No	Area	Cluster		Site			Focal Water Point No			Type		

Notes	

	Signature of the Respondent	Signature of the Social Surveyor	Checked By Supervisor	Data Entry by	Signature of Field Team Coordinator
Name					
Signature					

[Before Proceeding Interviewer ask a few questions to the caretaker of the focal water supply system]

D1: When did this water point installed?

d	d	/	m	m	/	y	y	y	y
		/			/				

D2: Who installed this water point? ☐

DPHE = 1 LGED = 2 NGO = 3 Private = 4

D2: Since installation has the water point became non functional. ☐

Yes = 1 No = 2

D21: **If D2 answer is Yes** then what is maximum time it remained non-functional? ☐ months

D22: If D2 answer is yes then how many times it remained non-functional? ☐

D23: **If D2 answer is yes** then what is the reason for becoming non-functional? ☐

Technical problem of the tube well head/bucket etc. = 1
Due to unavailability of the source water = 2
Due to flooding = 3
Due to drying of the surface water = 4
Due to unavailability or erratic rainfall = 5
Due to bad physical water quality = 6
Due to arsenic contamination = 7
Due to iron contamination = 8
Others = 9
Other (specify) _____ _____

D3: Do you have a maintenance tools? If yes show me ☐

Yes = 1 No = 2

D4: Do you receive any caretaker training? ☐

Yes = 1 No = 2

D5: Is there any contribution for installation of the water point from the user side? ☐

Yes = 1 No = 2

D51: The answer of question **D5 is Yes** then what is the average amount of user contribution? ☐

D6: Measure the flow rate? ☐ ml/min
(use a graduated bucked and collect water for a minute and record the amount)

D7: Open the tube well head and measure the depth and leave the system as it was after measurement or collect acceptable true information from the caretaker and the community about the depth of the borehole ☐ ft

D8: If the people uses river water pond water as source water for the technology measure the depth of the pond or river by appropriate method ☐ ft

SOURCE WATER SAMPLE COLLECTION FORM

TYPE OF FACILITY: PIPED WATER

General Information

Focal Water Point (FWP) Identification No	Area	Cluster		Site			Point No			Type	
GPS Location	Lattitude					Longitude					
Date of Visit	d	d	/	m	m	/	y	y			
			/			/					

Information on water sample for storage and sending to Central icddr,b laboratory for testing					Information of Sample for Field Testing	
Sample ID No	Amount of Sample (ml)	Parameter	Sent to Laboratory Mention time and date	Result**	Parameter	Result
Sample ID+EC		E. Coli (cfu/100 ml)			Appearance	
Sample ID+Tu		Turbidity (NTU)			Turbidity (NTU)	
Sample ID+As		Arsenic* (mg/l)			pH	

* In every 10th sample

** To be included later from laboratory and noted

Specific Diagnostic Information for Assessment

No	Diagnostic Items (Put ✓ Mark)	Yes	No
1	Do any tap stands leak?		
2	Does surface water collect around any tap stand?		
3	Is the area uphill of any tap stand eroded?		
4	Are pipes exposed close to any tap stand?		
5	Is human excreta on the ground within 10m of any tap stand		
6	Is there a sewer within 30m of any tap stand?		
7	Has there been discontinuity in the last 10 days at any tap stand?		
8	Are there signs of leaks in the mains pipes in the Parish?		
9	Do the community report any pipe breaks in the last week		
10	Is the main pipe exposed anywhere in the Parish?		
	Sum of Tick		

Signature of the Sample collector

TYPE OF FACILITY: PIPED WATER WITH SERVICE RESERVOIR

General Information

Focal Water Point (FWP) Identification No	Area	Cluster		Site			Point No			Type	
GPS Location	Lattitude					Longitude					
Date of Visit	d	d	/	m	m	/	y	y			
			/			/					

Information on water sample for storage and sending to Central icddr,b laboratory for testing					Information of Sample for Field Testing	
Sample ID No	Amount of Sample (ml)	Parameter	Sent to Laboratory Mention time and date	Result**	Parameter	Result
Sample ID+EC		E. Coli (cfu/100 ml)			Appearance	
Sample ID+Tu		Turbidity (NTU)			Turbidity (NTU)	
Sample ID+As		Arsenic* (mg/l)			pH	

* In every 10th sample

** To be included later from laboratory and noted

Specific Diagnostic Information for Assessment

No	Diagnostic Items (Put ✓ Mark)	Yes	No
1	Do any tap stands leak?		
2	Does surface water collect around any tap stand?		
3	Is the area uphill of any tap stand eroded?		
4	Are pipes exposed close to any tap stand?		
5	Is human excreta on the ground within 10m of any tap stand		
6	Is there a sewer within 30m of any tap stand?		
7	Has there been discontinuity in the last 10 days at any tap stand?		
8	Are there signs of leaks in the mains pipes in the Parish?		
9	Do the community report any pipe breaks in the last week		
10	Is the main pipe exposed anywhere in the Parish?		
	Sum of Tick		

Signature of the Sample collector

TYPE OF FACILITY: DEEP BOREHOLE WITH MECHANIZED PUMPING

General Information

Focal Water Point (FWP) Identification No	Area	Cluster		Site			Point No			Type	
GPS Location	Lattitude					Longitude					
Date of Visit	d	d	/	m	m	/	y	y			
			/			/					

Information on water sample for storage and sending to Central icddr,b laboratory for testing					Information of Sample for Field Testing	
Sample ID No	Amount of Sample (ml)	Parameter	Sent to Laboratory Mention time and date	Result**	Parameter	Result
Sample ID+EC		E. Coli (cfu/100 ml)			Appearance	
Sample ID+Tu		Turbidity (NTU)			Turbidity (NTU)	
Sample ID+As		Arsenic* (mg/l)			pH	

* In every 10th sample

** To be included later from laboratory and noted

Specific Diagnostic Information for Assessment

No	Diagnostic Items (Put ✓ Mark)	Yes	No
1	Is there a latrine or sewer within 100m of pump house?		
2	Is the nearest latrine un-skewered?		
3	Is there any source of other pollution within 50m?		
4	Is there an uncapped well within 100m?		
5	Is the drainage around pump house faulty?		
6	Is the fencing damaged allowing animal entry?		
7	Is the floor of the pump house permeable to water?		
8	Does water forms pools in the pump house?		
9	Is the well seal insanitary?		
	Sum of Tick		

Signature of the Sample collector

General Information

Focal Water Point (FWP) Identification No	Area	Cluster		Site			Point No			Type	
GPS Location	Lattitude				Longitude						
Date of Visit	D	d	/	m	m	/	y	y			
			/			/					

Information on water sample for storage and sending to Central icddr,b laboratory for testing					Information of Sample for Field Testing	
Sample ID No	Amount of Sample (ml)	Parameter	Sent to Laboratory Mention time and date	Result	Parameter	Results
Sample ID+EC		E. Coli (cfu/100 ml)			Appearance	
Sample ID+Tu		Turbidity (NTU)			Turbidity (NTU)	
Sample ID+As		Arsenic (mg/l)*			pH	

* In every 10th sample
** To be included later from laboratory and noted

Specific Diagnostic Information for Assessment

No	Diagnostic Items (Put ✓ Mark)	Yes	No
1	Is there a latrine within 10m of the borehole?		
2	Is there a latrine uphill of the borehole?		
3	Are there any other sources of pollution within 10m of borehole? (e.g. animal breeding, cultivation, roads, industry etc)		
4	Is the drainage faulty allowing ponding within 2m of the borehole?		
5	Is the drainage channel cracked, broken or need cleaning?		
6	Is the fence missing or faulty?		
7	Is the apron less than 1m in radius?		
8	Does spilt water collect in the apron area?		
9	Is the apron cracked or damaged?		
10	Is the hand pump loose at the point of attachment to apron?		
	Sum of Tick		

Signature of Interviewer (Quantitative) Checked by (Research Officer Signature)

Date: Date:

FORMAT J: WATER SPECIMEN COLLECTION, TESTING AND ANALYSIS PROCEDURE

SOP FOR WATER SAMPLE COLLECTION

1. Collect sterile container from the Environmental Microbiology Laboratory of icddr,b.
2. Do not open/mishandle the sterile container before sample collection.

Tube well:

1. Wear gloves.
2. Clean the tube well outlet with fresh tissue paper to remove dirt/debris/rust.
3. Discard water for 1 min to remove remaining dirt/debris/rust.
4. Use a piece of clean tissue paper to dry the tube well outlet.
5. Soak a piece of tissue paper/cotton with 100% alcohol holding with big forceps.
6. Set fire on the soaked tissue paper.
7. Sterilize the tube well outlet using the flame.
8. Wait until smoke comes out of the upper open end of the tube well.
9. Discard water from the tube well for 1-2 mins.
10. Label the water collection bottle as stated in the procedure.
11. Open the container cap and collect the water into the container up to the brim. Remember not to touch the container mouth with the tube well outlet.
12. Do not touch inside of the container with hands.
13. Close the container tightly.
14. Place the container in a cool box containing sufficient number of ice packs to keep the temperature inside the container between 4-10°C.

Distribution tap/faucet:

1. Wear gloves.
2. Remove hose/strain (if any) attached to the faucet.
3. Clean the faucet with tissue paper to remove dirt/debris/rust.
4. Discard water for 1 min to remove remaining dirt/debris/rust.
5. Use a piece of clean tissue paper to dry the tap/faucet. If the tap/faucet is made with plastic then clean it with 70% alcohol, do not flame.
6. If the tap is made with metal then soak a piece of tissue paper/cotton with 100% alcohol holding with big forceps.
7. Set fire on the soaked tissue paper.
8. Sterilize the faucet using the flame.
9. Discard water from the faucet for 1-2 mins.
10. Label the water collection bottle as stated in the procedure.
11. Open the container cap and collect the water into the container up to the brim. Remember not to touch the container mouth with the tap outlet.
12. Do not touch inside of the container with hands.
13. Close the container tightly.
14. Place the container in a cool box containing sufficient number of ice packs to keep the temperature inside the container between 4-10°C.

Point of Use Water:

7. Label the water collection bottle as stated in the procedure.
8. Ask the respondent to provide water sample as if s/he is serving water to a family member.

9. Open the container cap and collect the water into the container up to the brim. Remember not to touch the container mouth with the water holding pot from where water will be poured.
10. Do not touch inside of the container with hands.
11. Close the container tightly.
12. Place the container in a cool box containing sufficient number of ice packs to keep the temperature inside the container between 4-10°C.

FIELD BLANK/DUPLICATE SAMPLE COLLECTION

1. Each day one of the sample collector will carry a 'field blank' to control for field sampling conditions. The field blank will have lab water in the sterile container. The selected sample collector will just carry the blank container in their cooler box and open the cap of the blank container once in the field and then close the cap of the container tightly and then send back the blank sample together with other samples in the Environmental Microbiology Laboratory.
2. Each day the sample collector will collect a duplicate sample from one of every ten households. This sample will be collected along with the source as well as point of use water sample at the same time. The sample procedure should be the same, and the sample collector will write 'duplicate' on the label in addition to the normal household code.

SOP FOR WATER SAMPLE COLLECTION FOR DETERMINATION OF ARSENIC CONTENT

Both source water and point of use water will be collected for determination of arsenic content. Separate bottles containing concentrated nitric acid will be used.

1. Collect special sample collection bottles (with 200µl of concentrated nitric acid) from the Environmental Microbiology Laboratory of icddr,b.
2. Care must be taken to prevent any leakage from the bottles containing concentrated nitric acid.
3. Label the bottles properly.
4. Follow the collection procedure described for collection of water samples for microbiological analysis.
5. During sample collection pay attention not to overflow water as it will reduce the concentration of nitric acid.
6. Water sample for determination of arsenic should be collected from every 10^{th} household.
7. The bottles can be kept at room temperature.

SOP FOR PH MEASUREMENT

1. Samples should be tested as soon as possible after collecting the sample.
2. Rinse the probe (electrode) with distilled or deionised (DI) water if possible and then wipe with lint free tissue paper.
3. Thoroughly rinse probe once or twice with the sample water.
4. Press the power button to open the meter display.
5. Insert the electrode (probe) into the sample.
6. Press measure button.
7. The pH icon will flash until the reading is stable. Then it will stabilize and show the result on the digital display.
8. Record the result in the worksheet.

SOP FOR TURBIDITY MEASUREMENT

1. Sample should be tested as soon as possible after collecting the sample.
2. Clean the sample cell/vial.
3. Rinse the sample vial with approximately 10 ml of the sample water.
4. Place the turbidity meter on a flat and level surface.
5. Pour the sample into the rinsed sample vial up to the mark.
6. Wipe outside of the vial with soft, lint-free cloth/tissue. Ensure that the outside of the vial is dry, clean and free from smudges.
7. Place the sample vial inside the sample well and align the vial's index mark with the meter's index mark.
8. Push the vial until it is fully snapped in.
9. Cover the vial with the light shield cap.
10. Turn on the meter by pressing the ON/OFF key.
11. After the power-up sequence the meter goes to measurement mode.
12. The measured reading will then appear in the display.
13. Record the result in log-book.

SOP FOR TRANSPORTATION OF WATER SAMPLES IN THE ENVIRONMENTAL MICROBIOLOGY LAB OF ICDDR,B

- The water samples for microbiological analysis (source water, point of use water, duplicate sample, blank sample) will be sent to the Environmental Microbiology Laboratory (EML) of icddr,b.
- Take a clean and dry cool box.
- Place sufficient amount of ice packs inside the box.
- Keep a thermometer inside the box to measure temperature.
- Then place the samples inside the box. Recheck whether the caps of the bottles were tightened properly to avoid leakage of water.
- Close the cool box properly, avoid overloading and place masking tape around the neck of the box, so that air can't enter inside the box.
- Ensure the box is properly air tight.
- Label the box properly (mobile number of the contact person and address)
- Now the box is ready for transportation.
- It is absolutely essential to maintain cold chain (to keep the temperature inside the cool box from **4°C to 10°C**) during transportation of the samples. The samples need to be reached in the Environmental Microbiology Lab early in the morning of the following day. **It should be kept in mind that the samples must be processed within 24 hrs after collecting the samples.**

LAB SOP FOR WATER SAMPLE ANALYSIS

This SOP describes the procedures for the analysis of water samples

PREPARATION OF MEDIA

MI media will be used for analyzing samples. For analysis of water samples, MI media will be used for enumeration of *E. coli* and total coliforms by incubation at 35°C ± 0.5°C.

Materials Needed

MI Agar media
Cefsulodin sodium salt (stored in -20˚C freezer)
Distilled water
1 L flask

1000 mL graduated cylinder
Sterile petri dishes (approximately 60 petri dishes per 1000 ml media)
15 mL falcon tubes (2x)
10 mL syringe
0.2 um filter
Scale, weighing paper and weighing spatula
Stirring hot plate
Thermometer
Water bath
Sterile serological pipette for dispensing media
Pipettor (with 1-5 mL sterile tips) for dispensing cefsulodin solution
Gas burner
Autoclave machine
Autoclave tape
Aluminum foil
70% ethanol
Gloves

PREPARATION OF MI MEDIA

- Measure 1000 mL of distilled water in graduated cylinder
- Add 36.5 g MI Agar and 1000 mL of sterile distilled water to 2L flask
- Cover flask with sterile aluminum foil and place on stirring hot plate
- Heat on stirring hot plate until media boils (it will become transparent)
- Boil for 1 minute to completely dissolve, make sure it does not boil over
- Autoclave at 121°C and 15 psi for 15 minutes
- Let agar cool down to ~50˚C in a water bath
- Prepare 1 mg/1 mL Cefsulodin solution
    - Add 10 mg Cefsulodin and 10 mL of distilled water to sterile test tube
    - Shake to dissolve
    - Remove plunger from syringe and attach 0.2 um filter to tip of syringe
    - Filter solution into fresh sterile test tube
- Add 5 mL of fresh Cefsulodin solution to 1000 mL of media (final concentration 5 mg/L)
- Place remainder of solution in 4˚C fridge wrapped in aluminum foil. Discard if unused after 2 days.
- Place media on stirring hot plate for 30 seconds
- Cover work bench with aluminum foil and wipe with ethanol
- Put on gloves and wipe hands with ethanol
- Light gas burner
- Open and create stacks of 5 plates for pipetting.
- With sterile pipette and bulb pipettor and sterile technique, dispense 15 – 20ml per plate of media.
- Let stand on workbench for 2 hours for agar to solidify (minimize light exposure and be careful not to move plates while cooling)
- When all plates are poured, select two plates for QA/QC from each batch of media prepared that day.
- Select a plate for negative QA/QC and incubate for 24 hours.
- Select a plate for positive QA/QC. Place a positive control on the plate and incubate for 24 hours.
- Keep remaining plates in poly bag, write date, initials and batch number on the wrapping and place in refrigerator (4˚ C). Make sure to refrigerate plates in **inverted** position. This ensures that any condensation that forms will remain on the lid of the plate instead of falling on the media.
- Fill data sheet for the QA/QC plates for all media batches. If no growth is observed on negative QA/QC plate, and growth is observed on positive QA/QC plate, the media is good to use.
-

MEDIA QA/QC

Run one positive and one negative control for every new batch of media as follows (this should be done at least one day before any samples are processed with the new batch of media).

1. Label one plate of fresh media as positive control (PC) with date and batch number
2. Use preserved ATCC strains of *E. coli* as positive control
3. Process 100 mL volume of sample and place into plate
4. Label one plate of fresh media as negative control (NC) with date and batch number
5. Incubate PC and NC plates at 35°C ± 0.5°C (MI plates) for 24 hours
6. If the positive control does not show colonies or the negative control shows colonies, discard the batch of media and prepare a new batch
7.

PROCESSING SAMPLES

Samples should be processed in order of collection time. The goal is to process samples within 24 hours of collection. Membrane filtration can be performed using membrane filtration unit.

Materials Needed

Membrane filtration unit
Vacuum pump
47 mm membrane filter with 0.2 um pore size
90 mm petri dish with pre-poured media
Incubator (set at 35 °C ± 0.5°)
Longwave UV lamp (366 nm), handheld, 4-watt preferred or 6-watt
Forceps
10 mL sterile pipette
Gas burner
70% ethanol
Gloves (nitrile, latex or vinyle)
Aluminum foil

PROCESSING WITH MEMBRANE FILTRATION UNIT

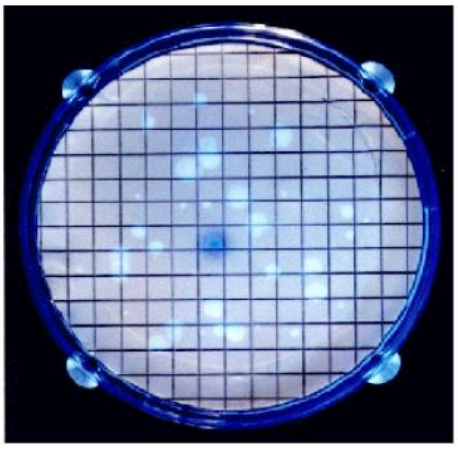
1. Remove petri dishes from fridge and allow to warm up to room temperature
2. Put on gloves and wipe hands with ethanol
3. Light Gas burner
4. Remove one bottle from cooler (remove in the order they have been collected)
5. Wipe down bottle with ethanol soaked tissue before placing on testing surface
6. Label Petri dishes with sample ID, unique ID, initials and volume processed
7. Place sterile funnel on filter apparatus (do not touch or set down filter funnel on any other surface)
8. Ensure that filter apparatus is disconnected from vacuum (valve in horizontal position)
9. Sterilize forceps by dipping in ethanol and flaming in burner, let them cool before use
10. Open membrane package, pull away package and yellow paper without touching membrane
11. Using sterile forceps, remove membrane from package (hold membrane by the edge only)
12. With forceps in other hand, place membrane (grid-side up) onto sterile filter holder
13. Place funnel immediately (do not touch or set down filter funnel on any other surface)
14. Shake bottle vigorously to distribute the bacteria uniformly
15. Carefully add 100 mL of sample from bottle into funnel (Bottle should not touch funnel)
16. Connect filtration apparatus to vacuum by bringing valve into vertical position
17. When sample is filtered, use a sterile squeeze bottle to rinse sides of filter funnel with sterile water
18. Disconnect from vacuum when the filter is dry
19. Lift the filter funnel
20. Using sterile forceps, hold the membrane by the edge and gently lift from the filter unit
21. Transfer the membrane (grid-side up) to petri dish containing MI media
22. Run forceps around outside edge of membrane to ensure it makes contact with media, reseat if needed
23. Replace the lid of the Petri Dish
24. Invert plate and place in a stack on lab bench
25. Preserve contents of rest of the samples in the refrigerator

26. Set aside the filter funnel for sterilization
27. Repeat steps 7 through 26 until all samples have been processed
28. Empty glass flask attached to vacuum pump before it fills up, do not allow the water to reach the level of the flask outlet – this would allow water into the pump and break the pump
29. Place all plates in incubator and fill out incubator sheet
30. Incubate the plates at 35° C ± 0.5° for 24 hours

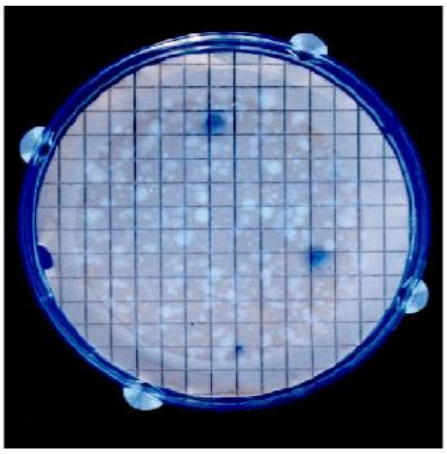
COUNTING PLATES

Plates should be counted as soon as they are removed from the incubator. If it is not possible to read them immediately or if the reading has to be interrupted, plates should be placed in a 4° C fridge until they can be read. Ideally there should be 20-80 colonies per plate after incubation for optimal reading but up to 200 is acceptable. ***E. coli target colonies are blue / indigo of all sizes. Total coliform are fluorescent under UV light.***

1. If number of colonies exceeds 200, record result as "TNTC" and process the preserved sample with appropriate dilution to get countable colonies.
2. Otherwise, count the colonies on the plate using a clicker and write the count on the back of plate
    a. Read all blue and blue/green colonies as *E. coli* regardless of size
    b. Create a dark environment and shine longwave UV light (366 nm) on plate
    c. Read all fluorescent colonies as total coliforms regardless of size
    d. Add any <u>non-fluorescent blue colonies</u> to total coliform count (color can mask fluorescence)
    e. Exclude any fluorescent bright green colonies from total coliform count (an increase in the number of bright green colonies may indicate breakdown of the Cefsulodin in the media)
3. If there are a lot of colonies (>100) evenly distributed across the plate, the plate can be divided in ½ or ¼ and only count colonies on a fraction of the plate. If plate is split in half or in quarters, record count (25) x multiplier (2) = real count (50) so it will be obvious for people transferring data (should also be obvious from markings on plate from counting).
4. Count any bacterial growth on blanks (even if they are not *E. coli* or total coliforms) and record the number and appearance of the colonies.



MI plate with *E. coli* and total coliforms under 366 nm UV light



MI plate with *E. coli* and <u>confluent</u> total coliforms under 366 nm UV light

DATA ENTRY

HAND ENTRY OF DATA INTO LAB SHEET

1. Microbiologist #1 (the plate counter): Copy number of MI colonies from plate to the data sheet.
2. Microbiologist #2: Take original plates with counts on back and compare to the filled out sheet. For quality check, recount every 10th plate. If recount is significantly different (off by ~5%) discuss with lab supervisor why difference occurred.

4.2 ELECTRONIC ENTRY OF LAB DATA

1. Lab microbiologists will be responsible for electronic data entry on a regular basis.
2. Data will be entered into excel using there "MF Results" data entry template; all data will be entered within 10-12 days after the data is generated by the lab.

5. QA/QC PROCEDURES

The following blanks, duplicates and replicates should be processed for quality control.

- Field blanks as per field schedule
- 1 lab blank per microbiologist per day
- 5% lab replicates (two aliquots from the same bottle)

5.1 FIELD BLANKS

1. Label plate with sample ID, unique ID, volume and initials
2. Water blanks will be labeled as "**WB.SAMPLE COLLECTOR ID.DAY.MONTH"**
3. Process 100 mL of the field blank.
4. Incubate with the rest of day's samples.
5. If field blank shows bacteria, contamination has occurred during sample collection and the contamination should be noted for analysis. Inform Supervisor to talk to sample collector about improving their performance.

Note: Field blanks will have a unique numerical ID.

5.2 LAB BLANKS

1. Label plate with sample ID
2. For sample ID, use "**LB.LAB MICROBIOLOGIST INITIALS.DAY.MONTH"**
3. Process 100 mL of autoclaved distilled water
4. Incubate with the rest of day's samples.
5. If the laboratory blank shows bacteria, contamination may have occurred during sample processing and the contamination should be noted for analysis. Inform Supervisor to assess contamination of distiller.

Note: Lab blanks will NOT have a unique numerical ID, only sample ID.

5.3 LAB REPLICATES

Lab replicates should be run for 5%

1. Use the unique IDs to select the sample for replicates according to the following rule:
2. Label plate with sample ID, unique ID, volume and initials
3. For sample ID, use "REP.TYPE.ID.DAY.MONTH" (i.e., put "REP" before the sample ID)
4. Incubate with the rest of day's samples.

Lab SOP for the Determination of Arsenic Using Hydride Generation Atomic Absorption Spectrophotometer (HGAAS)

1.0 Scope and application

This method is applicable for the determination of arsenic in water. The detection limit of this method is 0.3 to 0.5 µg/L.

2.0 Safety

Personal protective equipments (PPE) will be used during the laboratory analysis. For individual materials safety we will follow the material safety data sheets (MSDS).

3.0 Sample Storage

Collected samples can be stored up to six months at room temperature.

4.0 Accuracy Check and Quality control

4.1 Laboratory quality control standard will be analyzed as reference material to ensure the quality of the experiment.

4.2 All quality control data should be maintained and available for easy reference or inspection.

5.0 Method Performance

Standard reference material; SRM 1643e (trace elements in water) from NIST is used for checking the precision and accuracy of the analysis, which is found to be excellent with CV%=±5. Internal quality-control (QC) samples (pooled water samples) and spiked internal QC samples throughout the study showed good accuracy and precision. To validate the precision and accuracy of the method, recovery and duplicate samples is also analyzed (recovery=97%, CV%=±5).

6.0 Waste Management

ICDDR,B waste management policy will be followed.

FORMAT K: METEOROLOGICAL INFORMATION COLLECTION FORMAT

Administered every month to the BMD Data Repository Officer/District/Upazila Meteorological Officer

	Signature of the Respondent	Signature of the FRA	Checked By Supervisor	Data Entry by	Signature of Field Team Coordinator
Name					
Signature					

Instruction

1. Use the same format as shown for the collection of information on temperature (maximum and minimum), rainfall, humidity and extreme events in two different locations namely, Rajshahi and Faridpur district.

Metrological Item **Sub Item**

Temperature

Mean

Maximum

Minimum

Rainfall

Humidity

2. If any extreme event occurs during the research period please record its duration and follow instruction 1 for the days of extreme events.

FORMAT L: COMMUNITY LEVEL HEALTH INFORMATION COLLECTION FORMAT

ADMINISTERED TO THE UNION HEALTH ASSISTANT/NEAREST GOVERNMENT HOSPITAL

Name of the FRA	

Date of Collection	D	d	/	m	M	/	y	y
			/			/		

Notes	

	Signature of the Respondent	Signature of the Social Surveyor	Checked By Supervisor	Data Entry by	Signature of Field Team Coordinator
Name					
Signature					

Instruction

1. Site specific union data of diarrhoeal incidence need to collect by using the same format as shown form the union health clinic registers of the for all sites of all clusters.
2. If any extreme events occurred during the research period the same for need to be used during the extreme events days

District Name: **Upazila:** **Union:**
Cluster No: **Site No:** **Name of the Month:**

No	Date (dd/mm/yyyy)	Union (no of diarrhoeal incidence)									
1											
2											
3											
4											
5											
6											
7											
8											
9											
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16											
17											
18											
19											
20											
21											

No	Date (dd/mm/yyyy)	Union (no of diarrhoeal incidence)									
22											
23											
24											
25											
26											
27											
28											
29											
30											
31											