

Government of the People's Republic of Bangladesh
Ministry of Water Resources
Water Resources Planning Organization



Data Inventory and Data Needs Assessment Report for NWRD & ICRD

Consultancy Services for Maintenance, Updating and Dissemination of
National Water Resources Database (NWRD)
under Component 3B: WARPO Institutional Improvement
(Contract Package No.: WARPO/S2) of
Water Management Improvement Project (WMIP)

Dhaka
October 2012

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Abbreviation and Acronyms

ADB	Asian Development Bank
ASP	Active Server Page
BADC	Bangladesh Agricultural Development Corporation
BAEC	Bangladesh Atomic Energy Commission
BARC	Bangladesh Agricultural Research Council
BARI	Bangladesh Agricultural Research Institute
BAU	Bangladesh Agricultural University
BBA	Bangladesh Bridge Authority
BBS	Bangladesh Bureau of Statistic
BCC	Barisal City Corporation
BHWDB	Bangladesh Haor and Wetland Development Board
BIDS	Bangladesh Institute of Development Studies
BIWTA	Bangladesh Inland Water Transport Authority
BIWTC	Bangladesh Inland Water Transport Corporation
BMD	Bangladesh Meteorological Department
BMDA	Barrind Multipurpose Development Authority
BN	Bangladesh Navy
BPC	Bangladesh Petroleum Corporation
BPDB	Bangladesh Power Development Board
BR	Bangladesh Railway
BRRI	Bangladesh Rice Research Institute
BRTA	Bangladesh Road Transport Authority
BSC	Bangladesh Shipping Corporation
BSCIC	Bangladesh Small and Cottage Industries Corporation
BSMRAU	The Bangabandhu Sheikh Mujibur Rahman Agricultural University
BTMC	Bangladesh Textile Mills Corporation
BWDB	Bangladesh Water Development Board
CARE	Co-operative American Relief Everywhere
CCC	Chittagong City Corporation
CDA	Chittagong Development Authority
CDSP	Char Development and Settlement Project
CEGIS	Center for Environmental and Geographic Information System
CIMMYT	International Maize and Wheat Improvement Center

CNRS	Center for Natural Resource Studies
CPA	Chittagong Port Authority
CU	Comilla University
CUET	Chittagong University of Engineering and Technology
CWASA	Chittagong Water Supply and Sewerage Authority
DAE	Department of Agriculture Extension
DCC	Dhaka City Corporation
DLRS	Directorate of Land Records and Surveys
DMB	Disaster Management Bureau
DoE	Department of Environment
DoF	Department of Fisheries
DoFo	Department of Forestry
DoH	Directorate of Health
DoLS	Department of Livestock Services
DPHE	Department of Public Health Engineering
DU	Dhaka University
DUET	Dhaka University of Engineering and Technology
DWASA	Dhaka Water Supply and Sewerage Authority
FAO	Food and Agricultural Organization
GIS	Geographic Information Services
GoB	Government of Bangladesh
GSB	Geological Survey of Bangladesh
ICDDR,B	International Centre for Diarrheal Disease Research, Bangladesh
ICRD	Integrated Coastal Resources Database
IU	Islamic University, Kushtia
IUCN	International Union for Conservation of Nature
IWFM	Institute of Water and Flood Management IWFM, BUET
IWM	Institute of Water Modeling
JRC	Joint River Commission
JU	Jahangirnagar University
KCC	Khulna City Corporation
KDA	Khulna Development Authority
KU	Khulna University
KUET	Khulna University of Engineering and Technology
LGED	Local Government Engineering Department
Mol	Ministry of Industries

MoWR	Ministry of Water Resources
MPO	Master Plan Organization
NGO	Non Government Organization
NSTU	Noakhali Science and Technology University
NSU	North South University
NWMP	National Water Management Plan
NWRD	National Water Resources Database
PSTU	Patuakhali Science and Technology University
RAJUK	Rajdhani Unnayan Kartipakhha
RCC	Rajshahi City Corporation
RDA	Rajshahi Development Authority
REB	Rural Electrification Board
RHD	Roads & Highways Department
RRI	River Research Institute
RU	Rajshahi University
RUET	Rajshahi University of Engineering and Technology
SAC	SAARC Agricultural Information Centre, Bangladesh
SAU	Sylhet Agriculture University
SCC	Sylhet City Corporation
SMRC	SAARC Meteorological Research Centre, Bangladesh
SoB	Survey of Bangladesh
SPARRSO	Space Research and Remote Sensing Organization
SRDI	Soil Resources Development Institute
SUST	Shahjalal University of Science & Technology
UNDP	United Nation Development Programme
UNICEF	United Nation International Children Emergency Fund
WARPO	Water Resources Planning Organization
WB	World Bank
WFP	World Food Programme
WMIP	Water Management Improvement Project
WRE	Department of Water Resources Engineering, BUET

1. Introduction

1.1 Background

1. The National Water Policy (1999) gives WARPO the mandate to create a National Water Resources Database (NWRD) and to maintain and disseminate its information. The NWRD, which is implemented at WARPO, compiles information from different agencies as well as data and information generated under the project. During the first phase of the development of the NWRD, WARPO contacted 24 government agencies for their data and mode of accessibility to their data. As WARPO is involved in macro level planning, its requirement is not limited to only the water sector but is also linked with other related sectors. So during the second phase, WARPO contacted 46 government and non-government agencies to get a clearer picture of the data holding agencies in the country. Considering the growing demand for the NWRD, formation of data user groups and periodic update of the National Water Management Plan (NWMP) so that it becomes a rolling master plan, WARPO started updating the NWRD under Component 3B of the WMIP project.

2. The Integrated Coastal Resources Database (ICRD) was developed to help with ICZM planning by establishing a spatial database and a framework for knowledgebase development. A needs assessment was conducted during the development phase of the ICRD. In that phase, 55 organizations were identified and visited for collection and inventory of data and information. There has been a continuous change in coastal zone management and therefore based on the present situation further review and detailed investigation on data need are required. The needs assessment should be based on user interaction. It would not be limited to just the need for data, but would also focus on the need for outputs, usability and organizational link for producing the outputs. Since the ICRD is being updated as a subset of the NWRD under Component 3B of the WMIP project, data inventory and needs assessment for both the NWRD and the ICRD have been carried out in parallel using a questionnaire. During this phase, WARPO has selected 101 government and non-government agencies to carry out data inventory and needs assessment.

3. The data in the NWRD as well as the ICRD can be classified broadly as spatial data, attribute and time series data. These categories were considered in the preparation of data inventory forms, which were designed and sent to different organizations by WARPO. The questionnaire was reviewed and information was sought on the documentation procedure of the data layers, dissemination mode and metadata, which ultimately gave an in-depth idea about the data and policy regarding data sharing. To facilitate the collection of correct information from different agencies, a filled up sample was attached with the questionnaire.

1.2 Objectives

4. The objective of the data inventory and needs assessment was to prepare base information on existing data, the future plan for updates and redundancy of data sets. Quality of data is a vital part of information collection, so it is needed to be explained at what extent/ resolution data is being captured and the purpose of producing the data sets. Metadata of a data set explain the in-depth information of a data type and its usability index. This will help WARPO in the future in gathering information about agencies dealing

with data collection and processing and future data collection strategies for updating the NWRD and the ICRD. It will also help in avoiding duplication of data collection procedures. The document will also fulfill the needs of other agencies, projects and NGOs regarding detailed information on the data status of the country. The major objectives were:

- Enhancement of the data requirement and collection process;
- Facilitation of data collection, exchange or sharing within different organizations;
- Data documentation status or metadata information; and
- Preparation of documentation on data inventory and needs assessment.

2. Documentation Process

2.1 Inventory Processes

5. In order to perform the inventory in a systematic way a semi-structured questionnaire for data inventory and needs assessment was prepared based on the previous questionnaire and circulated to the NWRD core team of WARPO for review. The questionnaire was also presented in a progress meeting of the core team and finalized by incorporating feedback. It is provided in Annex A and a filled up copy, prepared in consultation with the NWRD core team, is provided in Annex B. This filled up sample will help and guide agencies in filling up the questionnaire easily and efficiently. The process of finalizing the questionnaire for data inventory and needs assessment is shown in Figure 2.1.

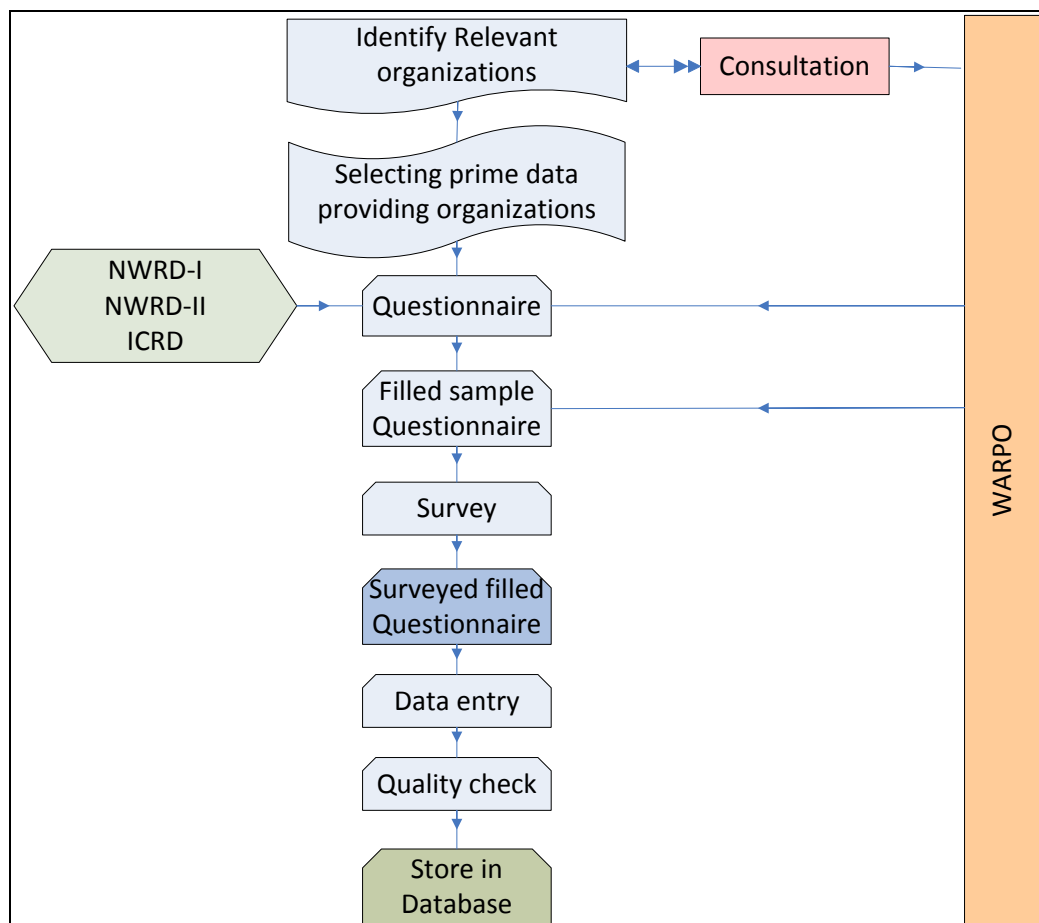


Figure 2.1: Process of finalizing the questionnaire for data inventory and needs assessment

6. The data inventory process is a very tedious job as it deals with the involvement of different agencies and mainly depends on their responses. During the inventory phase, many of the organizations were not willing to fill-up the questionnaire, therefore the survey period was extended and a reminder was also sent to the relevant organizations. It was found that the inventory forms did not reach the relevant professionals of many agencies, which ultimately hindered the overall process. The consultant team visited selected line agencies a number of times and described the potential use of the inventory and future functionality of the information. Short consultation meetings

were also conducted with GIS managers, database managers, IT experts and other relevant professionals of the line agencies.

7. To speed up the inventory process, the inventory questionnaire was made available for download from the WARPO website. Some agencies sent back the filled up questionnaire through e-mail or courier service and some were also collected personally by the NWRD consultant team. A web based data inventory and needs assessment form is also being developed which will help line agencies to submit their updated information through the web. This online form will be available soon in the www.warpo.gov.bd website.

2.2 Data Providing Agencies

8. The NWRD consultant team has prepared a list of agencies for data inventory and needs assessment according to the flow diagram shown in Figure 2.1. The list was circulated to the NWRD core team, which reviewed and finalized it in a progress meeting. Including 38 prime organizations the final list of 101 organizations is given in Annex C. The questionnaire along with a forwarding letter and a filled up sample has been sent to all line agencies including 38 prime data providing agencies. Out of this total, 37 agencies responded to the survey. A list of those organizations along with a filled questionnaire is given in Table 2.1. Among following data providing agencies BHWDB, DCC and DWASA are producing data those are related to NWRD only. Data from other agencies are linked with both NWRD and ICRD.

Table 2.1: List of data providing organizations

Sl. No.	Name of the organization	Address	Org. Type	NWRD/ICRD
1	Bangladesh Agricultural Development Corporation (BADC)	Krishi Bhaban 49-51, Dilkusha Commercial Area, Dhaka	Government	Both
2	Bangladesh Agricultural Research Council (BARC)	New Airport Road, Farmgate Dhaka, Bangladesh	Government	Both
3	Bangladesh Bureau of Statistics (BBS)	Parishankhyan Bhaban, E-27/A, Agargaon, Sher-E-Bangla Nagar, Dhaka-1207	Government	Both
4	Bangladesh Haor and Wetland Development Board (BHWDB)	72 Green road, Dhaka	Government	NWRD
5	Bangladesh Inland Water Transport Authority (BIWTA)	Bangladesh Inland Water Transport Authority (BIWTA) BIWTA Bhaban 141-143, Motijheel Commercial Area Dhaka-1000	Government	Both
6	Bangladesh Institute of Development Studies (BIDS)	E-17 Agargaon, Sher-e- Bangla Nagar, GPO Box # 3854, Dhaka-1207, Bangladesh	Autonomous	Both
7	Bangladesh Meteorological Department (BMD)	Abhawa Bhaban, Agargaon, Dhaka 1207	Government	Both
8	Bangladesh Navy (BN)	Neval Head Quarter, Banani, Dhaka	Government	ICRD
9	Bangladesh Railway (BR)	Rail Bhaban, 16, Abdul Gani Road, Dhaka-1000.	Government	Both

Sl. No.	Name of the organization	Address	Org. Type	NWRD/ICRD
10	Bangladesh Road Transport Authority (BRTA)	Old Airport Road, Dhaka	Government	Both
11	Bangladesh Water Development Board (BWDB)	WAPDA Bhaban, Motijheel C/A, Dhaka-1000.	Government	Both
12	Barind Multipurpose Development Authority (BMDA)		Government	NWRD
13	Center for Natural Resource Studies (CNRS)	House-19/B, Road-16, Block-B, Banani, Dhaka-1213	NGO	Both
14	Chittagong Port Authority (CPA)	Bandar Bhaban, P. O. Box 2013, Chittagong-4100, Bangladesh	Government	ICRD
15	Department of Agriculture Extension (DAE)	Khamarbari Sarak, Farmgate, Dhaka	Government	Both
16	Department of Environment (DoE)	Poribesh Bhaban E-16, Agargaon, Shere Bangla Nagar Dhaka 1207, Bangladesh	Government	Both
17	Department of Fisheries (DoF)	Matshya Bhaban, Shegun Bagicha, Dhaka	Government	Both
18	Department of Public Health Engineering (DPHE)	14, Shahid Captain Monsur Ali Sarani, Kakrail, Dhaka	Government	Both
19	Dhaka City Corporation (DCC)	Nagar Bhaban, Fulbaria, Dhaka	Government	NWRD
20	Dhaka Water Supply and Sewerage Authority (D, WASA)	98, Kazi Nazrul Islam Avenue, Kawran Bazar, Dhaka 1215	Government	NWRD
21	Directorate of Land Records and Surveys (DLRS)	28, Shaheed Tajuddin Ahmed Sharani, Tejgaon, Dhaka 1208.	Government	Both
22	Disaster Management Bureau (DMB)	92-93 Mohakhali C/A, Dhaka 1212	Government	Both
23	Forest Department (FD)	Ban Bhaban, Agargaon, Dhaka	Government	Both
24	Geological Survey of Bangladesh (GSB)	Segun bagicha	Government	Both
25	Institute of Water and Flood Management (IWFm)	BUET Dhaka	Academic	Both
26	International Centre for Diarrheal Disease Research, Bangladesh (ICDDR,B)	Mohakhali, Dhaka 1000	Research	Both
27	International Union for Conservation of Nature (IUCN)	IUCN, House 11, Road 138, Gulshan 1, Dhaka	International	Both
28	Joint Rivers Commission (JRC)	Janata Tower (3rd floor), Plot # 49, Kawran Bazar, Dhaka 1215	Government	Both
29	Local Government Engineering Department (LGED)		Government	Both
30	Patuakhali Science and Technology University (PSTU)	Dumki, Patuakhali 8602	Academic	Both
31	Rajshahi Development Authority (RDA)	Rajshahi Development Authority (RDA), RDA Bhaban, Banolata C/A, Airport Road, Rajshahi-6203.	Autonomous	NWRD
32	River Research Institute (RRI)	Faridpur-7800, Bangladesh	Government	Both
33	Roads & Highways Department (RHD)	Sarak Bhaban, Ramna, Dhaka	Government	Both

Sl. No.	Name of the organization	Address	Org. Type	NWRD/ICRD
34	Rural Electrification Board (REB)	Nikunja 2, Khilket, Dhaka	Autonomous	Both
35	Soil Resources Development Institution (SRDI)	Mrittika Bhaban, Krishi Khamar Sarak, Farmgate, Dhaka-1215	Government	Both
36	Survey of Bangladesh (SoB)	Tejgaon, Dhaka 1208	Government	Both
37	WaterAid Bangladesh (WAB)	H 97/B, R 25, Block A, Banani, Dhaka 1213	International	Both

2.3 Data entry

9. The information from the survey of data inventory and needs assessment has been compiled and captured in digital form and stored into a database system so that it can be accessed easily.

10. During the computerization process, many typing mistakes, inconsistencies and punching errors occurred, which were duly checked and corrected. A database system was designed and validation checks on the information were implemented for easy and correct entry of the information. Snap shots of the home page and digital data entry form are shown in Figure 2.2 and Figure 2.3.

NWRD Data Inventory Management System

[Home](#) [Data Inventory](#)

About NWRD and ICRD

Water Resources Planning Organization (WARPO) has developed the National Water Resources Database (NWRD), during the preparation of National Water Management Plan (NWMP). The primary objective of the development of NWRD is to meet the demand of water resource planners by continuous updating of existing database and enhancing it with more information and transforming it to the knowledgebase information. NWRD possesses more than 400 data layers. These data layers are categorized into several data groups such as Base Data, Surface water, Groundwater, Soil and Agriculture, Fisheries, Forest, Socio-economic, Meteorological, Documents and Reports, Environment and Images.

As per Coastal Zone Policy, WARPO has also setup an Integrated Coastal Resources Database (ICRD) to formulate and implement the Integrated Coastal Zone Management Plan (ICZMP) of Bangladesh. The purpose of developing ICRD is to provide better information and understanding of coastal conditions and processes to support ICZM planning process. ICRD contains more than 400 data layers which are grouped into 6 major categories such as Natural Resources and Environment, Human beings and Social Conditions, Infrastructure and Services, Economics and Finance, Administration and Institutions and Funds and Interventions.

Data Inventory Management System

NWRD and ICRD have been developed incorporating data and information collected from different data providing agencies. Data inventory and needs assessment of NWRD and ICRD is very essential to keep both the databases up-to-date and to avoid duplication of data collection procedures. In order to perform the inventory in a systematic way a semi-structured questionnaire has been developed and an extensive survey has been conducted to fill up the questionnaire by different data providing agencies. A web enabled and user friendly Data Inventory Management System has been developed to store surveyed information into a database system which will help to view and analyze data status information of different data providing agencies easily and efficiently.

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Figure 2.2: Home page of Data Inventory Management System

Data Inventory Management System

[Home](#) [Logout](#) [Update Forms](#) ▶

Update Form B Information
Go to Form B Insert Page

Name and Address of the organization :

Bangladesh Meteorological Department ▼

B.1: Name of Data :

Name of Data:

B.2: Brief Description of Data :

Description:

B.3: Source of Data :

Data Source:

B.4: Source of Data :

Spatial(GIS):	<input type="text"/>
Simple Table/Attribute:	<input type="text"/>
Temporal(Time Series):	<input type="text" value="Temporal(Time series)"/>
Generated(From Model):	<input type="text"/>
Others:	<input type="text"/>

B.5: Accessibility:

Within government:	Yes <input checked="" type="radio"/>	No <input type="radio"/>	With Cost <input type="radio"/>	Without Cost <input checked="" type="radio"/>
Accessible To:	Yes <input checked="" type="radio"/>	No <input type="radio"/>	With Cost <input checked="" type="radio"/>	Without Cost <input type="radio"/>
Other(Please Describe):	<input style="width: 100%;" type="text"/>			

B.6: Storage condition of the data set :

Media:	<input type="text" value="CD/DVD/ Portable HD/Pen drive"/>
Size in Megabyte:	<input type="text" value="20 GB"/>
Operating System:	<input type="text" value="Windows/LINUX"/>
Software and version Used:	<input type="text"/>

B.7: Spatial Extent :

1. National Division District Upazila Union Mouza

2. Other Hydrological region :

Bounding Coordinates : Upper Left: Lower Left:

B.8: Time period of content :

Time period of content:

Update
Next

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Figure 2.3: Data Entry Form of Data Inventory Management System

11. After this assessment survey, all data were entered in a systematic process and a matrix of available data and metadata was developed to map the various data compatibility issues among the organizations.

2.4 Data holding organizations and activities in Bangladesh

12. The survey has been conducted among the 101 selected agencies using the prescribed questionnaire. Around 37 organizations responded including 27 prime data providing agencies. The survey has shown that there are different organizations that deal with different data sets and are using different software. There are many public and private organizations in Bangladesh that produce maps, spatial or/and time series data for different types of use by planners and analysts. Some of them are currently equipped with modern GIS facilities. A list of such organizations with their most prominent spatial data is presented in Table 2.2.

Table 2.2: Organizations that deal with data sets and software use

SL No.	Name of Organization	Available Software	Databases Containing
1	BADC	ArcGIS 9.0, ArcInfo 2.1, ArcView-3.2 & 3.3, ERDAS-8.4	Both spatial and time series data on groundwater, surface water, and irrigation
2	BARC	Idrisi 3.2, ArcInfo-8.0.1e Desktop for Windows NT, ArcView 3.1, MS Access 2000	Both spatial and time series data on agriculture, land, soil, climate, hydrology, salinity, crops and socio-economics etc.
3	BBS	ArcInfo 3.5.1, ArcView 9.2, Erdas 8.5/9.3, Arc GIS Image 3.2a	Social, economic and demographic statistics, Data from Population Census, Agricultural Census and Economic Census as well as some other surveys.
4	BHWDB	None at present	Data on haors and wetlands, hydrology, environment, agriculture and fisheries, ecology and water resources
5	BIDS	None at present	Data from policy oriented research on development issues
6	BIWTA	Not applicable	Data on inland water transport, water table
7	BMD	ArcGIS-9.3 ArcView-3.X	Data on rainfall (daily, 3 hourly); temperatures (maximum, minimum, dry bulb, Wet bulb); humidity (3 hourly); wind speed and direction; mean sea level pressure; evaporation; sunshine hour; solar radiation; soil moisture and temperature at different depths; upper air data (temperature, humidity, wind speed and direction of

SL No.	Name of Organization	Available Software	Databases Containing
			different scales); doppler and conventional radar data as time series
8	BMDA	ArcInfo 5.1 ArcView 3.1	Groundwater level of irrigation wells in different upazilas; average monthly rainfall data in mm; deep tube well location; zila/upazila catchment boundary etc.
9	BN	CARIS GIS 4.4a CARIS HIPS & SIPS 5.3 and 7a Hypack 6a and 2009a	Data from hydrographic surveys that includes bathymetric data, coast lining, tidal data etc.
10	BR	Novell Netware 3.12 ArcServe 6.1 Inoculan 4 Railtracker 4.3	Data on positions of locomotives, freight trains, wagons, containers, loading unloading, arrival and departure time and station, railway network etc.
11	BRTA	Not related	Not related
12	BWDB	Microsoft access GIS (Arc view) Arc GIS DHI (MIKE 11, MIKE GIS)	Surface Water Data, Rainfall, Discharge, Water Level, Surface water quality, Evaporation, Sedimentation, Salinity, Sunshine, Wind velocity, River Morphological Data, Cross sectional data, Location of pillar, Groundwater Data, Groundwater level, Bore log, Groundwater quality etc.
13	CNRS	ArcView 3.2	Data on bio-diversity and natural resource management
14	CPA	Hypack 6.2a ProLink 1.15	Data on hydrographic survey, flow direction velocity & cross section, water level, water quality, water temperature, salinity etc.
15	DAE	SQL Server, CPMIS, FIS, AIMIS	Data on agricultural equipment, irrigated area, crop production, farmers database etc.
16	DCC	ArcView 3.3	Urban planning, word map, zone map
17	DLRS	ArcGIS 9.2 ArcView 3.5.2	Land Records & Surveys, Cadastral Surveys all over the Country and ownership of Land owner, Thana and Mouza Boundary, International boundary
18	DMB	ArcInfo ArcView 3.0	Hazards and risks, Administrative boundary, cyclone shelter etc.

SL No.	Name of Organization	Available Software	Databases Containing
19	DoE	ArcGIS ArcView Oracle	Industries of greater Dhaka, ecological area, Water quality, air quality etc.
20	DoF	Arc View Iddrisi	Fish catch data, Fisheries resource data, Water quality data etc.
21	DPHE	ArcGIS 9.2 Oracle 10g	Information of water points including depth, arsenic, chlorine, iron etc.
22	DWASA	ArcView 3.3 Water GEMS 8i	Water supply line, sewerage line, deep tube-well information, SW treatment plant, drainage, cannel etc.
23	FD	ArcGIS 9.2 Arcview3.2 ArcInfo 4.0 Erdas Imagine 8.5	Vegetation, Other land use within forest, River/ stream within forest, Road network within forest, Forest offices, Villages, settlements, growth centers etc within forest
24	GSB	ArcGIS ILWIS	Geological and geomorphological, satellite image analysis, Arial photograph interpretation
25	ICDDR,B	Nil	Nil
26	IUCN	ArcView 3.2	Environmental conservation
27	IWFM, BUET	Precis ILWIS	Hydrology
28	JRC	Not answered in this section	Not answered in this section
29	LGED	PCARCINFO 3.4.1 Arc View 3.2 Arc GIS9.3 / 8.2 ERDAS Imagine8.4	Administrative boundary, road network, river network, socio economic infrastructure, growth center/rural market etc.
30	PSTU	Not available	Not available
31	RDA	ArcView 3.3 ArcInfo 4.00	Data on Administrative boundary, Land use (existing), Surface water system, Roads, Detailed structures, Utility services data (drain, electric line etc), Topography, Socio-economic data
32	REB	ArcInfo(Including ArcGIS) 9.1 ArcView	Data on Rural Electric Network, Road & rail communication, Rivers,

SL No.	Name of Organization	Available Software	Databases Containing
		WindMil 7.1.0.9 CIS Software (Customized) ERC Software (Customized) HRM (Customized)	Administration boundary, Settlement cluster, Canals, Marshy land, CIS (Consumer Information System), ERC (Equipment Record Card)
33	RHD	ArcInfo 8.2 Arc View 3.1 Arc GIS 9.2, 9.3, 8.2 ERDAS Imagine8.4 ArcGIS Engine 9.1 Runtime I (9 . 1) Developer Kit	Data on Road layer (RHD Road Network), Rivers, Thana Boundary, Thana HQ, District HQ, Railway, Ferry location, LRP (Location Reference Point), Bridges & culverts, Traffic volume, Roughness, Roads, RAMS data (Maintenance Programme)
34	RRI	Not available	Data on River hydraulics, Hydraulics of structures and Irrigation, Coastal hydraulics, Soil mechanics, Material testing & quality control, Sediment technology, Hydro-chemistry and Geo-chemistry and Instrumentation.
35	SoB	Arc Editor Arc Map SQL 2008	Topographic database, Geo database Cartography database
36	SRDI	Arc-GIS Arcview GIS Arc-Info	Data on Soil, Land use, Soil fertility, Soil and water salinity, Crop Suitability, Drought, Problem soil
37	WAB	Ms Office	Program Management Information System, Community Situation Analysis database, HR database, CBO assessment database, Water quality database

2.5 Metadata status in Bangladesh

13. Metadata provide essential information about any type of data sets to facilitate understanding the reliability, analyzing, searching, extracting and sharing of data. During the data inventory phase under Component 3B in 2009-2011, the metadata status in Bangladesh was also assessed. That assessment indicated that only eight (8) organizations had the metadata system, 13 had a plan to develop it and 16 did not comment or did not have any plans for developing a metadata system (see Table 2.3).

Table 2.3: Metadata status during inventory

Update plan	Yes	No
Metadata maintained	8	29

Future plan for development of metadata	13	16
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14. According to the survey BWDB, BN, DAE, DPHE, DWASA, LGED, REB and SoB are organizations that practice the metadata system in different formats. It was noted that WARPO had developed their metadata model following the ISO standards with assistance from CEGIS.

2.6 Description of data collection status

15. During the survey, information on the description of data collection status was collected. According to the assessment of the collected information 18 organizations are involved as primary, secondary and collator type data collectors, 11 organizations are primary data collectors and 2 organizations are secondary data collectors. The remaining organizations did not comment on this issue.

2.7 Data dissemination status

16. Data dissemination can be defined as the formal agreement among the data holding organizations sharing data. Sharing of data also explains when and under what condition information can be shared. It also eliminates the duplication of data, which minimizes cost as well. Data sharing is one of the major problems in Bangladesh. For developing a national data sharing protocol it is essential to know the present data sharing/dissemination status of the organizations. In Bangladesh there is no well-established data sharing protocol to disseminate data. Different organizations disseminate/share data following their own organizational rules and regulations. Data are also disseminated based on national requirement and request from data receiving organizations.

17. Data sharing status was assessed using information inventoried under the Data Inventory and Data Needs Assessment for Maintenance, Updating and Dissemination of National Water Resources Database (NWRD) under WMIP: Component 3B-2 project. In this period data accessibility of different agencies was assessed, which is presented in Table 2.4. The table shows that data accessibility varies from agency to agency and user to user. It also shows that 29 organizations have data accessibility and only 11 of them are practicing their own data dissemination policy. The remaining organizations do not have any option for sharing data and apparently have no data sharing policy.

Table 2.4: Data sharing status among the organizations

Sl.	Organization	Disseminate data	Dissemination policy
1	BADC	Yes	No
2	BARC	Yes	No
3	BBS	Yes	No
4	BHWDB	No	No
5	BIDS	Yes	No
6	BIWTA	Yes	Yes
7	BMD	Yes	Yes
8	BMDA	Yes	No

Sl.	Organization	Disseminate data	Dissemination policy
9	BN	Yes	Yes
10	BR	Yes	Yes
11	BRTA	No	No
12	BUET, IWFM	No	No
13	BWDB	Yes	Yes
14	CNRS	Yes	No
15	CPA	Yes	No
16	DAE	Yes	Yes
17	DCC	Yes	Yes
18	DLRS	No	No
19	DMB	Yes	No
20	DOE	Yes	No
21	DOF	Yes	No
22	DPHE	Yes	No
23	DWASA	No	No
24	FD	Yes	No
25	GSB	Yes	No
26	ICDDR,B	Yes	Yes
27	IUCN	Yes	No
28	JRC	Yes	Not answered
29	LGED	Yes	Yes
30	PSTU	Yes	No
31	RDA	Yes	No
32	REB	No	No
33	RHD	No	No
34	RRI	Not answered	Not answered
35	SoB	Yes	Yes
36	SRDI	Yes	Yes

Sl.	Organization	Disseminate data	Dissemination policy
37	WAB	Yes	No

2.8 Data backup/archiving system

18. Data can be accidentally deleted, damaged by a virus or become lost due to hard disk failure, etc. So, data backup or archiving is one of the most important, yet also one of the most neglected areas in computing. Backing up of valuable data should be at the top of the computer maintenance list. In this regard, the organizations were asked about their respective data backup/archiving system during the survey period. According to the collected information it has been found that 27 organizations are practicing data backup or systematic archiving process, 5 organizations have not yet developed this system and 5 did not give any answer in this section. Most of the organizations, who are involved in this process maintaining prescribed modern secure software like Oracle, SQL, Windows Server and customized applications as well as using hard disks, servers, tapes, CDs, DVDs etc. as media devices. Agencies maintaining the system for data backup/archiving are presented briefly in Table 2.5.

Table 2.5: Data backup system

Agency	Status	Using media	Using software
BADC	Yes	Data backup server	Oracle, SQL
BARC	Yes	Tape/CD	
BBS	Yes		RDBMS
BIWTA	Yes	CD	DOS base
BMD	Yes	CD/DVD/Pen drive	
BMDA	Yes	CD	
BN	Yes	Hard Disk, DVD	Windows
BR	Yes	CD/HDD	
BWDB	Yes	Server	Microsoft access Flood Watch Database
CNRS	Yes	External HD	
CPA	Yes	CD/Paper Chart	HYPAC
DAE	Yes	Dard Disc/CD/DVD	Windows
DCC	Yes	CD	
DLRS	Yes	DVD/Pen drive	SQL 2005
DMB	Yes	CD	
DOE	Yes	HDD	
DOF	Yes	CD	
DPHE	Yes	HDD	HAWQ
FD	Yes		
GSB	Yes	HDD/CD/DVD	
ICDDR,B	Yes		
LGED	Yes	Server/CD	Windows Server 2003

Agency	Status	Using media	Using software
RDA	Yes	CD	
REB	Yes	HDD/CD	
RHD	Yes	CD/DVD/Data Backup Server/Hardcopy	SQL Server
SoB	Yes	Tape/Back Server	Windows Server 2008
WAB	Yes	DVD and mobile hard drive	Windows Server
BHWDB	no archiving system		
BIDS	no archiving system		
BUET, IWFM	no archiving system		
JRC	no archiving system		
PSTU	no archiving system		
BRTA	no response		
DWASA	no response		
IUCN	no response		
RRI	no response		
SRDI	no response		

2.9 Status of digital/non digital databases

19. Some more important information was needed to be learnt from the survey. These include the spatial extent of data layer, quality of data, data updating and so on. Regarding spatial extent, it was found that most of the organizations are dealing with the national extent and only 5 are interested to attain just their own jurisdiction.

20. The organizations were also asked about the quality of data and data quality checking. Out of 37, 14 organizations claimed to have data of very good quality; however, only 3 organizations are following the standard guideline for data quality checking. Thirteen organizations claimed to have data of good quality although checking was still needed and other organizations did not have any comment in this regard.

21. Data/records are accumulated every moment and it is necessary to keep them updated to be useful for research, planning and decision making. Organizations working with various types of data are also collecting and updating their data regularly and systematically. The organizations covered by the survey were asked about their data updating systems. Fourteen out of 37 organizations claimed to update their data as per need when data are generated in the system; however, they do not have any routine data updating system. There are at least 12 organizations that are following a standard routine updating system; 2 of them updating continuously, 4 update yearly and 2 used to update in 5-year intervals. The BIWTA is responsible for collecting data hourly and the BMD collects data daily. The BWDB collects both spatial and time series data on surface water, groundwater and river morphology on a regular basis. Other organizations remained silent when asked about frequency of data collection. The Table 2.6 gives at-a-glance information on data updating status of organizations in Bangladesh.

Table 2.6: Data updating status

Regular basis	When required	Not regularly	No comments
12	13	4	8

2.10 Data Needs Assessment

22. It is essential to assess the data needs of relevant organizations to update the NWRD and the ICRD. The data needs assessment was done through a questionnaire survey which is summarized and presented in Table 2.7. The details of the information can be found in the filled in questionnaire attached in Annex D.

Table 2.7: Needs assessment of different data user organizations

Sl. No.	Name of Organization	Name of required data in NWRD and ICRD
1.	BADC	<ul style="list-style-type: none"> - Groundwater demand and lifting in industrial and private sectors - Surface water availability - Aquifer map - River system - Polder - Embankment - Rainfall data - Road network - Bangladesh 3D DEM
2.	BARC	<ul style="list-style-type: none"> - Groundwater table - Rainfall - Salinity
3.	BBS	No response
4.	BHWDB	No response
5.	BIDS	<ul style="list-style-type: none"> - Property database along with elevation information with individual grid references - Following extreme floods - Peak flood level data
6.	BIWTA	No response
7.	BMD	<ul style="list-style-type: none"> - DEM - Bathymetry - Detailed river information
8.	BMDA	No response
9.	BN (for ICRD)	<ul style="list-style-type: none"> - River discharge of major rivers flowing into the Bay of Bengal - Tidal data on different stations for the coastal belt - Topographical data of the coastal region
10.	BR	No response
11.	BRTA	No response
12.	BWDB	<ul style="list-style-type: none"> - Water resource project - Coastal embankment - River network - River morphology - Hydrological states

Sl. No.	Name of Organization	Name of required data in NWRD and ICRD
		– Other GIS data
13.	CNRS	– DEM – Land type data
14.	CPA <i>(for ICRD)</i>	– Tidal flow observation – Wave data observation
15.	DAE	– Groundwater level block – Rainfall data – Total water – Planning for irrigation water due to scarcity in cropping season – Ground zone map
16.	DCC	– Rivers surrounding Dhaka – DCC boundary – Zone boundary – Ward boundary – Mohalla boundary – Rail Line – Primary school – Secondary school – College – University – Madrasa – Coaching center – Other educational institutions – Mosque – Temple – Church – Mazar – Hospital/private hospital – Clinic – Other health center – Social institution – Community center – Holding numbers – Ward Commissioners – Govt. organizations – NGOs – Banks – Dustbins – Overbridge – Bridge/culvert – Pond – Footpath – Road – Road divider – Water bodies – Slum – Open space/park/playground – Graveyards – Building society No.
17.	DLRS	No response
18.	DMB	– DEM – Administrative boundary (mauza level)

Sl. No.	Name of Organization	Name of required data in NWRD and ICRD
19.	DoE	<ul style="list-style-type: none"> - Water bodies - Wetland - Polder - Embankment - River morphology
20.	DoF	<ul style="list-style-type: none"> - Rainfall - Water quality - Water depth
21.	DPHE	<ul style="list-style-type: none"> - New/old water point digital data
22.	DWASA	No response
23.	FD	No response
24.	GSB	No response
25.	ICDDR,B	Not required at this stage
26.	IUCN	<ul style="list-style-type: none"> - Administrative boundary (mauza level) - Road - River - Water bodies - Settlements - Growth center - School - College - Administrative HQs - Demographic data - Climatic data - DEM
27.	IWFM, BUET	<ul style="list-style-type: none"> - Rainfall - Temperature - Relative humidity - Sunshine hour - Wind speed - DEM - High resolution satellite image - Water level - Discharge - GW level - Sea level - Land use
28.	JRC	No response
29.	LGED	<ul style="list-style-type: none"> - Hydrological data - River network - Digital Elevation Model
30.	PSTU	<ul style="list-style-type: none"> - Information on public & private universities (i.e. course curriculum, teaching method, academic side etc.) - Other national level data
31.	RDA	<ul style="list-style-type: none"> - Digital Elevation Model
32.	REB	<ul style="list-style-type: none"> - Satellite image - Road communication - Population cluster

Sl. No.	Name of Organization	Name of required data in NWRD and ICRD
		<ul style="list-style-type: none"> - Grid system map of Bangladesh - Highest flood level - River erosion record - Sunlight intensity - Wind velocity - Water discharge rate - Bio-mass availability - Industry density - Housing complex - Electrical distribution network system of the utilities other than the RE system - Electrical transmission network of PGCB - Gas transmission and network system.
33.	RHD	Mauza boundary
34.	RRI	No response
35.	SoB	<ul style="list-style-type: none"> - Rivers - Canals - Streams - Other water bodies
36.	SRDI	No response
37.	WAB	<ul style="list-style-type: none"> - Digital water, sanitation and hygiene status at HH level - Data on water regime (groundwater, surface water)

2.11 Database Development and Web based Application

23. The inventory and needs assessment forms and a relational database system have been designed keeping in mind that the information will be accessed through web based application. The entry forms have been developed using ASP .Net which will be used as the front end and the Oracle database will be used as backend to store information on data holding agencies. Information gathered through the questionnaire has been entered into the Oracle database using the interface and several data checking processes have been implemented to prevent false information capturing. A simple query tool and report have been designed to generate information on existing data. The report has been designed using the Crystal Report to describe the features in a well articulated manner.

3. Conclusions and Recommendations

3.1 Conclusions

24. The data inventory will help to develop future data update strategies for the NWRD and the ICRD. It is expected that this inventory report will be helpful to other organizations for collecting, sharing and exchanging data and other information. Based on the findings of the inventory and needs assessment, it could be concluded that different organizations maintain different types of data sets at different frequency which can be used at various levels of planning. WARPO is involved in national level planning using information on hydro-meteorology, environment, socio-economics, and soil-agriculture etc. collected from different agencies. The inventory covers most of the agencies and their data holdings and will help in the assessment of future data requirement of WARPO. It will also help WARPO to develop a relationship with the agencies in data dissemination and sharing. WARPO can play a role in planning data requirement fulfillment of the agencies.

3.2 Recommendations

25. It is recommended to continue the inventory process for updating information and data available in respective organizations. Special arrangements may be made so that each organization can update their inventory and send it back to WARPO for future publication of reports with updated information. The web based application can help agencies to update the inventory easily and on a regular basis.