# National Spatial Data Infrastructure (NSDI)

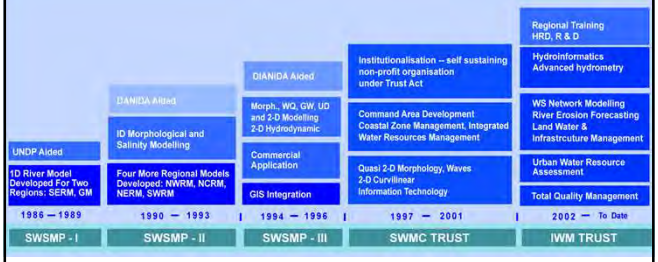
**Dr. Mollah Md Awlad Hossain**

Director, ICT-GIS Division

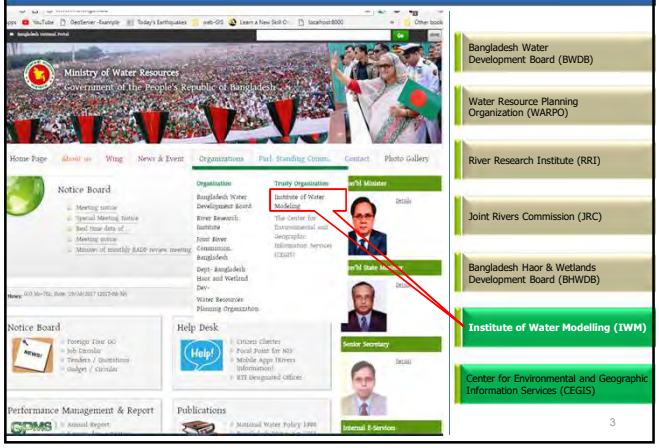
Institute of Water Modelling

## IWM Development: 1986 – to date

### SWSMP TO IWM




## Institute of Water Modelling




## IWM Board of Trustees (BOT)

1. Secretary, MOWR - Chairperson
2. DG, BWDB
3. DG, WARPO
4. Chief Engineer, RHD
5. Chief Engineer, LGED
6. One Joint Secy/Joint Chief, Planning Commission
7. One Joint Secy, MoF
8. Chief Executive of an International Hydraulic Institute
9. Head of WRE of BUET
10. Chief Engineer DPHE
11. Chief Executive of an NGO
12. An individual with high repute
13. President, Institution of Engineers Bangladesh
14. Executive Director, IWM – Member Secretary

## Divisions in IWM

- Water Resources Planning
- Irrigation Management
- Flood Management
- River Engineering
- Coast Port & Estuary Management
- Survey & Data
- ICT & GIS

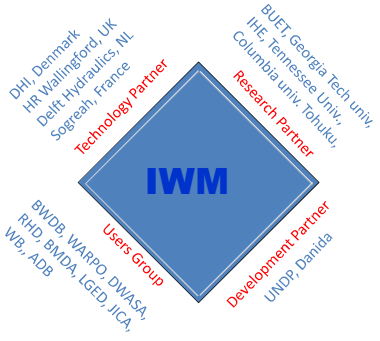
Executive Director

Deputy Executive Director (Opn)

Deputy Executive Director (P&D)

7 Working Divisions

## Major Partners of IWM



## Areas of Service

- Integrated Water Resource Management
- Flood Management, Irrigation Management
- Integrated Coastal Zone Management
- Port and Coastal Structure Management
- Estuary and Marine System Management
- Water Quality Investigation
- Geo-Spatial Analyses and ICT solutions
- Hydrogeological investigation
- EIA, SIA
- Climate Change & Adaptation
- Training & Technology Transfer

## IWM International Projects

- Tajikistan
- Nepal
- India
- Malaysia
- Philippines
- Cambodia
- Sri Lanka

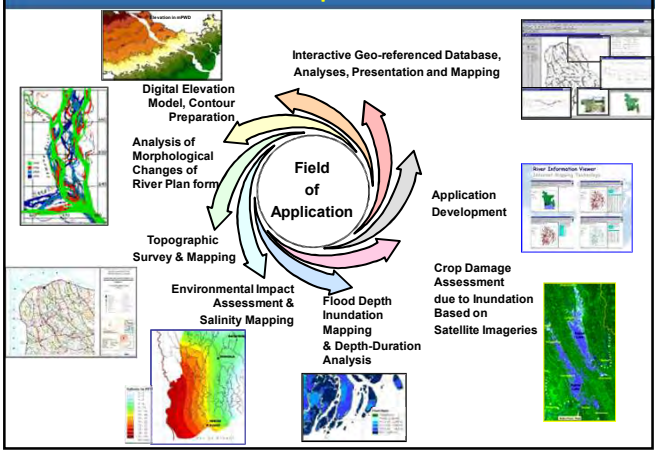
## Growth of Geo-Spatial Data/System

| | | | |
|---|---|---|---|
| BADC | CCC | DOL | MES |
| BBS | CDA | DPHE | NMIDP |
| BCAS | CDA | DSHE | PDB |
| BIDS | CDSP | DU | Petro Bangla |
| BIWTA | CEGIS | DWASA | RAJUK |
| BMD | CERP | EGIS | REB |
| BPC | CPA | ERD | RHD |
| BRRI | CWASA | FAP 25 | RRI |
| BRTA | DAE | FD | RU |
| BSCIC | DDC | GSB | SoB |
| BTMC | DLRS | ISPAN | SPARRSO |
| BTTB | DMB | IUCN | SRDI |
| BUET | DoE | IWM | SWMC |
| BWDB | DoF | KDA | WARPO |
| CARE | DoH | LGED | WFC |
| ++..... | | | |

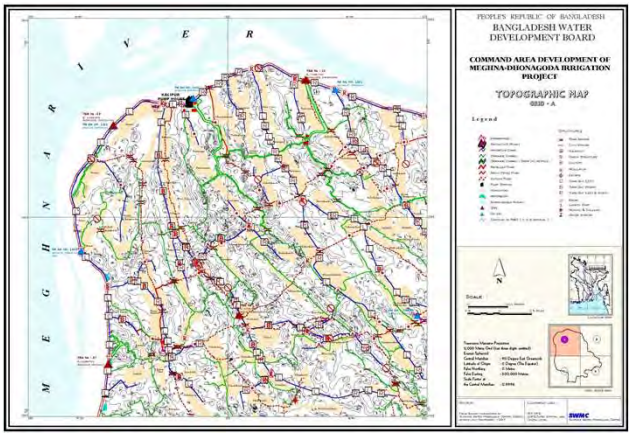
## Some use of Geo-Informatics in Bangladesh

## Where IWM contributed

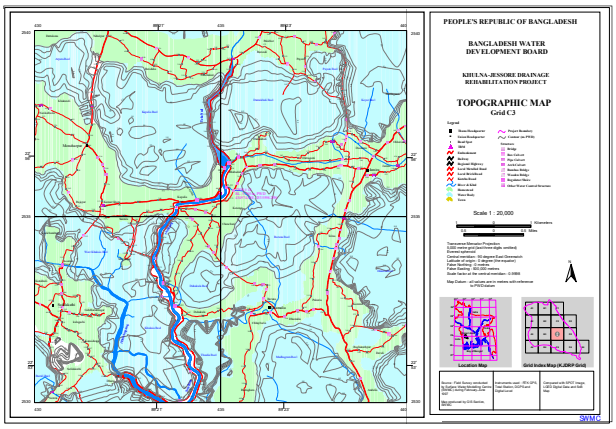
## IWM in Geo-Spatial activities



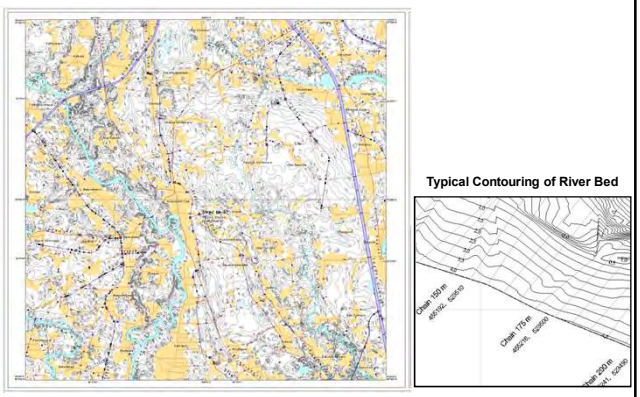

## Topographic Survey and Mapping



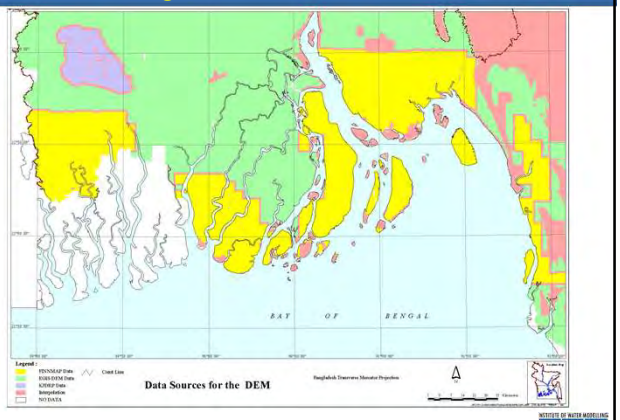
## Topographic Survey and Mapping



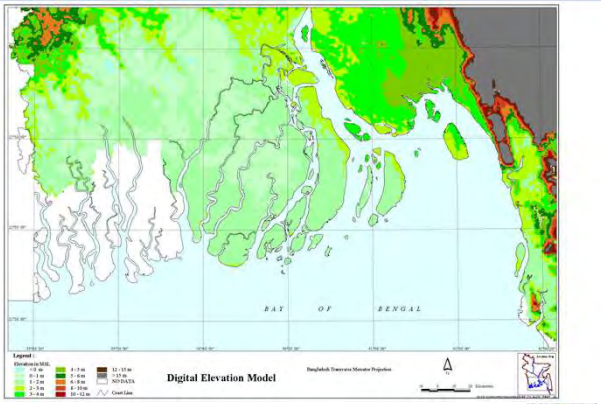

## Contour Preparation



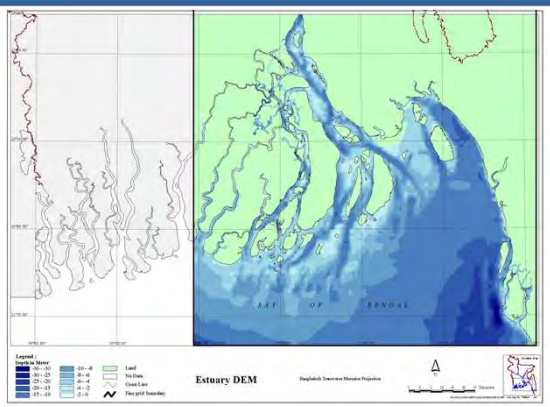

## Digital Elevation Model Data




## Digital Elevation Model (DEM)

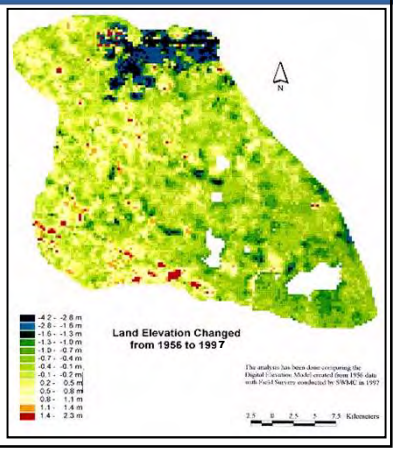



## Estuary DEM from Bathymetry

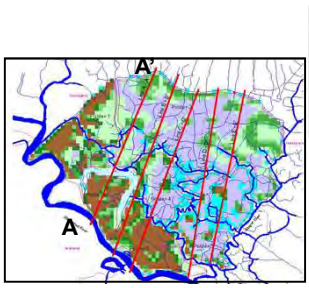



## Assessment of elevation changes

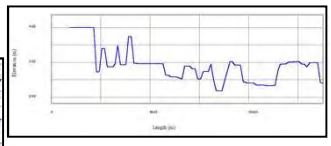
**DEM Comparison**
**(SoB 1956 vs IWM 1997)**



## Cross Section Profile

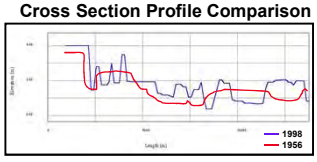



DEM

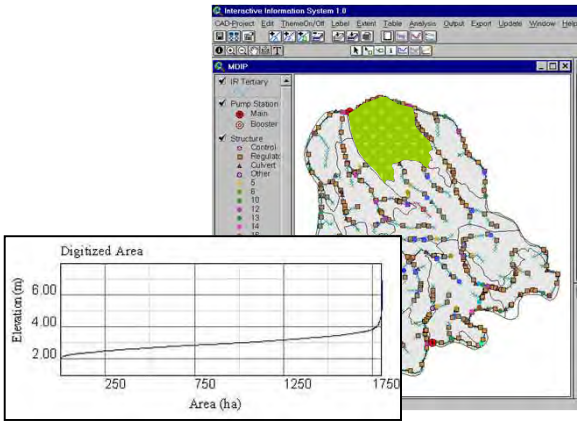


Cross Section Profile A-A'

Cross Section Profile Comparison

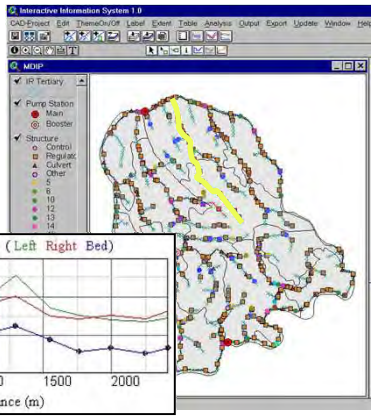


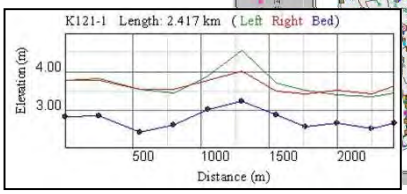

## Area Elevation Curve




## Long Profile of River

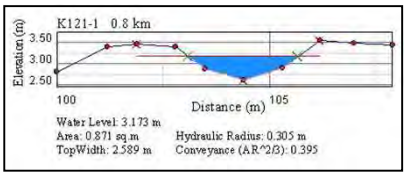
Long Profile of River generated from cross-sections

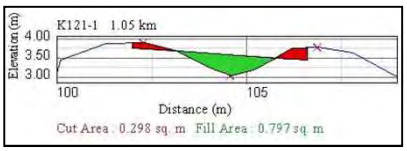





## Cut / Fill and Conveyance Calculation

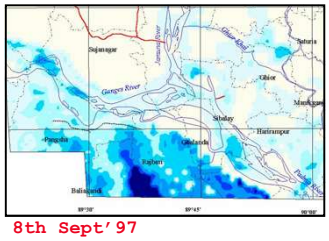
Cut / Fill calculation is done using GIS technology



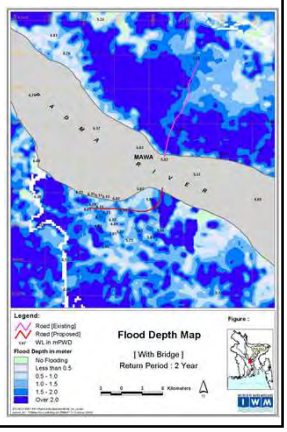




## Flood Depth / Inundation Map

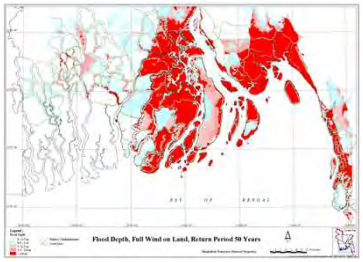
MIKE11GIS output

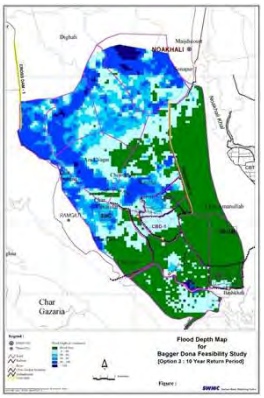


8th Sept'97



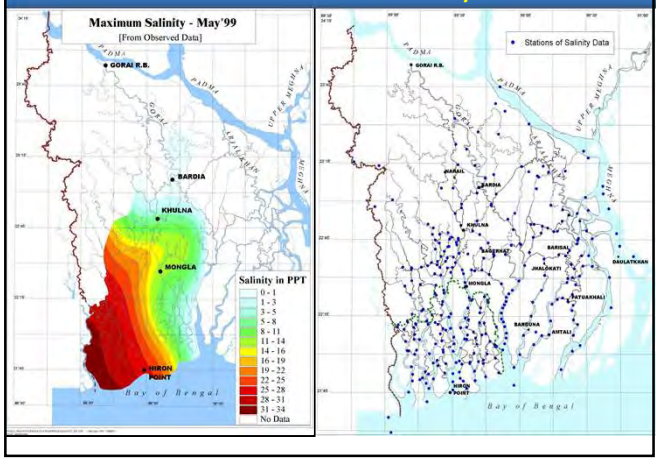

## Flood Inundation Mapping



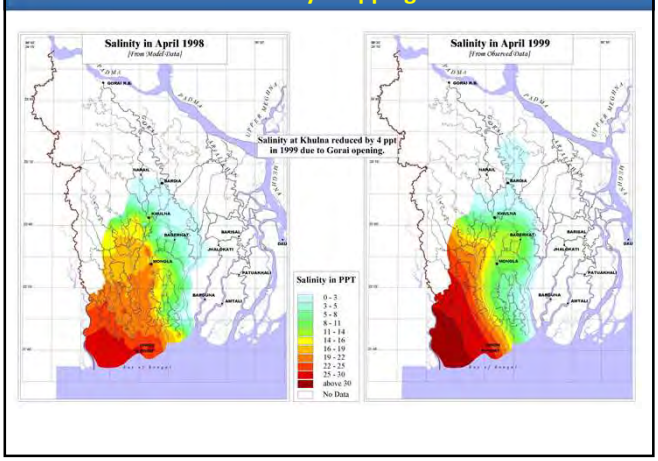



Model outputs of Flood Depth has demonstrated in a definite way for proper realization

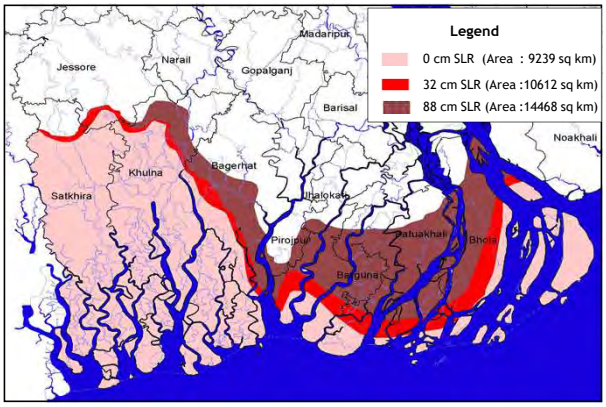
## Surface Generation for Salinity




## Salinity Mapping

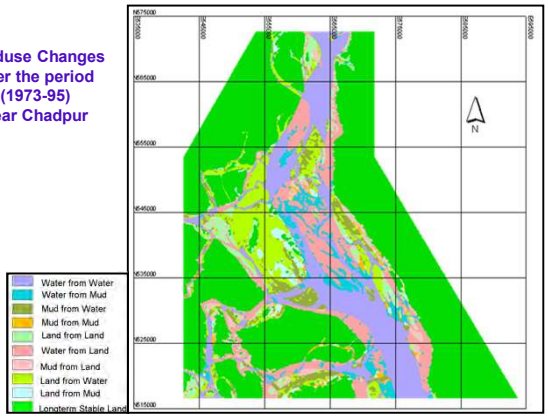



## Salinity at Different SLR

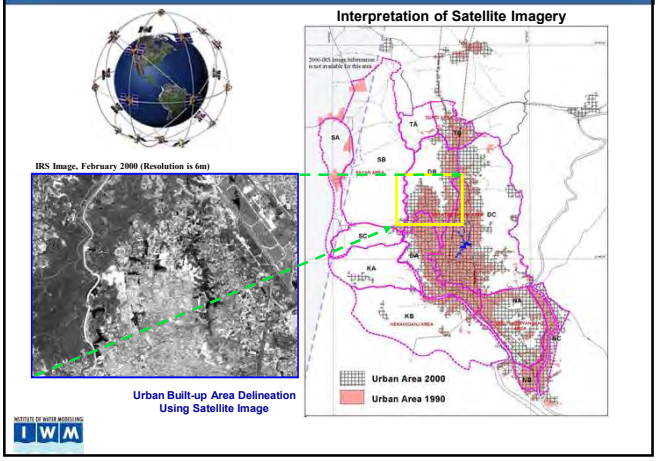



## Landuse Changes Detection using satellite image processing

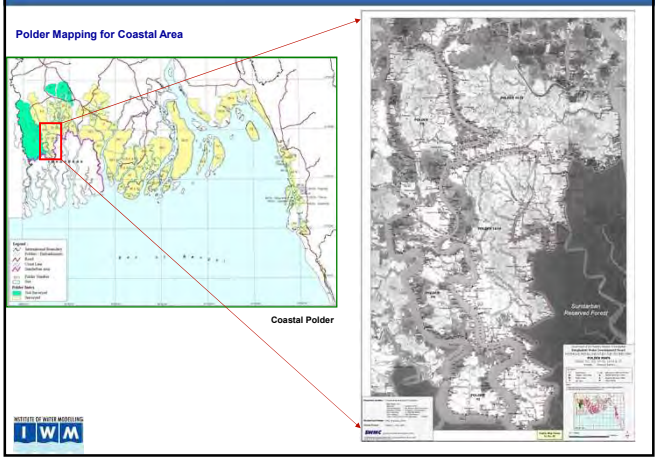
Landuse Changes over the period (1973-95) near Chadpur



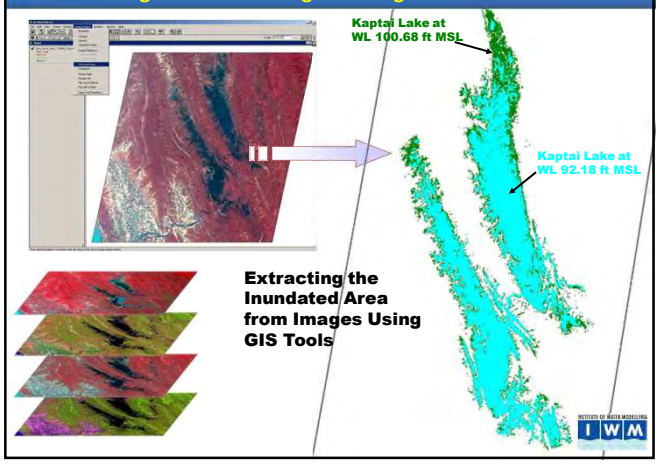

## Built-up Area Delineation Using Satellite Image



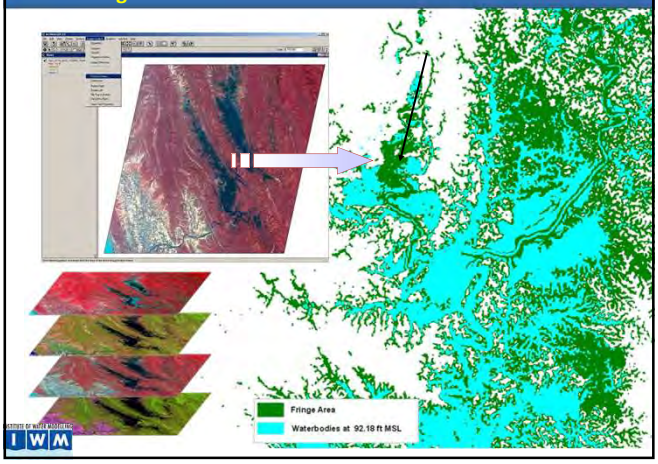

## Interpretation of Satellite Imagery



## Finding Inundation using Sat. Image and relate to WL




## Fringe Area which are inundated at WL 100.68 ft MSL




## Process Automation for Flood Forecasting and Warning

Mobile Applications for data collection and Flood forecast mapping

## Flood Forecasting

*Source: FFWC Website*
*http://www.ffwc.gov.bd*
*Access date: 6-Oct-2016*

## Geo-Spatial Data Capturing

- Manual Survey
- Digital Survey
- Satellite Images
- Aerial Photograph
- UAV/Drone

## IWM provides following Supports in the field of Geomatics Surveying

a) Establish Geodetic Control Points
b) Topographic Survey and Mapping for Urban are/Irrigation Projects etc.
c) Engineering Route survey for Railway, Road, Embankment
d) Use Remote sensing for Rural and Urban area
e) Satellite-based Global Positioning
f) Hydrographic/Bathymetric Survey in Marin and Inland Rivers

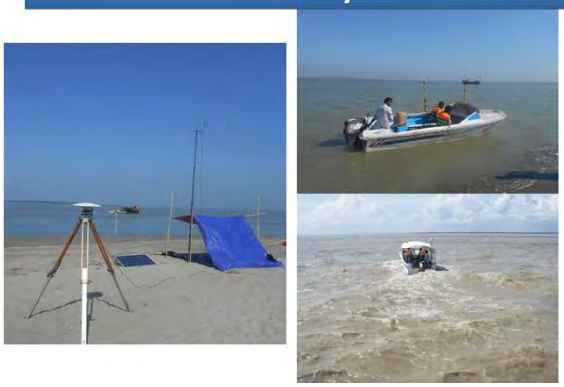
## IWM use Equipment for Geomatics surveying

- Trimble SPS 855 GNSS Receiver
- Ashtech ProFlex 500 GNSS Receiver
- Ashtech Pro Mark 200 GNSS Receiver
- Trimble 4000 ssi GPS Receiver
- Trimble S5 Robotic Total Station
- Trimble M3 Mechanical Total Station
- SOKKIA Total Stations (Model- 550X, 550RX, 230R, SET 620 etc)
- SOKKIA Digital Level DL-30

## Robotic and Mechanical Total Stations is used for land topography survey

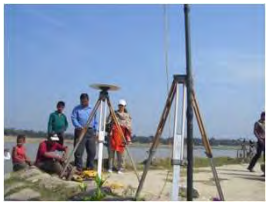
## Establish Geodetic Control Points
## (Use RTK GNSS Receiver for Static and Real-time correction method)

## RTK GNSS GPS is used for Bathymetric Survey

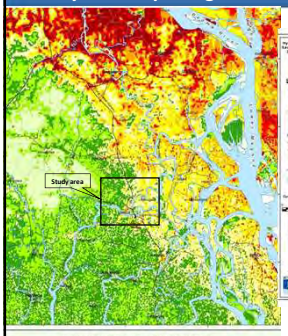


## RTK-GPS and Echo Sounder (bathymetric survey)

URTK-GPS and Echosounder in Spatial data collection works (bathymetric survey)



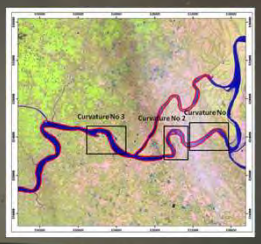
## Hydro morphological study to save the Guide bund at Barisal

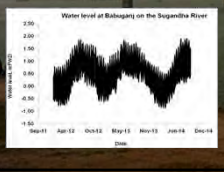


➢The average ground elevation varies from about 1 mPWD to 3 mPWD within the study area

➢The study area is vulnerable to cyclones during the monsoon season when storm surges can cause dramatic increases in water level of up to 4m above tide and seasonal levels

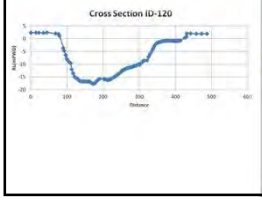
## Study Area



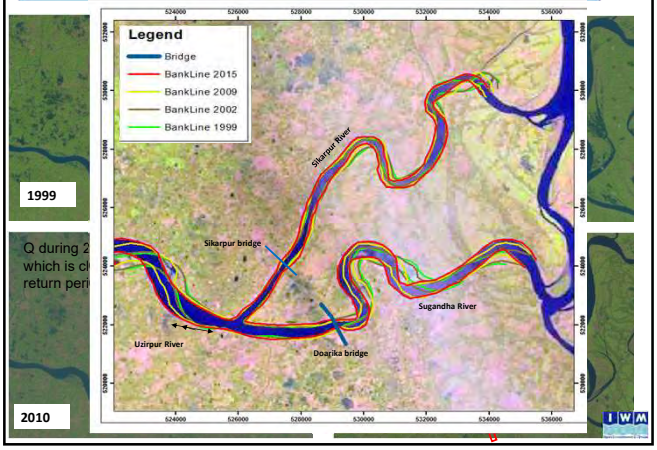




| Curvature No | Thalweg Length (m) | Valley Length (m) | Sinuosity |
|---|---|---|---|
| 1 | 3,880.32 | 3,110.13 | 1.25 |
| 2 | 6,289.24 | 2,941.01 | 2.14 |
| 3 | 6,091.25 | 5,041.26 | 1.21 |

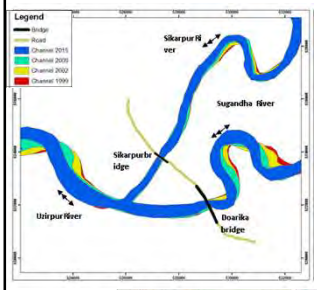
## Survey works- Bathymetry Survey to develop model



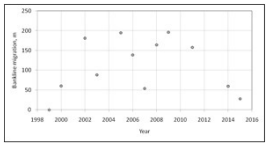
## Secondary Data Analysis (Morphological)




## Secondary Data Analysis (Morphological)




Range of bank erosion at immediate upstream of the Doarika bridge is from 25 to 200 m



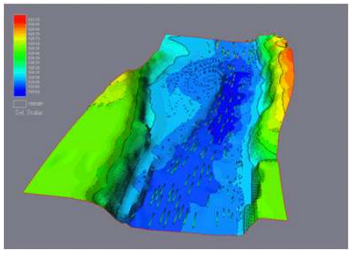
## Mathematical Modelling : tool to understand and assess morpho-dynamics of the Sugandha River focusing the bridge area

- 1-Dimensional Modelling (Mike11)

  Provides boundary conditions for 2-D modelling

- 2-Dimensional Modelling (Mike21C)

  Provides the hydraulic design variables to the proposed measure



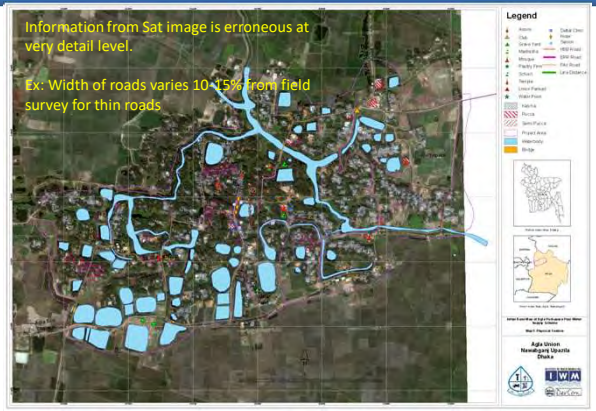
## IWM-Study: Applying UAV technology for geo-spatial analysis

- Study Partners
  - IWM
  - Aplombtech

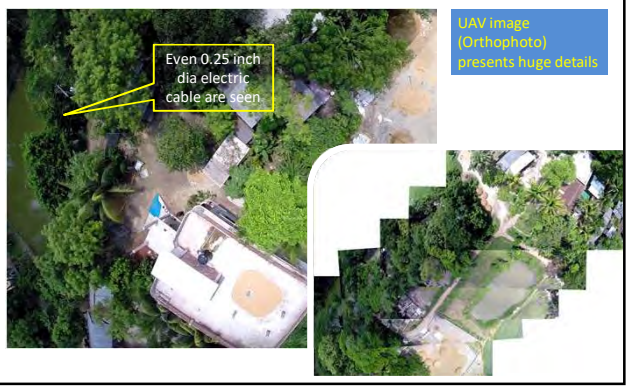
Objectives:

- Generate Orthophoto
- Digital Surface Model
- Digital Terrain Model
- 3D Point Cloud
- 3D Model

## Satellite Image

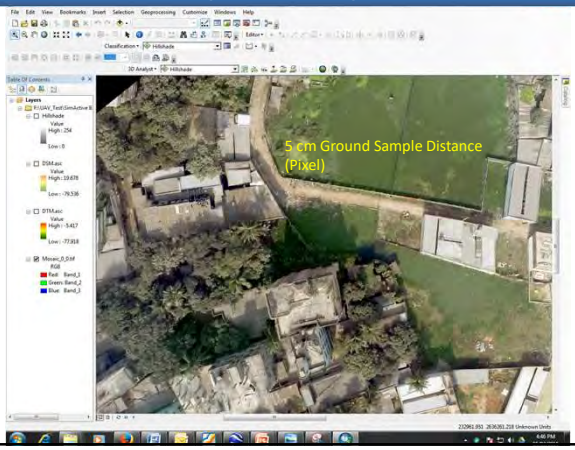



## Very High Level of Details: Agla, Nawabganj, Dhaka

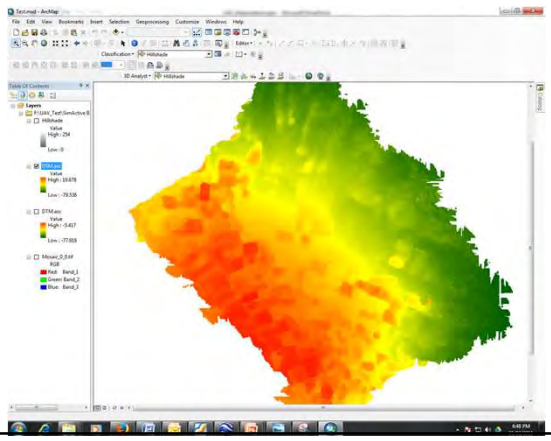



## Case Study: Study Area

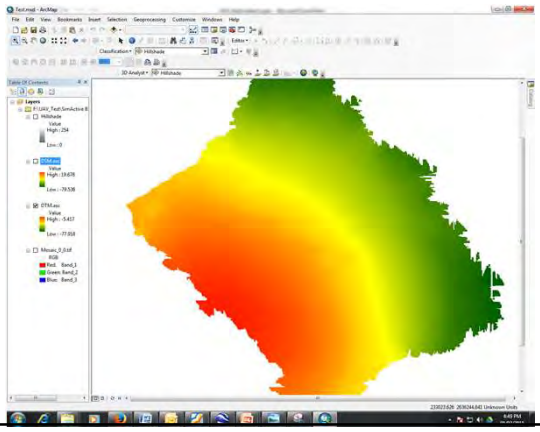
## Output: Orthophoto



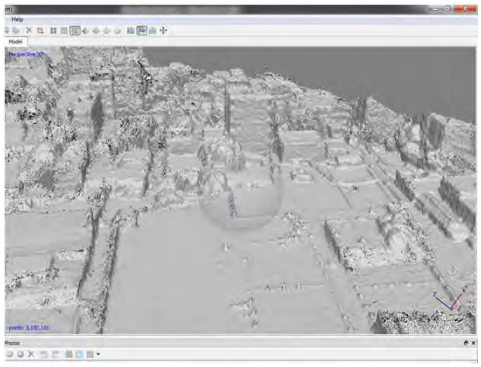

## Output: Digital Surface Model



## Output: Digital Terrain Model



## Output: 3D Point Clouds (DSM)

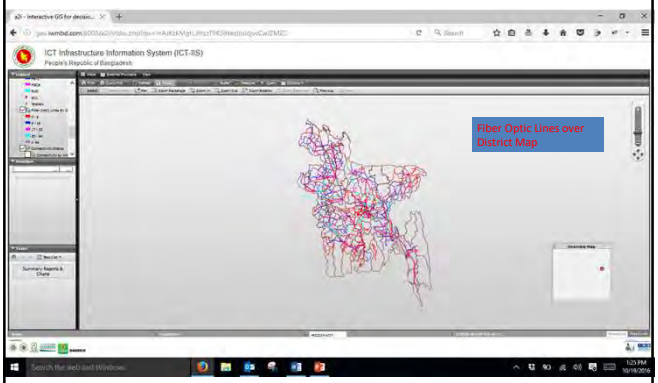


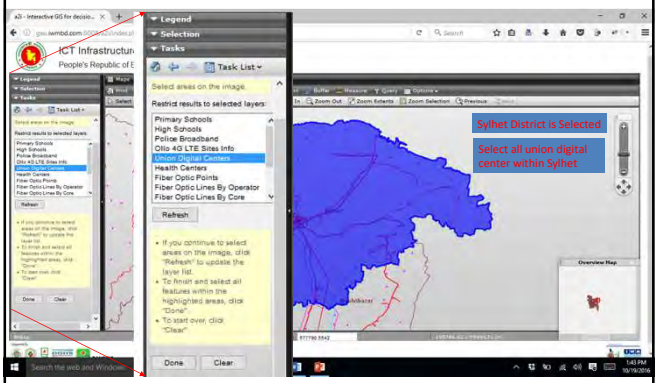
## Output: 3D Model

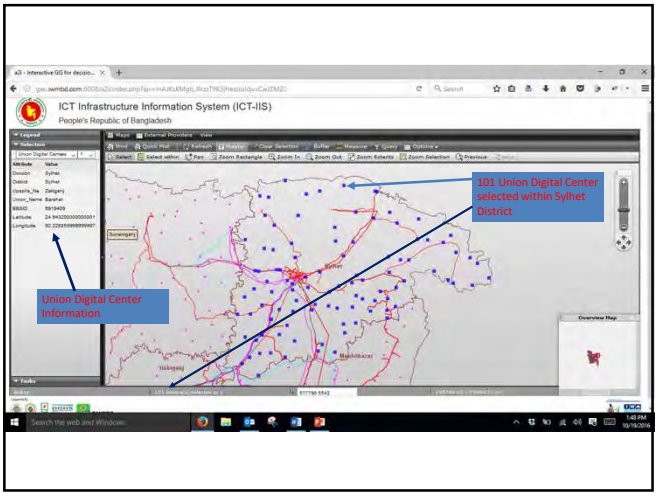
- Carrier: Indigenous Quad-Copter
  - Made by Aplombtech, Dhaka, Bangladesh
- Flight Planning: Mission Planner2
  - Customized by Aplombtech, Dhaka, Bangladesh
- Coding: MATLAB
- Image Processing Software:
  - Pix4DMapper, Switzerland
  - Agisoft PhotoScan Pro, Russia
  - Correlator3D, SimActive, Canada

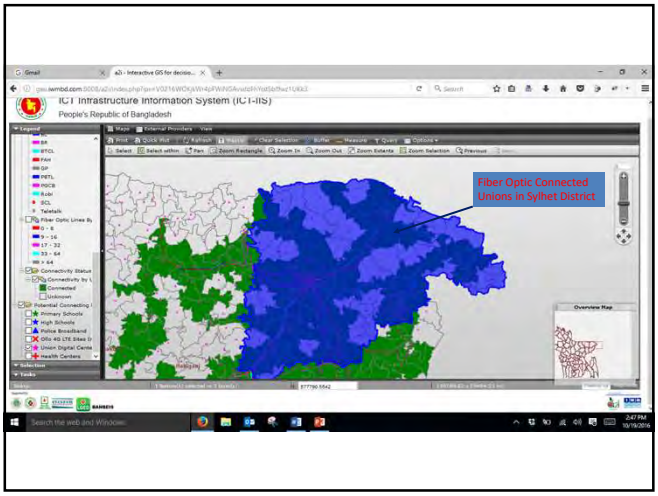
For 100 km2

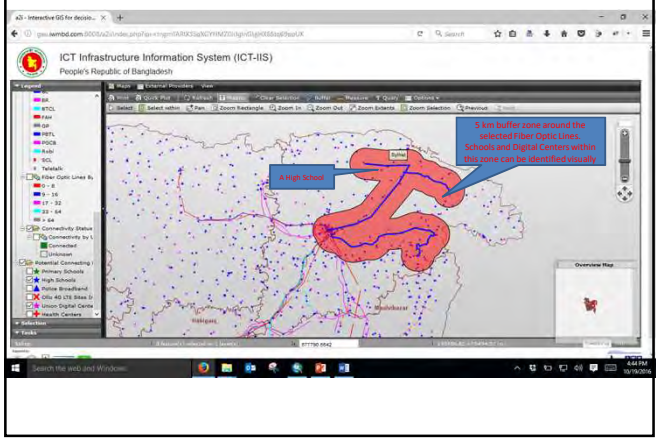
| | Field Survey | UAV |
|---|---|---|
| Time | 80 days | 10 days |
| Person | 800 man-days | 20 man-days |



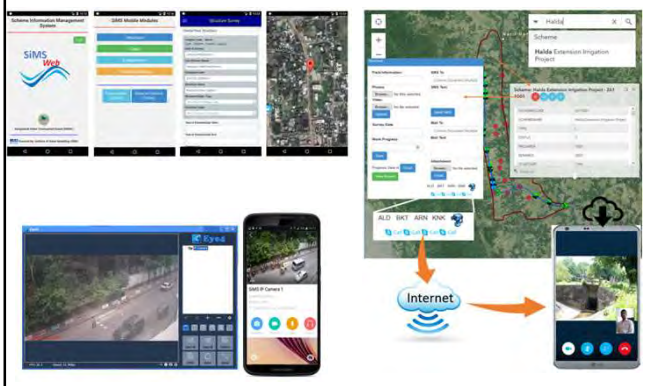






## Scheme Information System




62

## Recommendations

- There should be a common and standard data capturing, processing and development system of GIS data
- There should be a common projection systems among the GIS users organization

NDSI

63

## Recommendations

- Select Standard
  - Projection System
  - Data Capturing Procedures
  - Quality Check List
  - a set of guidelines for GIS data sharing considering data security and royalty among the GO-NGO organizations
- A Common National Metadata Standard, a National GIS to be developed and enforced

NDSI

64

## Issues to Consider

- Data/Metadata Access – Policy at national/organizational level
  - A National Data Center as ONE STOP
- Development Platform
  - Should be roust and reliable
    - Support should ensured
    - Sustainable development support
    - Expandable and upgradable

Freeware/low cost option should not be compromise with long term support and development scopes

65

## IWM participation

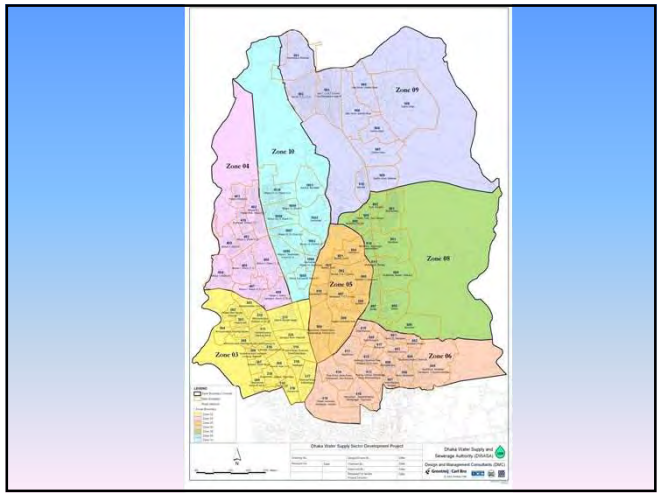
- IWM is a Govt. Trust under the Ministry of Water Resources
- IWM prepare and generate data for different projects
- IWM retains huge quantity of GoB data
- The data are maintained under the restriction of contract clauses
- IWM would be a good user of NDSI
- IWM could
  - Support NSDI with
    - Knowledge, Experiences, Technical support gained over decades
    - Data
- IWM also has the ability to participate in NSDI development, if required
- IWM is a sustainable, dependable and trusted organization by the GoB

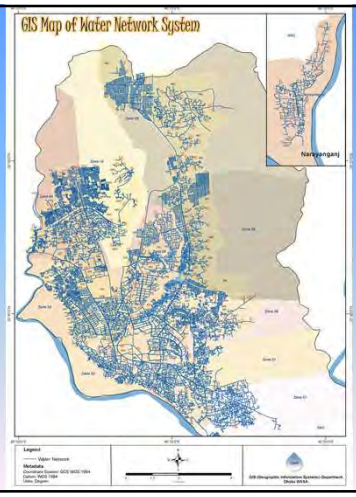
66

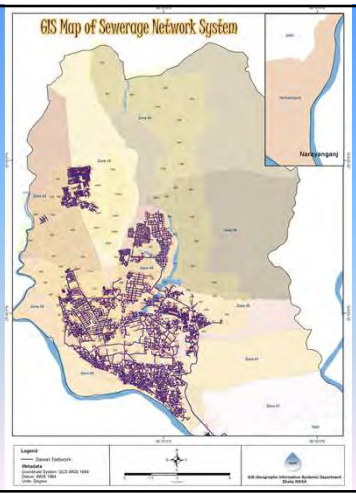
Thank You

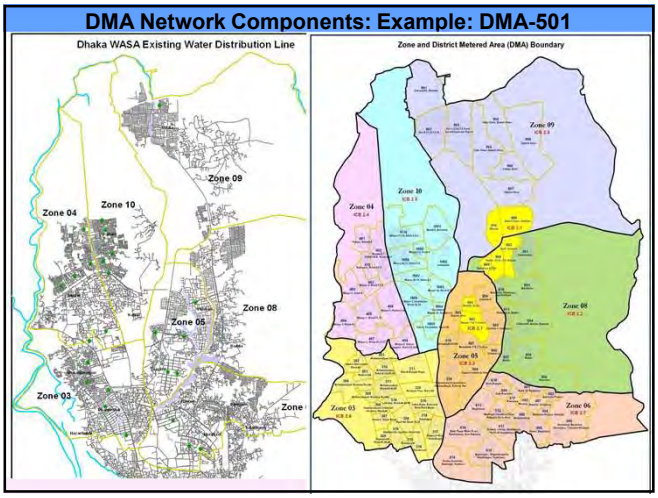
## GIS Data at Dhaka WASA

K.M. Khalid Ahsan
Sr. Systems Analyst (GIS & MIS)

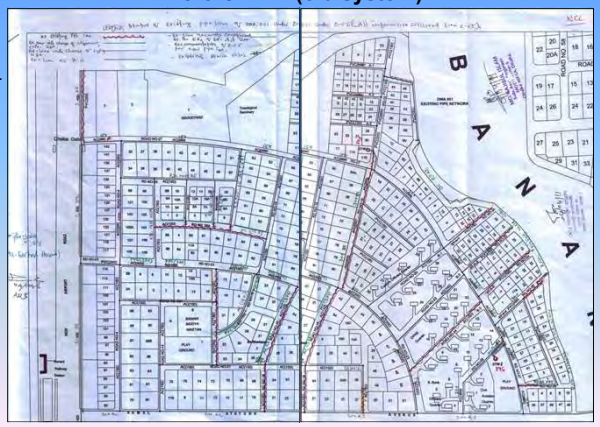




## DMA Network Components
## Before DMA (old system)



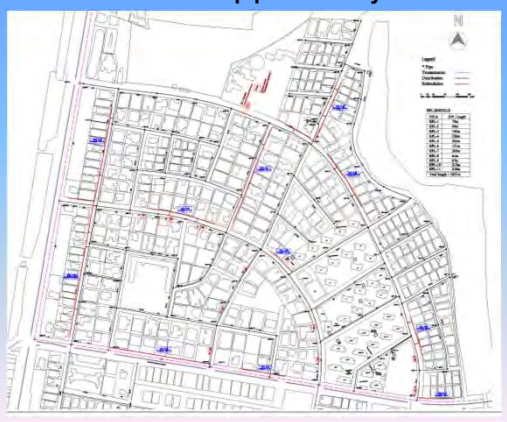

## DMA Network Components
## After DMA creation

## DMA Network Components
## (mains and reticulations pipes, HDPE)

## DMA Network Components
## Sluice valves location

## DMA Network Components
## Bulk meter chambers

## DMA Network Components
## Reticulation pipes / tertiary network



## DMA Network Components
## Service connections

## DMA Network Components
## PTWs

## GIS Shapefile Data Format

| | Fields | ID | WGS_X | WGS_Y | Ward | Thana | DMA_ID | Zone_ID | Datum | Elev_m |
|---|---|---|---|---|---|---|---|---|---|---|
| DTM | Explanations | | X coordinate in WGS 84 (Degree Decimal) | Y coordinate in WGS 84 (Degree Decimal) | Name of Ward | Name of Thana | DMA ID | Zone ID | SOB/ PWD/ Others | Elevation in (m) |
| | Format | Number (15 digit) | Number (1 digit precision) | Number (1 digit precision) | Text (50) | Text (50) | Number (5) | Number (5) | Text (10) | Number 5 (2 digit precision) |

| | Fields | Package | Contractor | LastUpdate |
|---|---|---|---|---|
| DTM | Explanations | Package ID: e.g. ICB 2.1, ICB 2.2 | Name of Contractor | Date on which database was last updated. (dd/mm/yy) |
| | Format | Text (10) | Text (100) | Date |

| Digitizer | LastUpdate | Elev_m | DMA_ID | ID | WGS_X | WGS_Y |
|---|---|---|---|---|---|---|
| Decode | 6/20/2013 | 2.24 | 811 | 1 | 90.42495 | 23.78551 |
| Decode | 6/20/2013 | 4.04 | 811 | 2 | 90.42505 | 23.78551 |
| Decode | 6/20/2013 | 2.83 | 811 | 3 | 90.42515 | 23.78551 |
| Decode | 6/20/2013 | 2.84 | 811 | 4 | 90.42525 | 23.78552 |
| Decode | 6/20/2013 | 2.24 | 811 | 5 | 90.42466 | 23.7856 |
| Decode | 6/20/2013 | 2.24 | 811 | 6 | 90.42476 | 23.7856 |
| Decode | 6/20/2013 | 2.24 | 811 | 7 | 90.42485 | 23.7856 |
| Decode | 6/20/2013 | 2.24 | 811 | 8 | 90.42495 | 23.7856 |
| Decode | 6/20/2013 | 4.2 | 811 | 9 | 90.42505 | 23.7856 |
| Decode | 6/20/2013 | 2.83 | 811 | 10 | 90.42515 | 23.7856 |
| Decode | 6/20/2013 | 2.84 | 811 | 11 | 90.42525 | 23.78561 |
| Decode | 6/20/2013 | 2.85 | 811 | 12 | 90.42534 | 23.78561 |
| Decode | 6/20/2013 | 2.86 | 811 | 13 | 90.42544 | 23.78561 |
| Decode | 6/20/2013 | 2.87 | 811 | 14 | 90.42554 | 23.78561 |
| Decode | 6/20/2013 | 2.89 | 811 | 15 | 90.42564 | 23.78561 |

## Road Double Line(Polyline)

| | Fields | ID | Name | Ward | Thana | DMA_ID | Zone_ID | Category | DataSource | Length_m |
|---|---|---|---|---|---|---|---|---|---|---|
| Road (Double Line) Geometry -Polyline | Explanations | | Name of Road | Name of Ward | Name of Thana | DMA ID | Zone ID | DCC/ RHD/ LGED/ Others | Name of Source Authority(DCC,Rajuk,Survey) | Length in (m) |
| | Format | Number (15 digit) | Text (100) | Text (50) | Text (50) | Number (5) | Number (5) | Text (10) | Text (10) | Number (2 digit precision) |

| | Fields | Package | Contractor | LastUpdate |
|---|---|---|---|---|
| Road (Double Line) | Explanations | Package ID: e.g. ICB 2.1, ICB 2.2 | Name of Contractor | Date on which database was last updated (dd/mm/yy) |
| | Format | Text (10) | Text (100) | Date |

## Road Double line

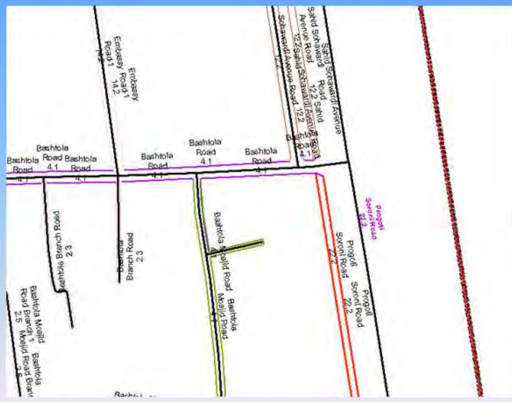
## Footh Path(Polyline)

| | Fields | ID | Name | Location | DMA_ID | Surface | Data_Source | Width_m | Package | Contractor | LastUpdate |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Footh_Path(Polygone) | Explanations | | Name of Road | Name of Location | DMA ID | Concrete/Brick/Earth | Name of Source Authority(DCC,Rajuk,Survey) | Width in (m) | Package ID: e.g. ICB 2.1, ICB 2.2 | Name of Contractor | Date on which database was last updated (dd/mm/yy) |
| | Format | Number (15 digit) | Text (100) | Text (50) | Number (5) | Text (10) | Text (10) | Number (2 digit precision) | Text (10) | Text (100) | Date |

## Road Centerline(Polyline)

| | Fields | ID | Name | Location | Ward | Thana | DMA_ID | Zone_ID | Category | Surface | DataSource | Width_m | Length_m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Road_centerline(Polyline) | Explanations | | Name of Road | Name of Location | Name of Ward | Name of Thana | DMA ID | Zone ID | DCC/ RHD/ LGED/ Others | Bituminous/ Concrete/ Earthy/Foot Path/Others | Name of Source Authority | Width in (m) | Length in (m) |
| | Format | Number (15 digit) | Text (100) | Text (50) | Text (50) | Text (50) | Number (5) | Number (5) | Text (10) | Text (20) | Text (10) | Number (2 digit precision) | Number (2 digit precision) |
| Road_centerline | Fields | Package | Contractor | LastUpdate | | | | | | | | | |
| | Explanations | Package ID: e.g. ICB 2.1, ICB 2.2 | Name of Contractor | Date on which database was last updated. (dd/mm/yy) | | | | | | | | | |
| | Format | Text (10) | Text (100) | Date | | | | | | | | | |

## Road Centerline




## Water body(Polygone)

| | Fields | ID | Category | Name | Area_sqkm | Package | Contractor | LastUpdate |
|---|---|---|---|---|---|---|---|---|
| Waterbody(Polygone) | Explanations | | River/ Lake/ Pond/ Storage Reservoir/ Others | Name of Water-body | Area in (sqkm) | Package ID: e.g. ICB 2.1, ICB 2.2 | Name of Contractor | Date on which database was last updated. (dd/mm/yy) |
| | Format | Number (15 digit) | Text (10) | Text (50) | Number (2 digit precision) | Text (10) | Text (100) | Date |

## Railway Line(polyline)

| | Fields | ID | Gauge | Location | Ward | Thana | DMA_ID | Zone_ID | DataSource | Length_m | Package | Contractor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Railway(Polyline) | Explanations | | Broad-gauge/ Meter-gauge/ Others | | | | DMA ID | Zone ID | CEGIS/ DMDP/ Others | Length in (m) | Package ID: e.g. ICB 2.1, ICB 2.2 Package | Name of Contractor Contractor |
| | Format | Number (15 digit) | Text (20) | Text (50) | Text (50) | Text (50) | Number (5) | Number (5) | Text (10) | Number (2 digit precision) | Text (10) | Text (100) |
| Railway | Fields | Mauza_Name | Plot No. | Digitizer | LastUpdate | | | | | | | |
| | Explanations | This Field is optional. | This Field is optional. | Name of the person who digitized | Date on which database was last updated. (dd/mm/yy) | | | | | | | |
| | Format | Text(100) | Number | Text (100) | Date | | | | | | | |

## Building(Polygone)

| | Fields | ID | Category | Storey | Population | Cus_Type | HC_ID | Location | Ward | Thana | DMA_ID | Zone_ID | Area_sqm | Package | Contractor | Digitizer | LastUpdate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Building | Explanations | First 3 digits DMA ID, then 08 and last 4 digits building ID. e.g. 501080001, 910080010 | Roof/ Tin-shed/ Under Construction/ Tower/ Others | No of Storey | Total Population in Building | Residential/ Commercial/ Others | Corresponding ID of the House Connections | | | | DMA ID | Zone ID | Area in (sqm) | Package ID: e.g. ICB 2.1, ICB 2.2 | Name of Contractor | Name of the person who digitized | Date on which database was last updated. (dd/mm/yy) |
| | Format | Number (15 digit) | Text (20) | Number (5) | Number (5) | Text (10) | Number (15 digit) | Text (50) | Text (50) | Text (50) | Number (5) | Number (5) | Number (2 digit precision) | Text (10) | Text (100) | Text (100) | Date |
| | Fields | Mauza Name | Plot No | Plot No | Owner name | Account no | Holding No | | | | | | | | | | |
| | Explanations | | RS This Field is optional. | CS This Field is Mandatory | Name of Owner | Customer Account No | Holding no | | | | | | | | | | |
| | Format | | Text(100) | Text(100) | Text(100) | Text(100) | Text(100) | | | | | | | | | | |

## Bridge(Polygone)

| | Fields | ID | Category | Name | Location | Ward | Thana | DMA_ID | Zone_ID | Data Source | Length_m | Width_m | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bridge | Explanations | | Bridge/ Culvert/ Flyover/ Others | | | | | DMA ID | Zone ID | BBA/ RHD/ LGED/ Others | Length in (m) | | Package ID: e.g. ICB 2.1, ICB 2.2 |
| | Format | Number (15 digit) | Text (10) | Text (100) | Text (50) | Text (50) | Text (50) | Number (5) | Number (5) | Text (10) | Number (2 digit precision) | Number (2 digit precision) | Text (10) |
| Bridge | Fields | Contractor | LastUpdate | | | | | | | | | | |
| | Explanations | Name of Contractor | Date on which database was last updated. (dd/mm/yy) | | | | | | | | | | |
| | Format | Text (100) | Date | | | | | | | | | | |

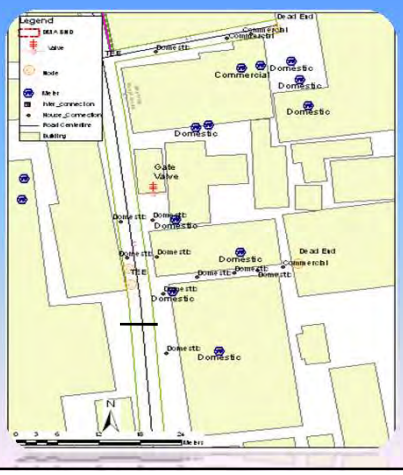
## As-built Network: House Connection(Polyline)

| | Fields | HC_ID | Meter_ID | DMA_ID | Zone_ID | Owner_Name | Account_No | Address | Cell_Phone | Ref_PipeID | Dia_mm |
|---|---|---|---|---|---|---|---|---|---|---|---|
| House Connection | Explanations | First 3 digits DMA ID, then 05 and last 4 digits Service Connection ID. e.g. 501050001, 910050010 | Reference Domestic Meter ID | DMA ID | Zone ID | Name of the Owner | Customer Account No. | Holding No. and Address of the Owner | Mobile No. | Reference Distribution Pipe ID | Diameter of house connection pipe line in mm |
| | Format | Number (15 digit) | Number (15 digit) | Number (5 digit) | Number (5 digit) | Text (100) | String (100) | Text (100) | Number (15 Digit) | Number (15 digit) | Number (5 digit) |

| | Fields | Building_ID | Cus_Type | Length_m | PV_elev_m | PV_L_m | WGS_X | WGS_Y | Elev_m | StreetName | Location |
|---|---|---|---|---|---|---|---|---|---|---|---|
| House Connection | Explanations | ID of the Building in shape files | Residential/ Commercial/Industrial | Length of House Connection Pipe | Elevation of Float Valve (PV) in m. | Length of pipe, connected from domestic meter up to PV, in m. | Main line connection point X coordinate in WGS 84 (Degree Decimal) | Main line connection point Y coordinate in WGS 84 (Degree Decimal) | Elevation of house connection pipe at corresponding junction in m | Name of the Street | Name of Location |
| | Format | Number (5 digit) | Text (20) | Number(Upto two digit precisions) | Number(Upto two digit precisions) | Number(Upto two digit precisions) | Number (1 digit Precision) | Number (1 digit Precision ) | Number 5 (2 digit Precision) | Text (100) | Text (50) |

| | Fields | Thana | Package | Contractor | Digitizer | LastUpdate |
|---|---|---|---|---|---|---|
| House Connection | Explanations | Name of Thana | Package ID: e.g. ICB 2.1, ICB 2.2 | Name of Contractor | Name of the person who digitized | Date on which database was last updated. (dd/mm/yy) |
| | Format | Text (50) | Text (10) | Text (100) | Text (100) | Date |

## As-built Network: House Connection (Polyline)




## As-built Network: Pipe Network & Node

| | Fields | Pipe_ID | Dia_mm | Material | Length_m | Category | DMA_ID | Zone_ID | From_Nd_ID | To_Nd_ID | Ins_Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pipe(Line) | Explanations | First 3 digits DMA ID, then 01 and last 4 digits pipe ID. e.g. 501010001, 910010010 | Nominal Diameter of Pipe in mm | HDPE / PVC / DI | Length of pipe in meter | Reticulation / Distribution/ Transmission | DMA ID | Zone ID | Start Node ID | End Node ID | Date of Pipe Installation (dd/mm/yy) |
| | Format | Number (15 digit) | Number (5 digit) | Text (20) | Number (2 digit Precision) | Text (20) | Number (5 digit) | Number (5 digit) | Number (15 digit) | Number (15 digit) | Date |

| | Fields | StreetName | Location | Thana | HCs_No | Supplier | Package | Contractor | Digitizer | Model ID | LastUpdate |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pipe | Explanations | Name of the Street | Name of Location | Name of Thana | No. of House Connections from that pipe | Name of Pipe Supplying company | Package ID: e.g. ICB 2.1, ICB 2.2 | Name of Contractor | First name of the person who digitized | Pipe_ID in Design Model | Date on which database was last updated. (dd/mm/yy) |
| | Format | Text (100) | Text (50) | Text (50) | Number (5 digit) | Text (100) | Text (10) | Text (100) | Text (100) | String (15) | Date |

| | Fields | Node_ID | DMA_ID | Zone_ID | Node_Type | WGS_X | WGS_Y | Elev_m | Elev_Type | StreetName | Location |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Node(Point) | Explanations | First 3 digits DMA ID, then 02 and last 4 digits Node ID. e.g. 501020001, 910020010 | DMA ID | Zone ID | TEE / Cross / Elbow / Dead END/ Reducer | X coordinate in WGS 84 (Degree Decimal) | Y coordinate in WGS 84 (Degree Decimal) | Elevation of node in m | PWD / SOB / Others | Name of the Street | Name of Location |
| | Format | Number (15 digit) | Number (5 digit) | Number (5 digit) | Text (20) | Number (1 digit Precision) | Number (1 digit Precision) | Number 5 (2 digit Precision) | Text (20) | Text (100) | Text (50) |

| | Fields | Thana | Package | Contractor | Digitizer | LastUpdate |
|---|---|---|---|---|---|---|
| Node | Explanations | Name of Thana | Package ID: e.g. ICB 2.1, ICB 2.2 | Name of Contractor | Name of the person who digitized | Date on which database was last updated (dd/mm/yy) |
| | Format | Text (50) | Text (10) | Text (100) | Text (100) | Date |

## Pipe Network

## As-built Network: Valve & Meter

| | Fields | Valve_ID | Product_ID | DMA_ID | Zone_ID | Type | Dia_mm | WGS_X | WGS_Y | Elev_m | Ref_PipeID |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Valve(point) | Explanations | First 3 digits DMA ID, then 03 and last 4 digits Valve ID. e.g 501030001, 910030010 | Valves Specification ID from Suppliers | DMA ID | Zone ID | Sluice Valve / Air Release Valve / Pressure Sustaining Valve / Non-return Valves etc. | Diameter of valve in mm | X coordinate in WGS 84 (Degree Decimal) | Y coordinate in WGS 84 (Degree Decimal) | Elevation of valve in m | Reference Pipe ID |
| | Format | Number (15 digit) | String (50) | Number (5 digit) | Number (5 digit) | Text (50) | Number (5 digit) | Number (1 digit Precision) | Number (1 digit Precision) | Number 5 (2 digit Precision) | Number (15 digit) |

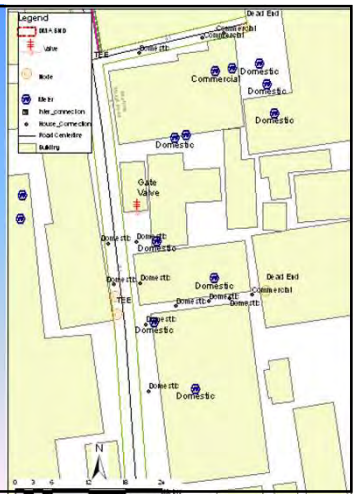
| | Fields | Status | Supplier | StreetName | Location | InfrastrNm | Thana | Package | Contractor | Digitizer | LastUpdate |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Valve | Explanations | Closed / Open | Name of Manufacturer / Suppliers | Name of the Street | Name of Location | Name of Nearest Infrastructure | Name of Thana | Package ID e.g. ICB 2.1, ICB 2.2 | Name of Contractor | Name of the person who digitized | Date on which database was last updated (dd/mm/yy) |
| | Format | Text (20) | Text (100) | Text (100) | Text (50) | Text (100) | Text (50) | Text (10) | Text (100) | Text (100) | Date |

| | Fields | Meter_ID | Product_ID | DMA_ID | Zone_ID | Met_Type | Cus_Type | Dia_mm | Elev_m | WGS_X | WGS_Y |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Meter(Point) | Explanations | First 3 digits DMA ID, then 04 and last 4 digits Meter ID. e.g. 501040001, 910040010 | Meters Specification ID from Suppliers | DMA ID | Zone ID | Bulk Meter / Domestic Meter | Residential / Commercial/Industrial | Diameter of meter in mm | Elevation of meter in m | X coordinate in WGS 84 (Degree Decimal) | Y coordinate in WGS 84 (Degree Decimal) |
| | Format | Number (15 digit) | String (50) | Number (5 digit) | Number (5 digit) | Text (20) | Text (20) | Number (5 digit) | Number 5 (2 digit Precision) | Number (1 digit Precision) | Number (1 digit Precision) |

| | Fields | Ref_PipeID | Supplier | StreetName | Location | Thana | Package | Contractor | Digitizer | LastUpdate |
|---|---|---|---|---|---|---|---|---|---|---|
| Meter | Explanations | Distribution Pipe ID for Bulk Meters and House Connection ID for Domestic Meters | Name of Manufacturer / Suppliers | Name of the Street | Name of Location | Name of Thana | Package ID: e.g. ICB 2.1, ICB 2.2 | Name of Contractor | Name of the person who digitized | Date on which database was last updated (dd/mm/yy) |
| | Format | Number (15 digit) | Text (100) | Text (100) | Text (50) | Text (50) | Text (10) | Text (100) | Text (100) | Date |

| | Fields | Owner Name | Account No | Holding No |
|---|---|---|---|---|
| Meter | Explanations | Name of Owner | Customer Account No | Holding no |
| | Format | Text | Text | Text |

## As-built Network: Valve & Meter



## As-built Network: Inter Connection & Utility Crossing

| | Fields | IC_ID | DMA_ID | Zone_ID | WGS_X | WGS_Y | Type | Dia_mm | Ref_PipeID | GV_No | Meter_No |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Inter-connection (Point) | Explanations | First 3 digits DMA ID, then 06 and last 4 digits Interconnection ID, e.g. 501060001, 910060010 | DMA ID | Zone ID | X coordinate in WGS 84 (Degree Decimal) | Y coordinate in WGS 84 (Degree Decimal) | Inter-DMA Connection or Transmission Main Connection | Common Diameter of inter-connection chamber equipements in mm | Reference Pipe ID | No. of Gate Valves at Interconnection chamber | No. of Meters at Interconnection chamber |
| | Format | Number (15 digit) | Number (5 digit) | Number (5 digit) | Number (1 digit Precision) | Number (1 digit Precision) | Text (20) | Number (5 digit) | Number (15 digit) | Number (5 digit) | Number (5 digit) |

| | Fields | PRV_No | PSV_No | NRV_No | StreetName | Location | Thana | Package | Contractor | Digitizer | LastUpdate |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Inter-connection | Explanations | No. of PRV at Interconnection chamber | No. of PSV at Interconnection chamber | No. of Non-return Valves at Interconnection chamber | Name of the Street | Name of Location | Name of Thana | Package ID. e.g. ICB 2.1, ICB 2.2 | Name of Contractor | Name of the person who digitized | Date on which database was last updated (dd/mm/yy) |
| | Format | Number (5 digit) | Number (5 digit) | Number (5 digit) | Text (100) | Text (50) | Text (50) | Text (10) | Text (100) | Text (100) | Date |

| | Fields | Utility_ID | DMA_ID | Zone_ID | WGS_X | WGS_Y | Type | Ref_PipeID | Elev_m | StreetName | Location |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Utility_Crossing (Point) | Explanations | First 3 digits DMA ID, then 07 and last 4 digits Crossing ID, e.g. 501070001, 910070010 | DMA ID | Zone ID | X coordinate in WGS 84 (Degree Decimal) | Y coordinate in WGS 84 (Degree Decimal) | Sewer, Telephone, Electricity Cable, Gas Pipe etc. | Reference Pipe ID that is crossed by the utility | Elevation of crossing point in m | Name of the Street | Name of Location |
| | Format | Number (15 digit) | Number (5 digit) | Number (5 digit) | Number (1 digit Precision) | Number (1 digit Precision) | Text (20) | Number (15 digit) | Number 5 (2 digit Precision) | Text (100) | Text (50) |

| | Fields | Thana | Package | Contractor | Digitizer | LastUpdate |
|---|---|---|---|---|---|---|
| Utility_Crossing | Explanations | Name of Thana | Package ID. e.g. ICB 2.1, ICB 2.2 | Name of Contractor | Name of the person who digitized | Date on which database was last updated. (dd/mm/yy) |
| | Format | Text (50) | Text (10) | Text (100) | Text (100) | Date |

**Projection System GEOGRAPHIC kept in all Shapefile & Satellite Image**

# Glimpses into LGED's GIS Activities and

## Pilot Project and System Design Concept for NSDI Construction in Bangladesh

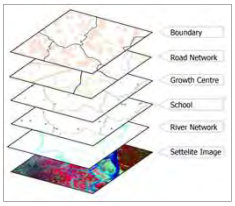
## LGED GIS UNIT

**GIS Unit**

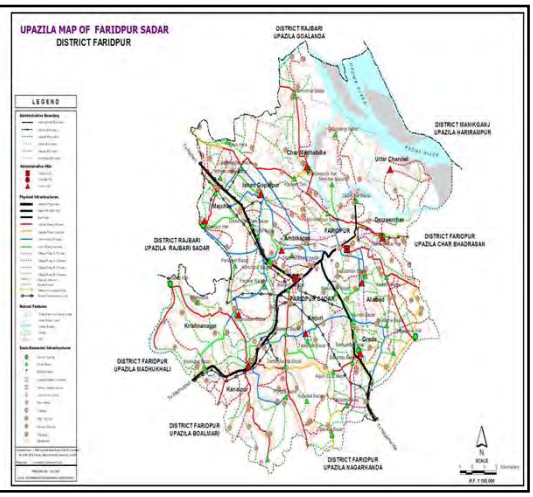
- Established **in 1992**
- One of the core units of LGED
- Dedicatedly involved in planning, monitoring and implementing of development activities of LGED

**Geo Spatial database**

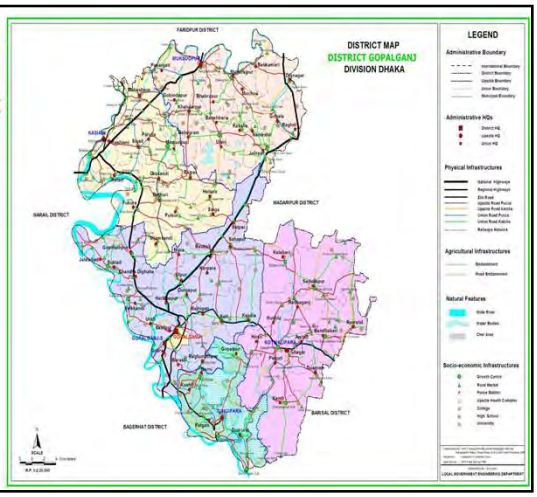
- **17 layers** of information
- Covers **491 Upazila** (Sub-District)
- Different analytical maps in terms of accessibility
- Municipal area Map
- LGED GIS Portal (www.gis.lged.gov.bd )



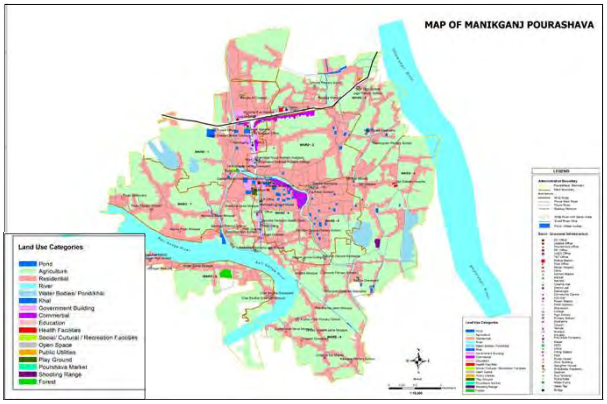

## GIS Upazila Map



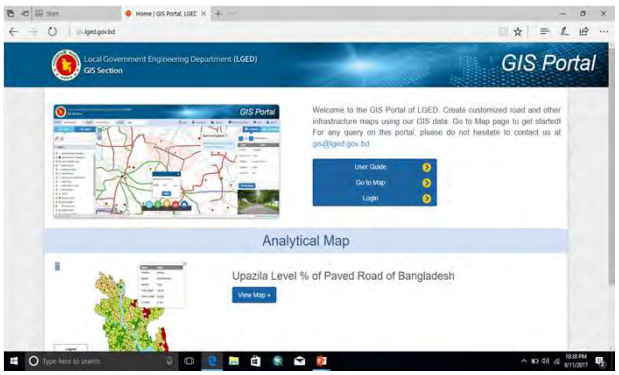

## GIS District Map




## Municipal Area Map



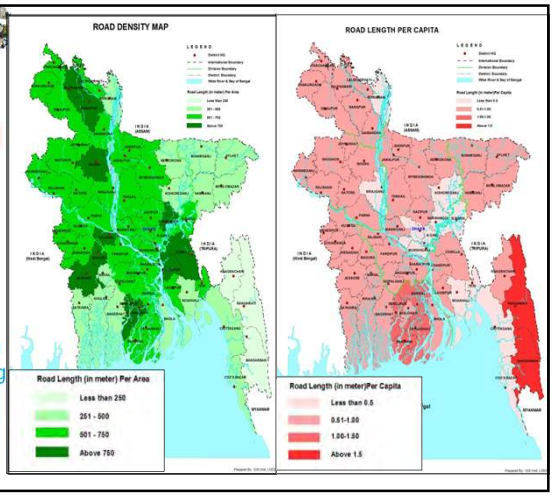

## LGED GIS Portal (www.gis.lged.gov.bd )




http://gis.lged.gov.bd

# Analytical Works

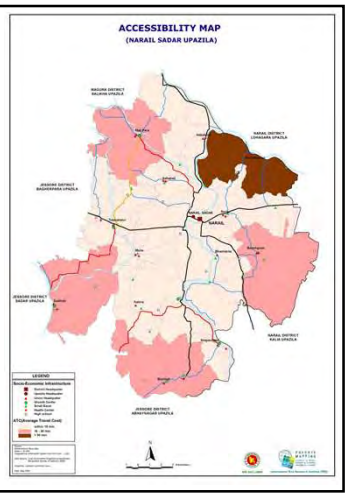
## Road Density and Road Length per Capita: Helps Planners & Decision Makers in prioritizing areas




## Physical Accessibility Analysis

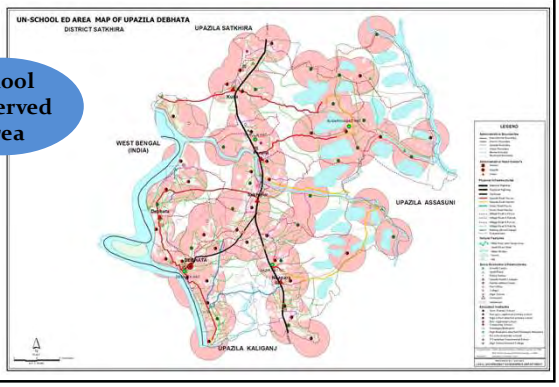
Helps Planners & Decision makers regarding

- Public quick access to service delivery organizations & institution
- Agricultural and food commodity quick access to Markets & Growth Centers




## Primary School Mapping and Planning

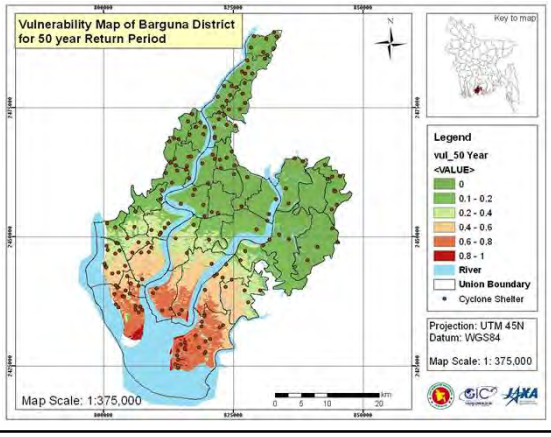
School un-served area




## School Mapping of PEDP

Helps to prioritize where new building is necessary

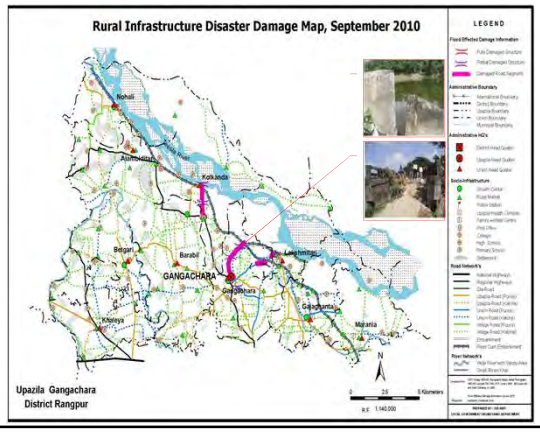
## Vulnerability Map of Cyclone Disaster



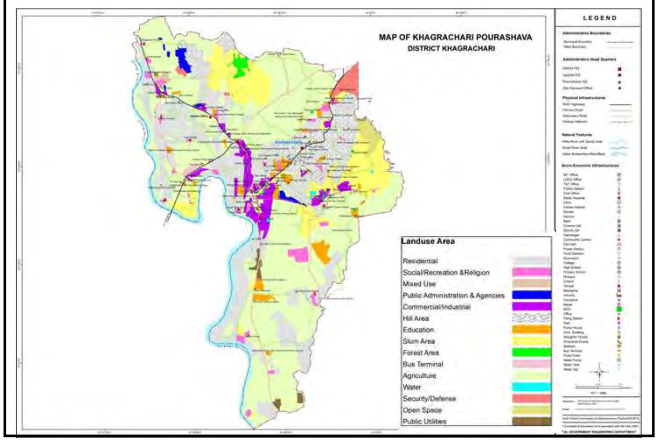



LGED

## GIS Disaster Damage Map




## GIS Land use Map of Pourashavaing




## NSDI Pilot Project

## Important Issues

**Draft NSDI ACT & Survey Act**

Coordination bet Govt. Depts

Review similar acts

More WG Meeting

## Important Issues

Standardization of Existing Database

Capacity Development of Major Contributors

Training

Resource Allocation

Participation Agreement

## Important Issues

**Creating & Updating Database**

- Incomplete database
- Noises in database
- Survey & Processing
  - Resource
  - Training

## Roadmap to NSDI

**Legal Framework-** WG to be involved in every activity.
-Data policy & formulation of guideline may be started earlier

**Geographic Information Standards:** In study, research & creation of domestic standard LGED & WG may be involved

**Topographical Map in Other Cities:** LGED can play vital role in the preparation of this large scale map

**IT SERVICES:** In Construction & demonstration of administrative information provision system regarding disaster prevention & environment, LGED may be involved

**HRD/Technology Dev./Promotion/New Industry Dev:** In Examination & dissemination in Local Government Intitutions' Work, LGED can play significant role.

## Data Sharing Policy:

- Data should be given to other Government organization free of cost.
- Fees may be taken from non-government organization

THANK YOU

GeoDASH

# GEODASH.GOV.BD

A web-based application and platform for developing geospatial information systems (GIS) and for deploying spatial data infrastructure (SDI)

GeoDASH

## What GeoDASH Offer

- ✓ Standard, facebook, google+ login.
- ✓ Shape formatted layers
- ✓ OSM formatted layers
- ✓ CSV formatted layers
- ✓ TIF formatted layers
- ✓ Documents
- ✓ Dock favourite layers, maps, documents and organizations
- ✓ Create map with layers
- ✓ Style layers
- ✓ Pan maps
- ✓ Get FeatureInfo
- ✓ Measure length
- ✓ Measure Area
- ✓ Zoom in/ Out
- ✓ 3D map view
- ✓ Print map
- ✓ Download layer and metadata
- ✓ Connect to other GeoServer(s)
- ✓ Filter / select by attribute
- ✓ Data chart view
- ✓ Radius search
- ✓ Query on Map
- ✓ Cross joining of layers
- ✓ Wiki

2

GeoDASH

## GeoDASH Home Page Overview

Sections: Development partners, Layer, map, Doc, org, news, search, dashboard, featured layer, Message, Notification, User profile, Language, wiki, Android app, Usage of GeoDASH

3

GeoDASH

## GeoDASH Advantages

- It has a built-in map composer and viewer, tools for analysis, and reporting.
- Different agency and personnel can share their spatial data on GeoDASH and collaborate with each other for using different layer stack shared differently through the public or permissioned access of each layer.
- It allows the integrated creation of data, metadata, and map visualizations. Each dataset in the system can be shared publicly or restricted to allow access to only specific users.
- Social features like user profiles and commenting and rating systems allow for the development of communities around each platform to facilitate the use, management, and quality control of the data the GeoDASH instance contains.
- It allows connectivity between several GeoDASH like SDIs to augment the collaborative potential of govt. and non govt. GIS databases.

4

GeoDASH

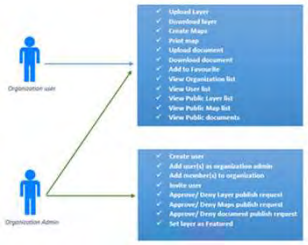
## Some Live Example

- Location of Educational Institutions in Bangladesh + Extreme Poverty Map of Bangladesh
- Dhaka Road System + Dhaka Schools ( to see the accessibility of Schools in Dhaka)
- Dhaka Population Literacy Rate + Dhaka Schools
- Dhaka Hospitals + Dhaka Population 2011 ( see the distribution of hospitals against population density)
- Flood Affected Upazilas in 2015 + Absolute Poverty map of Bangladesh

5

GeoDASH

## Role Management For Organization Admin And User




6

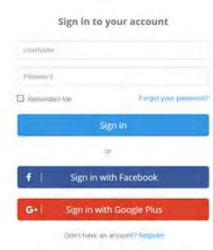
GeoDASH

## User Registration

7

GeoDASH

## Sign-in

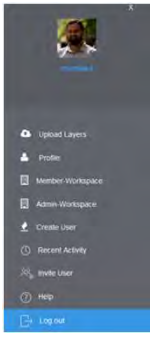



8

GeoDASH

## User Profile For Admin

Profile for Admin, user- Profile (User must update their profile), member wp, Admin wp, recent activity, create user, invite user, help




9

GeoDASH

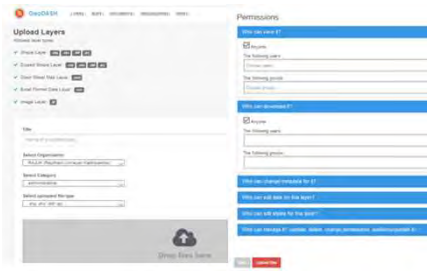
## User Profile Detail

10

GeoDASH

## Upload Layer

Upload layer (shape, Zip Shape, OSM, CSV, tif) & set permission, update Metadata

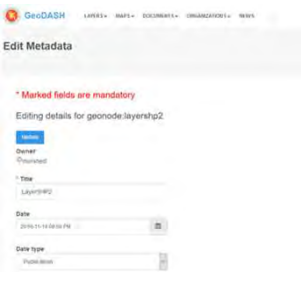



11

GeoDASH

## Metadata Update

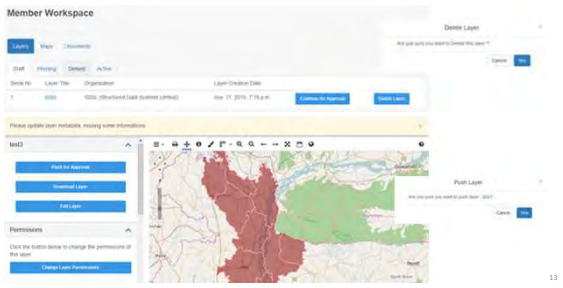
Why Metadata is Important?




12

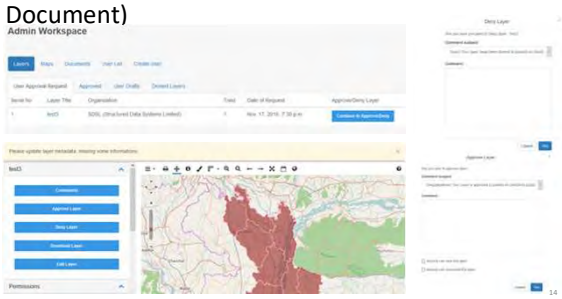
GeoDASH

## Push For Approval By User (Layer, Map, Document)




GeoDASH

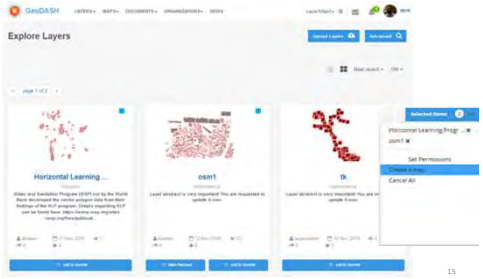
## Admin Approval And Deny (Layer, Map, Document)




GeoDASH

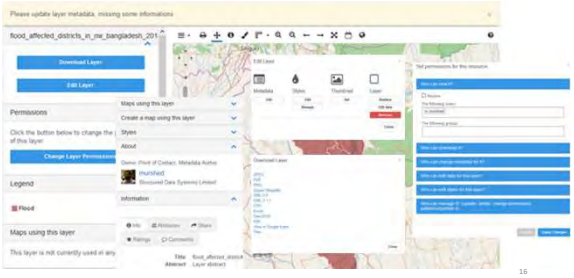
## Layer Explore

Layer explore: Select layer, Make feature, Favourite, sorting, list view, Advance search, layer info icons




GeoDASH

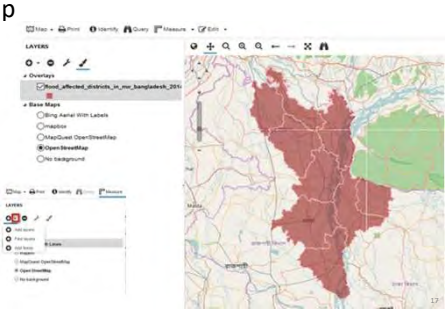
## Layer Detail Page Operations



GeoDASH

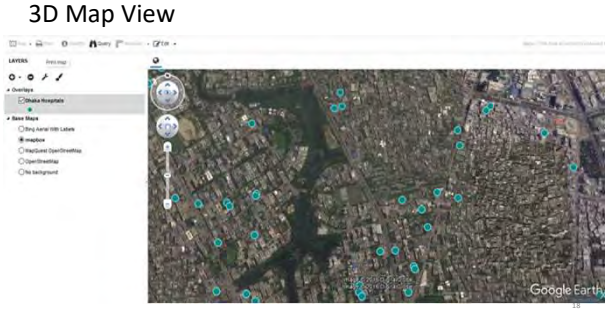
## Create Map

Set base map, Add layers, Add new server, find layers, Map save, Publish map, Print map, Identify, Query, Measure, Edit, 3D view, pan, zoom dragging box, zoom, last/next lavel zoom, max extent map, chart, search by radius



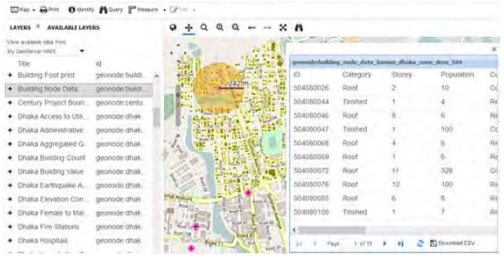
GeoDASH

## 3D Map View



GeoDASH

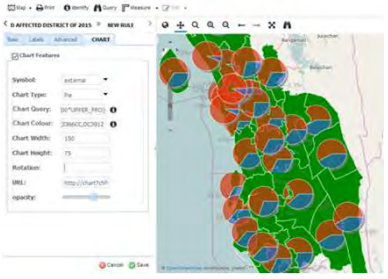
## Search By Radius



19

GeoDASH

## Chart View

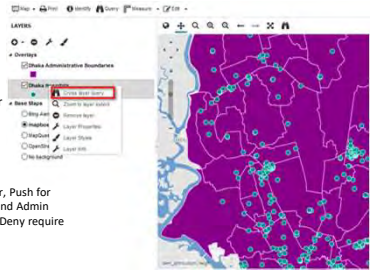


20

GeoDASH

## Cross Joining

cross joining, zoom to layer extent, remove layer, layer properties, Layer style, Layer info

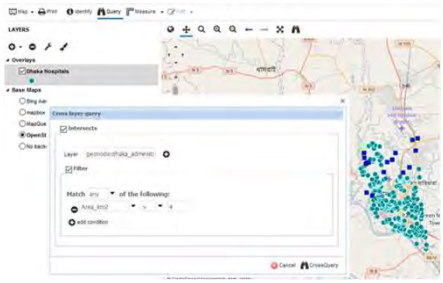


Remember, Push for approval and Admin approval /Deny require

21

GeoDASH

## Cross Joining Result

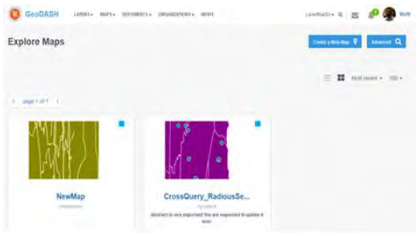


22

GeoDASH

## Explore Map

Explore map, sorting, list view set permission, feverous, map info, map detail page, download, edit, change permission

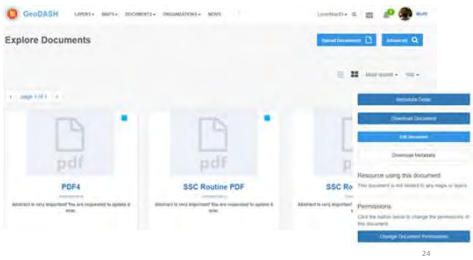



23

GeoDASH

## Explore Map

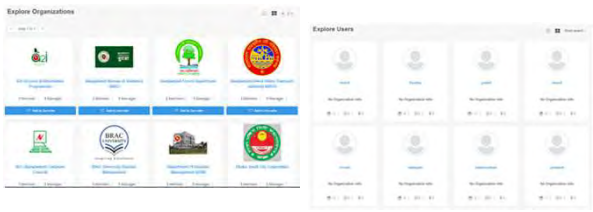
Explore Doc: Select Doc – set permission, Favourite, sorting, list view, Advance search, layer info icons




24

GeoDASH

## Explore Organizations & Users




25

GeoDASH

## News & Dashboard

26

GeoDASH

## User Manual On WIKI (geodash.gov.bd/wiki/)

27

National Spatial Data Infrastructure (NSDI) for Bangladesh

# Products and Services from SOB

**Syed Mohammad Masum**
*Asst. Director (Survey)*
*In-Charge, GIS Unit*
*In-Charge, Digital Cartographic Unit*
*Survey of Bangladesh*

## Scope

- Introduction
- Photogrammetric Resources & Probable Contribution
- GIS Resources & Probable Contribution
- Cartographic Resources & Probable Contribution

## Introduction

## NSDI Components

CLEARING HOUSE | WEB PORTAL | GIS DATA SERVERS

META DATA

FRAMEWORK | SPATIAL DATA

STANDARDS

PARTNERSHIP & ORGANIZATIONS

## Photogrammetric Resources & Probable Contribution

## Aerial Photographs

## Chronological history of Aerial Photography in Bangladesh

| Sl. | Year | Scale | Name of Company | Area |
|---|---|---|---|---|
| 1 | 1974-75 | 1:30,000 | Capital Air Survey Limited, Canada | All over the country |
| 2 | 1977 | 1:5,000 | Bangladesh Air Force | Dhaka City |
| 3 | 1981-82 | 1:50,000<br>1:30,000<br>1:15,000 | Capital Ari Survey Limited, Canada | Sundarban & Chittagong |
| 4 | 1983-84 | 1:50,000<br>1:15,000 | IGN France | All over the country |
| 5 | 1990-91 | 1:50,000<br>1:30,000<br>1:20,000 | Finnmap International, Finland | Coastal area, Jamuna & Surrounding |
| 6 | 1995 | 1:30,000<br>1:20,000 | Quasco Company, Australia | Chittagong, Cox's Bazar, Mymensingh |
| 7 | 1998 | 1:50,000 | Finnmap International, Finland | Coastal Area |
| 8 | 1999-2001 | 1:25,000 | Kevron Pvt Ltd. Australia | All over the country |
| 9 | 2003 | 1:20,000 | SOB/JICA/Asia Air Survey | Dhaka City |
| 10 | 2010-11 | 50 cm GSD | Passco Finnmap International | All over the Country |
| | | 25cm GSD | | Chittagong, Khulna, Rajshahi, Barisal & Sylhet City |

## Satellite Imagery

## Photogrammetric Hardware and Software

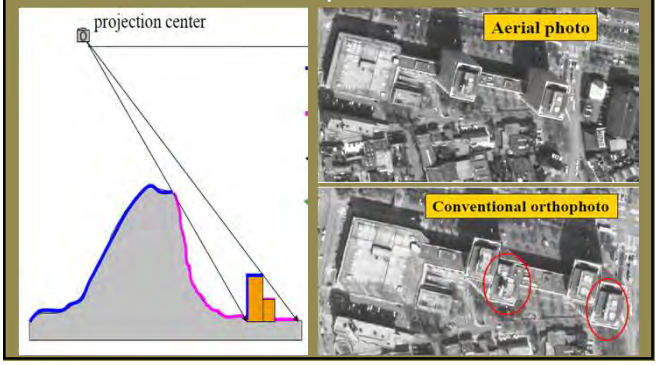
| | |
|---|---|
| Workstation | 90 |
| Aerial Triangulation | 30 |
| DTM & Orthophoto | 20 |
| 2D Workstation | 02 |
| Software | |
| Summit Evolution with AutoCAD Map3d | 63 |
| Summit Evolution with ArcGIS | 02 |
| DT Master, Ortho Master, Ortho Vista | 20 |
| Plotter | 02 |

## Probable Contribution for NSDI

### Stereo Plotted Data

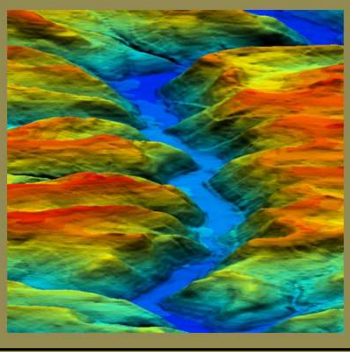
## Probable Contribution for NSDI

### Orthophoto



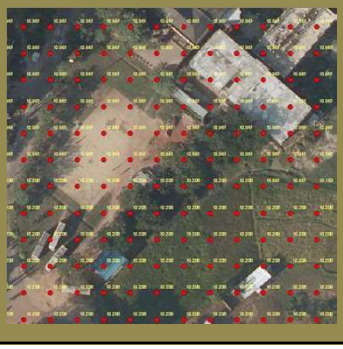

## Probable Contribution for NSDI

### Digital Elevation Model



## Probable Contribution for NSDI

Dense and Accurate Spot Height



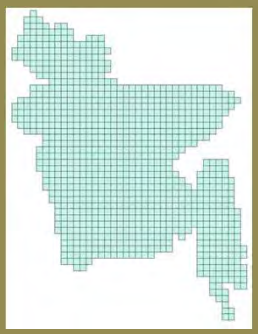
## Probable Contribution for NSDI

Accurate Contours with minimum interval

# GIS Resources & Probable Contribution

## GIS Database

- 1 : 5,000 Scale
- 1 : 25,000 Scale
- 1 : 50,000 Scale
- 1 : 250,000 Scale
- 1 : 1,000,000 Scale



## GIS Database

Properties of the Base GIS Database of 1:25K

| | |
|---|---|
| Number of Sheets : | 980 |
| Number of Feature Datasets: | 11 |
| Number of Feature classes: | 68 |
| Number of Subtype: | 303 |
| Coordinate System: | BUTM2010 |
| Coordinate Components: | (X,Y,Z) |
| Data Format: | ESRI Geodatabase |

## GIS Hardware and Software

| | |
|---|---|
| Workstation | 37 |
| Software | |
| ArcGIS (ArcEditor) | 30 |
| ArcGIS (ArcInfo) | 07 |
| ArcGIS Server | 01 |
| ArcSDE | 01 |
| Data Reviewer | 05 |
| Workflow Manager | 04 |
| Production Manager | 02 |
| SQL Server | 01 |
| Plotter | 01 |
| Line Scanner | 01 |

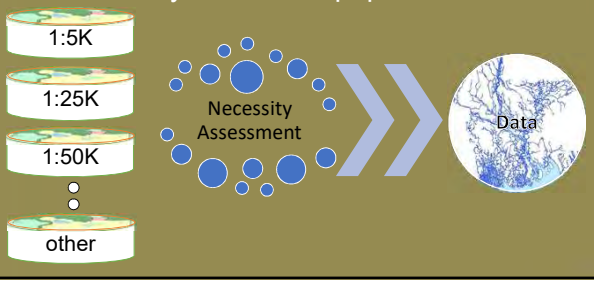
## Probable Contribution for NSDI

Providing Fundamental Geospatial Data (FGD)

can be used as the basis for the referencing of any other spatial data in a country.

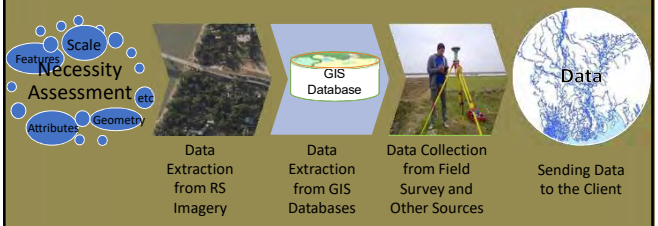
## Probable Contribution for NSDI

Providing GIS data from different scale based **Ready Database** according to the category of necessity in different popular formats



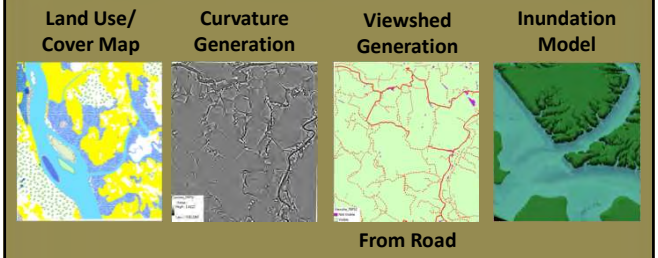

## Probable Contribution for NSDI

Providing **on demand** GIS data for specific purposes




## Probable Contribution for NSDI

Providing Analytical Products




## Metadata

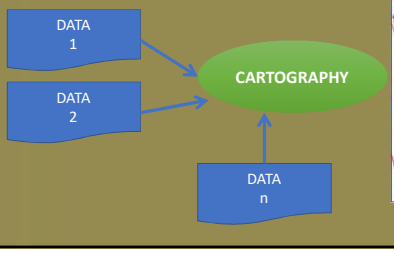
- Source of the data
- Purpose of the data
- Time and date of creation
- Creator or author of the data
- Method, Projection, Coordinate and Datum System
- Limitations of the Data

SoB will provide comprehensive metadata for its own all spatial data with a standard format and may delineate the standard template for all other stakeholders to provide their metadata

# Cartographic Resources & Probable Contribution

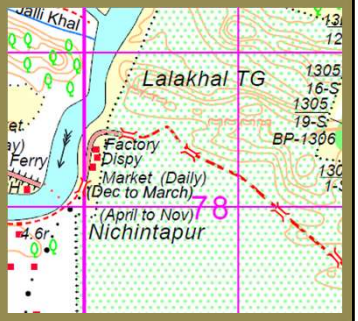
## Cartography

The Science and Art to produce different types of Maps of different scale for different Purposes with the data from different Sources



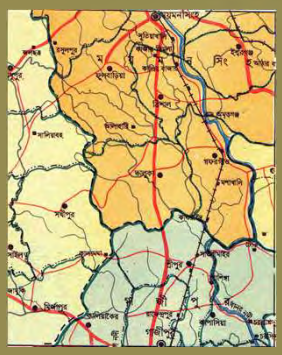
## Topographic Map

- 1 : 5,000 Scale
- 1 : 25,000 Scale
- 1 : 50,000 Scale
- 1 : 250,000 Scale
- 1 : 1,000,000 Scale




## Other Map

- District Map
- Division Map
- City Guide Map
- Ancient Monument Map
- Communication Map
- Etc.

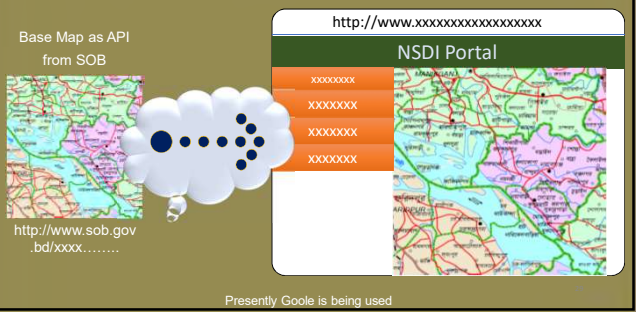


## Cartographic Hardware and Software

| | |
|---|---|
| Workstation | 45 |
| Software | |
| ArcGIS (ArcEditor) | 42 |
| ArcGIS (ArcInfo) | 03 |
| ArcGIS Server | 01 |
| Production Mapping | 45 |
| Plotter | 01 |
| Line Scanner | 01 |

## Probable Contribution for NSDI

Providing Base Map as API for the NSDI Portal and Geoportal of Other Organizations




Presently Goole is being used

## Probable Contribution for NSDI

Providing Different Maps in most of the popular formats (such as)

- .tiff
- .jpeg,
- .pdf
- etc

## Probable Contribution for NSDI

- Representation Rules including Symbology
- Layout Templates
- Grid Templates
- Color Chart
- Annotation Styles

# Project for Strengthen the Capacity on Advanced Mapping of SOB for Building Digital Bangladesh
## - Making the Roadmap to Establish NSDI -

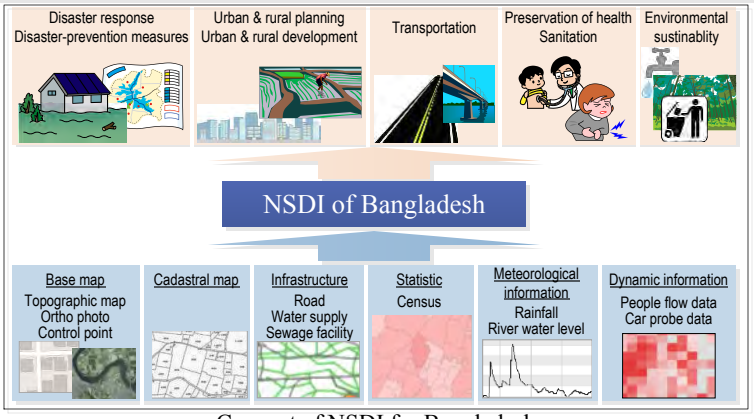
As of 12th September, 2017

## 1. NSDI Seminar in Bangladesh

International seminar on National Spatial Data Infrastructure (NSDI) for Bangladesh was held on 1st and 2nd June, 2016, attended by Honorable Prime Minister Madam Sheikh Hasina.

Honorable Prime Minister mentioned as follows:

- NSDI would help development planning of the land, ensuring optimum utilization of the land.
- NSDI will preserve geo-spatial data in same platform helping all users to use the data according to their need, which we feel very much at the time of taking a project.
- A national committee led by the Ministry of Defense will be formed to formulate short and long term plan, fix up action strategy and provide necessary assistance to develop the NSDI.

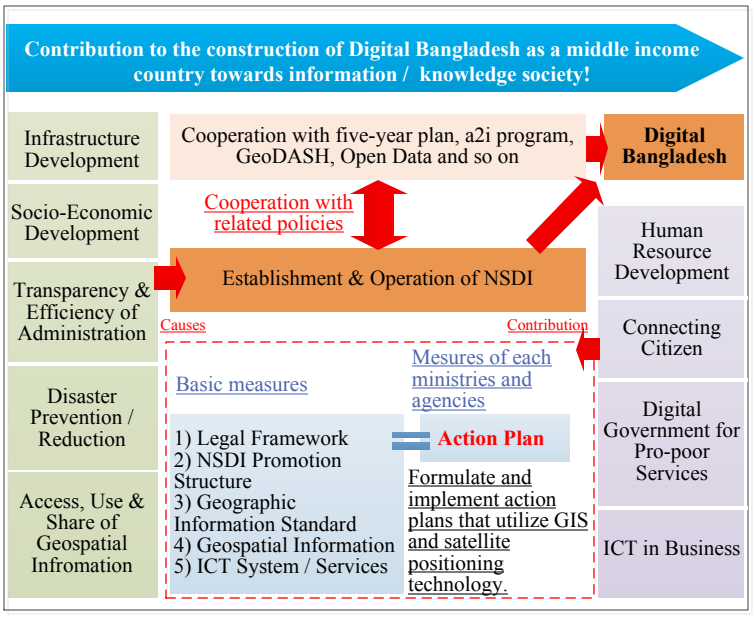



Concept of NSDI for Bangladesh

## 2. Basic Principles concerning Establishment & Operation of NSDI

Basic principles concerning basic measures and formulation and implementation of action plan of each ministry and agency are suggested as follows:

- As basic measures for establishment and operation of NSDI, development and provide of geospatial information, promote the use of GIS and satellite positioning technology, human resource development, research & development, and strengthen cooperation among related organizations.
- 1) Effective and efficient management of public facilities, 2) Promotion of disaster prevention / reduction measures, 3) Use, maintenance and preservation of the land, 4) Improvement of agricultural productivity, and 5) Protection of the people's lives and property, are applied GIS and satellite positioning technology.
- Improve the efficiency, sophisticated (advanced) and transparency of administrative management of the central and local governments.
- Provide diverse services that contribute to the improvement of convenience for citizens regardless of difference of rich and poor, literacy abilities, place of residence in urban and rural areas.
- Create and develop diverse businesses utilizing GIS & satellite positioning and harmonize with the envirnment.
- Pay attention to protection of personal information, promotion of secondary use of public data, and consideration of national security.




Concept for Establishment and Operation of NSDI

## 3. Main Activities and Setting Period for Roadmap to Establish NSDI (Draft)

| | Preparation Period | Infrastructure Formation / Dissemination Period | Operation Period (Medium-term / Long-term Plan) |
|---|---|---|---|
| Period | Now − June 2018 | July 2018 − June 2021 | Medium-term: July 2021 − June 2026<br>Long-term: July 2026 − June 2031 |
| Objective | Implement preparation work required to establish NSDI | Building and operation of NSDI, solving of various issues | Promote utilization of NSDI |
| Main activities | ❖ Building of Geo-portal website (Prototype version)<br>❖ Passage of Survey Act (Including required regulations)<br>❖ Passage of NSDI Act (Including required regulations)<br>❖ Determination of disclosure range/method of SOB geographic information<br>❖ Preparation for expansion of GNSS CORS<br>❖ Completion of digital topographic map (1:25,000 and 1:5,000)<br>❖ Preparation for establishment of NSDI Committee | ❖ Building of NSDI platform<br>❖ Establishment of NSDI Committee and working group activities (Activities to solve various issues)<br>❖ Creation of primary data/demonstration of updating<br>❖ Expansion of continuous operating reference stations<br>❖ Updating and release of digital topographic map of Dhaka<br>❖ Review of base map updating technique<br>❖ Changing SOB organization and development of human resources/management system | ❖ Periodic updating of base maps<br>❖ Development/updating of primary data with high importance<br>❖ Expansion/deployment of NSDI platform<br>❖ Operation, dissemination and use promotion of GNSS CORS<br>❖ Enhance map literacy of citizens |

## 4. Determine Disclosure Range for SOB Geospatial Information

Based on the Survey Act (proposed), it is to determine the content of the geospatial information to be provided/released on the NSDI and release method. The content of operation performed of SOB in Survey Act are as follows:

- Creation of base map and other maps
- Preparation and distribution of DEM, DTM, DSM and ortho photos
- Distribution of map and GIS data
- Base map preparation, distribution and updating
- Preparation and distribution of thematic maps of different scales
- Other work

| Data | | Opened on NSDI | Online site *for purchase* |
|---|---|---|---|
| Topographic maps | 1:5,000<br>1:25,000<br>1:250,000<br>1:1,000,000 | Map tiles/API | PDF/SHP |
| Ortho photo | 1:5,000<br>1:25,000 | Map tiles/API | TIFF |
| DEM | | Map tiles/API | XYZ |
| GCP | BM/GPS points<br>CORS | Position | XYZ/RINEX |

# Project for Strengthen the Capacity on Advanced Mapping of SOB for Building Digital Bangladesh

## 5. Roadmap to Establish NSDI (Draft)

Priority activities on-going/planned | Priority activities needed | Priority activities for future

2017 | 2018 | 2019 | 2020 | 2021 | 2026 | 2031

Preparation Period | Infrastructure Formation / Dissemination Period | 1st Operation Period (8th 5 Years Plan) | 2nd Operation Period (9th 5 Years Plan)

**Legal Framework**
- NSDI Act & New Survey Act, rules
- Making Roadmap
- Planning for NSDI establishment and operation
- Review
- Review
- Formulation of data policy
- Formulation of guidelines
- Formulation of action plan of ministries and agencies utilizing geospatial information etc.
- Incorporation into 8th 5years plan

**NSDI Promotion Structure**
- Establishment of NSDI Committee
- Establishment of WG (Contributors meeting)
- Formulation of operation method
- Enhancement of the functions of secretariat
- Setting and discussing substantive issues to be considered by the working group
- Establish a collaborative system of industry, academia and government etc.

**Geographic Information Standard**
- Establish of domestic deliberation organization
- ▲ Participation in ISO/TC211
- Study and research on geographic information standards
- Standardization of metadata etc.
- Creation of domestic standard of geographic information standard
- Standardization of method of quality evaluation etc.
- Creation of product specification of fundamental geospatial information
- Formulation of promotion of geographic information standard

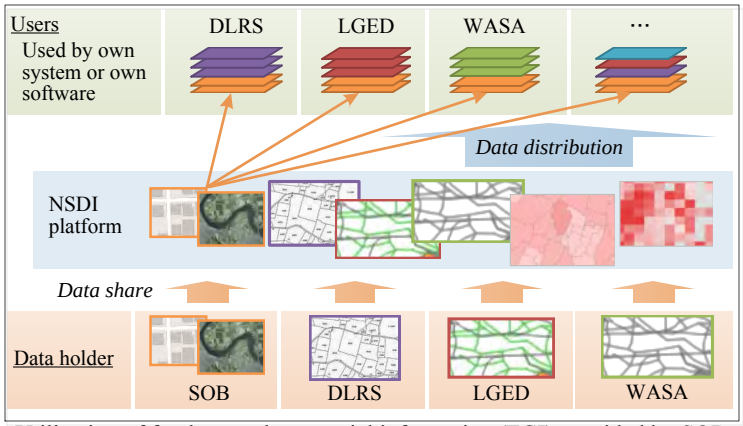
**Geospatial Information**
- Definition of FGI and demonstration
- Creation & update of thematic data
- Promotion of digitization of various geospatial information
- Promotion of collection & digitalization of aerial photo etc.
- Creation of 1:25,000
- Update the national digital topographic map (1:25,000)
- Update of Dhaka city area (1:5,000)
- Update Dhaka city area (1:5,000)
- Creation of large scale map in other local city
- Demonstration of creation of geospatial information of utility facilities
- Extension of CORS and tidal station
- Evaluation of RTK GNSS survey

**IT Service/IT System**
- Geo-portal (prototyepe)
- Construction of NSDI platform system
- Update NSDI platform system
- Development metadata tool
- Study IT service to promote sharing etc.
- Demonstration of administrative system
- Demonstration of local government system
- Improvement of application method
- Improvement of GIS development capabilities
- Construction of CORS data distribution system

**Human Resources Development/Technology Development/Promotion/New Industry Creation**
- Introduction of new technology based on with the needs and study
- Human resource development
- Dissemination of GIS into the work of government agencies
- Holding seminar and workshop on NSDI
- ▲ Presentation to international conference or seminar
- Consideration of creation of new services and industries utilizing GIS and satellite positioning

## 6. Example of using NSDI Platform

NSDI platform system is provided in order to search for and to obtain information related to geospatial information.



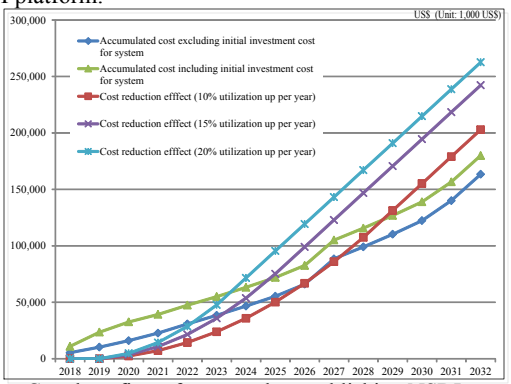

Utilization of fundamental geospatial information (FGI) provided by SOB

## 7. Cost-Benefit Performance by NSDI

The cost-benefit by NSDI will be able to calculate from cost reduction by utilizing geospatial information by the organizations. In case that utilization of NSDI will increase 20% per year, it is estimated that the cost reduction effect will exceed the total cost of initial investment, maintenance and operation, activity, and update of system and data at the end of 4th years after the construction on NSDI platform.

| Cost and Effect of NSDI |
|---|
| Initial cost (2018-2020) |
| US$ 18,300 (Including CORS) |
| O/M cost (Annual Avg) |
| US$ 1,450 |
| Activity cost (Annual Avg) |
| US$ 7,200 |
| Update cost (2027etc.) |
| US$ 14,500 |
| Cost Reduction Effect (Annual Avg) |
| US$ 15,600 -122,990 |

(Unit: 1,000 US$)




Cost-benefit performance by establishing NSDI

Ministry of Defence, Survey of Bangladesh (SOB), in cooperation with: Japan International Cooperation Agency (JICA)

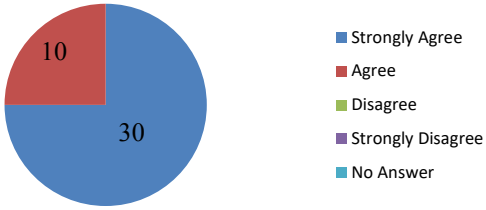
O/M: Operation and maintenace

# 添付資料－18　NSDI ワークショップにおける
# アンケート調査結果

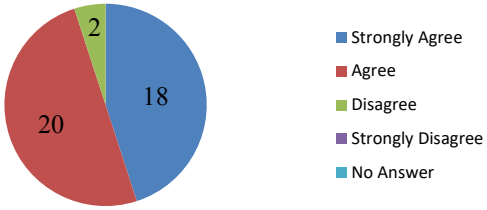
Quetionnarie of NSDI Workshop

| Question | Strongly Agree | Agree | Disagree | Strongly Disagree | No Answer |
|---|---|---|---|---|---|
| a. I understood about the objectives of this workshop. | 30 | 10 | 0 | 0 | 0 |
| b. This workshop lived up to my expectations. | 18 | 20 | 2 | 0 | 0 |
| c.i. I recognized important things in order to establish the NSDI. - Legal framework | 32 | 8 | 0 | 0 | 0 |
| c.ii. I recognized important things in order to establish the NSDI. - NSDI promotion structure | 27 | 10 | 2 | 0 | 1 |
| c.iii. I recognized important things in order to establish the NSDI. - Geographic information standard | 31 | 7 | 1 | 0 | 1 |
| c.iv. I recognized important things in order to establish the NSDI. - Sharing geospatial information | 33 | 7 | 0 | 0 | 0 |
| c.v. I recognized important things in order to establish the NSDI. - Preparation and updating of geospatial information | 31 | 8 | 0 | 0 | 1 |
| c.vi. I recognized important things in order to establish the NSDI. - Human resources development | 29 | 10 | 1 | 0 | 0 |
| c.vii. I recognized important things in order to establish the NSDI. - ICT System / Service – (NSDI platform system) | 27 | 12 | 0 | 0 | 1 |
| c.viii. I recognized important things in order to establish the NSDI. - Protection of personal information | 26 | 11 | 0 | 0 | 3 |
| d. I recognized the roles of SOB and related institutions for NSDI. | 25 | 13 | 0 | 1 | 1 |
| e. I understood NSDI would be incorporated into the Digital Bangladesh & the eighth five-year plan. | 28 | 10 | 2 | 0 | 0 |
| f. The workshop has enabled me to apply the topic in my work. | 13 | 23 | 2 | 0 | 2 |
| g. The presenter(s) was knowledgeable about the subject. | 25 | 15 | 0 | 0 | 0 |
| h. I had a productive discussion in this workshop. | 15 | 19 | 1 | 0 | 5 |
| i. I would like to share the result of this workshop to others. | 25 | 15 | 0 | 0 | 0 |
| j. The materials provided me useful information. | 25 | 15 | 0 | 0 | 0 |

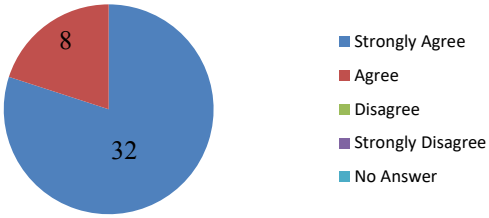
**a. I understood about the objectives of this workshop.**



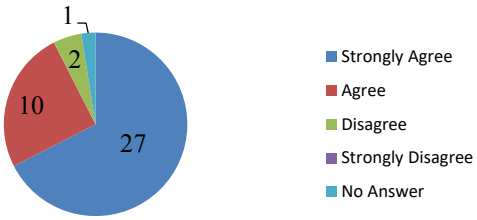

**b. This workshop lived up to my expectations.**



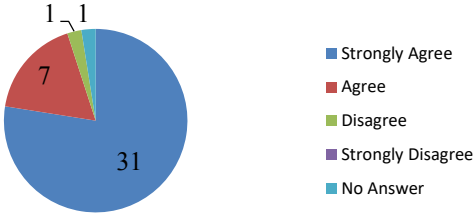

**c.i. I recognized important things in order to establish the NSDI. - Legal framework**



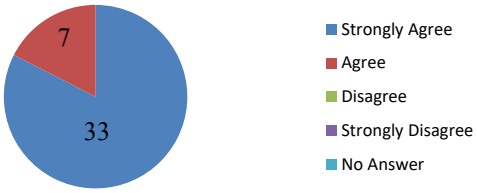

**c.ii. I recognized important things in order to establish the NSDI. - NSDI promotion structure**



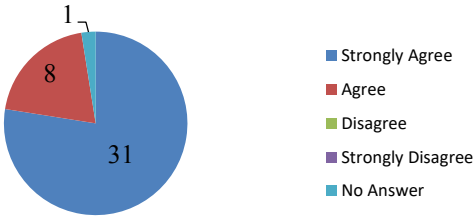

**c.iii. I recognized important things in order to establish the NSDI. - Geographic information standard**



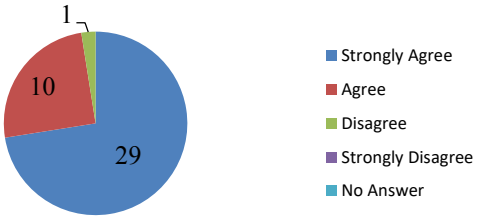

**c.iv. I recognized important things in order to establish the NSDI. - Sharing geospatial information**



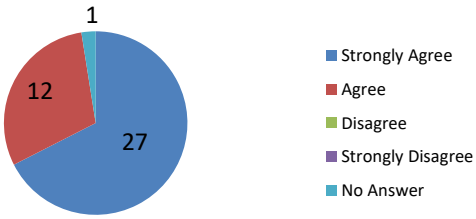

**c.v. I recognized important things in order to establish the NSDI. - Preparation and updating of geospatial information**



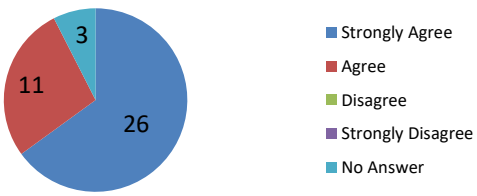

**c.vi. I recognized important things in order to establish the NSDI. - Human resources development**



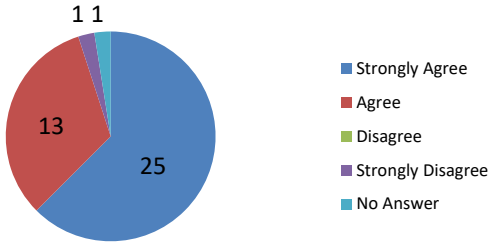

**c.vii. I recognized important things in order to establish the NSDI. - ICT System / Service – (NSDI platform system)**



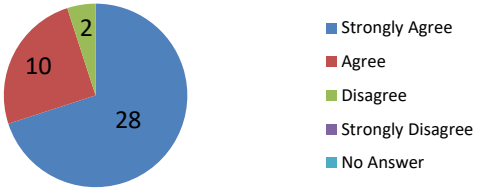

**c.viii. I recognized important things in order to establish the NSDI. - Protection of personal information**



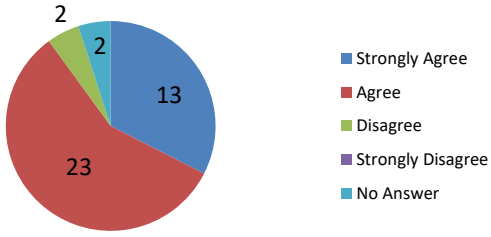
**d. I recognized the roles of SOB and related institutions for NSDI.**



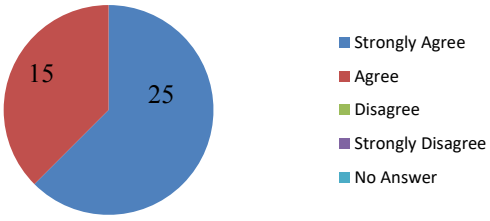

**e. I understood NSDI would be incorporated into the Digital Bangladesh & the eighth five-year plan.**



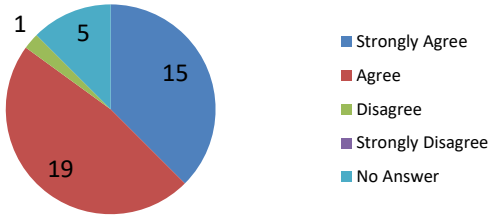

**f. The workshop has enabled me to apply the topic in my work.**



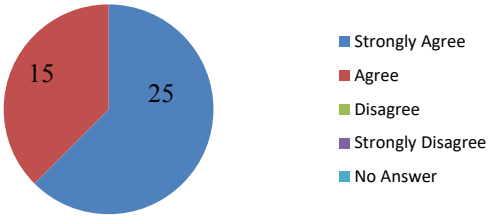

**g. The presenter(s) was knowledgeable about the subject.**



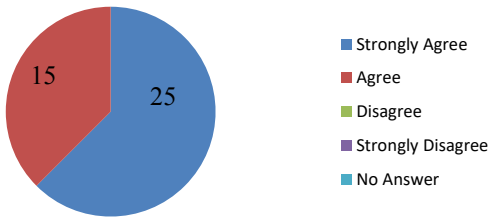

**h. I had a productive discussion in this workshop.**




**i. I would like to share the result of this workshop to others.**




**j. The materials provided me useful information.**



Quetionnarie of NSDI Workshop

| Num | Organization | 2:What do you think about having an effect and benefit by NSDI on your organization? | 3:Please share any other comments you have regarding this workshop. |
|---|---|---|---|
| 1 | Bangladesh Meteorological Department (BMD) | BMD collect and archiving all kinds of metereological data.In this regards, BMD can be benefitted by NSDI as NSDI is going to be a platform of Spatial Data. | This workshop is very fruitful for NSDI. It is necessary to co-operate Government Organizations each other as much as possible. |
| 2 | Bangladesh Space Research and Remote Sensing Organization (SPARRSO) | No comment | More extant level discussion is required. |
| 3 | Rajdhani Unnayan Kartripakkha (RAJUK) | My organization will be benefited ny NSDI to establish the digital Bangladesh. NSDI is very effective way to improve the present system. | All organization should follow the one or some coordinate system for sharing various data within the organization and should be a common platform. |
| 4 | Rajdhani Unnayan Kartripakkha (RAJUK) | - | - |
| 5 | Rajdhani Unnayan Kartripakkha (RAJUK) | - | - |
| 6 | Bangladesh Water Development Board (BWDB) | BWDB can be highly benefited from NSDI. | Coordination, cooperation and sharing of NSDI knowledge to other organization are highly recommended. |
| 7 | Dhaka Water and Sewage Authority (Dhaka WASA) | knowledge sharing | Organizational Coordination |
| 8 | Geological Survey of Bangladesh (GSB) | I believe GSB will be benefited through NSDI for Geological mapping and mineral identification. | - |
| 9 | Department of Land Record and Survey (DLRS) | DLRS is mainly responsible for preparation of cadastral maps. Definitely DLRS will be benefitted by the NSDI. | - |
| 10 | Access to Information Program (a2i) | Land related initiatives and other citizen centric e-services that A2i in developing. | - |
| 11 | Dhaka South City Corporation (DSCC) | DSCC expect to get the benefit of NSDI. For this project DSCC is ready for any cooperation. | TITAS Gas and Fiber Optic Intitution can be the member of working group.<br>Administrative boundaries of all the Institutions should be included in map.<br>Data sharing process should be easy from SOB/NSDI to other institutions. |
| 12 | Bangladesh Computer Council (BCC) | For proper maintaining the Bangladesh govt. Network and Planning for to establish DRC the NSDI will play a vital role for us. | It is grand workshop to share knowledge on making the Roadmap to implement for BD Govt. |
| 13 | Department of Disaster Management (DDM) | I believe NSDI will be the central Spatial Data hub which can be used for DM and DRR. | - |
| 14 | Institute of Water Modelling (IWM) | IWM might get data and metadata from NSDI in consistent format. | Chief/ CEO and real working professionals should be invited. |
| 15 | Urban Development Department (UDD) | UDD is responsible for the preparation of plan of different Upazilas/ Union/ Zilas of Bangladesh. We need several Survey data (GIS data) from different organization for plan preparation. I think this will be helpful for my organization if we get data required from single plaform. | The requirement of data are different for different organization again the format of some data may be different for different organization. This must be considered. |

Quetionnarie of NSDI Workshop

| Num | Organization | 2:What do you think about having an effect and benefit by NSDI on your organization? | 3:Please share any other comments you have regarding this workshop. |
|---|---|---|---|
| 16 | Dhaka Electric Supply Company Limited (DESCO) | DESCO has a platform to develop GIS based network operator and asset management. So it would be helpful for DESCO. | - |
| 17 | Bangladesh Power Development Board (BPDB) | NSDI is extremely established in Bangladesh for digitization but a great challenge due to similar like BCC. So I hope NSDI will be work integrated with above office. | Realistic and effective people needs to establish this project. I hope the NSDI will be effect within the expected time. |
| 18 | Dhaka Power Distribution Company Limited (DPDC) | NSDI would be benefiting to DPDC in planning & designing physical infrastructure of power system. | It is clear how NSDI will share information with utilities as almost all utility are establishing.their own GIS system that require common guideline interface. Without this facility, effect of NSDI may become less effective in true sense. |
| 19 | Bangladesh Rural Electrification Board (REB) | Yes, NSDI will benefit our organization. We will have NSDI policy in our country. | We understand the benefit of NSDI specify integrated Geo-Spatial Data in different organization. |
| 20 | Water Resources Planning Organization (WARPO) | Helpful for<br>-availability of updating data, to reduce the laps and gaps of spatial data, provision for shareing remote sensing data and images among the Govt. agencies should be made possible, to reduce the cost significantly thruogh NSDI. | Data availability management, evaluation improvement system should be included in NSDI. Provisions to asss nd assign the quality level of a particular data layer need to be included.<br>Data management policy for NSDI should be formulated with the cooperation of all spatial data holdering agencies of the country. |
| 21 | Department of Environment | Yes. | - |
| 22 | Directorate of Primary Education | Monitoring and mentoring all primary schools of Bangladesh to ensure quality education, intensive and equitable education & lifelong education. | Role of different ministries/ divisions/ departments/ organizations may be clarified by arranging another workshop to establish NSDI for Bangladesh. |
| 23 | Military Institute of Science and Technology | It is helpful in the context of academic point of view. Academician will be able to conduct research in an integrated. | - |
| 24 | Bangladesh Army | For disaster management/ quick response where army needs to be employed in case of emergency i.e. aid to civil power. | 1) A representative from Bangladesh Army should be included in the working group. 2) Separate gate way for the Armed Force & other national security agencies must be considered. 3) Sharing of spatial data of diffeent Govt.& other organizations must be planned accurately. 4) Administrative boundary must be preserved and prepared by single agency to be shared accordingly. Other organizaton AOR(Area of Responsibilities) may be developed by individual organization. 5) List of data holders user's point of view must be made. 6) Seperate policies/ procedures/ guidelines must be made security, sharing, collection etc.7) GIS maps and cartographic maps are not same as per accuracy concerned.So topo maps (1:25K & 1:5K) genrated by system may not be appropiate for many govt. agencies e.g. WASA, DESCO etc who need large scale map even upto 1:1000. 8) For base data only SOB may be selected and assisted by SPARSSO for satellite images. |
| 25 | World Bank | - | - |
| 26 | JICA | - | Better to share the objective of each presentation first. |

Quetionnarie of NSDI Workshop

| Num | Organization | 2:What do you think about having an effect and benefit by NSDI on your organization? | 3:Please share any other comments you have regarding this workshop. |
|---|---|---|---|
| 27 | JICA | JICA as the bilateral development partner engaged in various development projects, recently NSDI for proper planning and implementation. | 1) Disaster Risk Mitigation becoming a growing concern for any country. So NSDI should involve the DRR organization. 2) Coordination mechanism with allt he relevant organizations. |
| 28 | Survey of Bangladesh | My organization will be benefited enough. | An act is very essential for making NSDI. |
| 29 | Survey of Bangladesh | It will be very fruitful for us as well as other agencies of Govt. If it is established, it will be helpful for making digital Bangladesh. | Thanks for organizing the workshop. I wish its every success in future. |
| 30 | Survey of Bangladesh | In constructing NSDI my department will be immensely benefited and geoinformation department as well. After that the country will help to become digital Bangladesh using NSDI dataset. | 1) Users and stakeholders of geoinformations should come for work & play their roles in making NSDI. 2) Government departments should play their pivotal efforts in making the project completed. |
| 31 | Survey of Bangladesh | It will be a great platform to share and get spatial data effectively, smoothly and quickly. | More stakeholders like Titas (Gas supply), planners, Disaster Management, NGO (UNDP, Red Cresent) should be invited. |
| 32 | Survey of Bangladesh | To establish the NSDI, Survey of Bangladesh will highly beneficial because SOB is National Mapping organization. | More stakeholders should be invited. |
| 33 | Survey of Bangladesh | No doubt from this platform it will be very easy to share and get spatial data, smoothly, effectively and quickly. | More stake holder like, World Bank, UNDP, Red Crescent, WHO, etc, should be invited. |
| 34 | Survey of Bangladesh | I think SOB is the main geospatial producer in Bangladesh. By establishing NSDI, the user of geospatial data can be benefited. | The workshop is nice. I think more and more workshop is needed making the roadmap to establish NSDI for Bangladesh. |
| 35 | Survey of Bangladesh | Establishment of NSDI in Bangladesh will be very effective for the development of Bangladesh. It will be benefited to all of us. | The workshop will inspire the participants to built NSDI for Bangladesh. So I think it is a fruitful workshop. |
| 36 | Survey of Bangladesh | From NSDI my organization will be highly beneficial by having mapping data from other organization like RHD, LGED, WASA, REB, BWDB, City corporation and Rajuk for preparing more information maps. | This workshop was highly demanding in this stage to construct the NSDI for Bnagladesh. It helped a lot have communication between organizations. It is also gave clear view of NSDI to the organization attended the workshop. |
| 37 | Survey of Bangladesh | To establish the NSDI, SOB can play a vital role and making a fundamental Geospatial data using common parameters. | This types of workshop is needed for motivating different stakeholders. |
| 38 | JICA Study Team | - | There was a question regarding duplicationof data and different platformof data problem. This problem is prevailing for decades past and shall continue in future decaeds unless the Govt. issues an executive order to stop it. SOB can take the initiative. |
| 39 | JICA SCAM Project | It will be very useful. | NSDI is totally new for Bangladeshi people. It needs another workshop for better understanding of NSDI. |
| 40 | Survey of Bangladesh | SOB will be benefited by NSDI by exchanging.Geospatial data to the other organization. | - |