Interactive M&E and Knowledge Management web portal development

Enhancing adaptive capacities of coastal communities, especially women, to cope with climate change induced salinity AKA Gender-responsive Costal Adaptation (GCA) Project
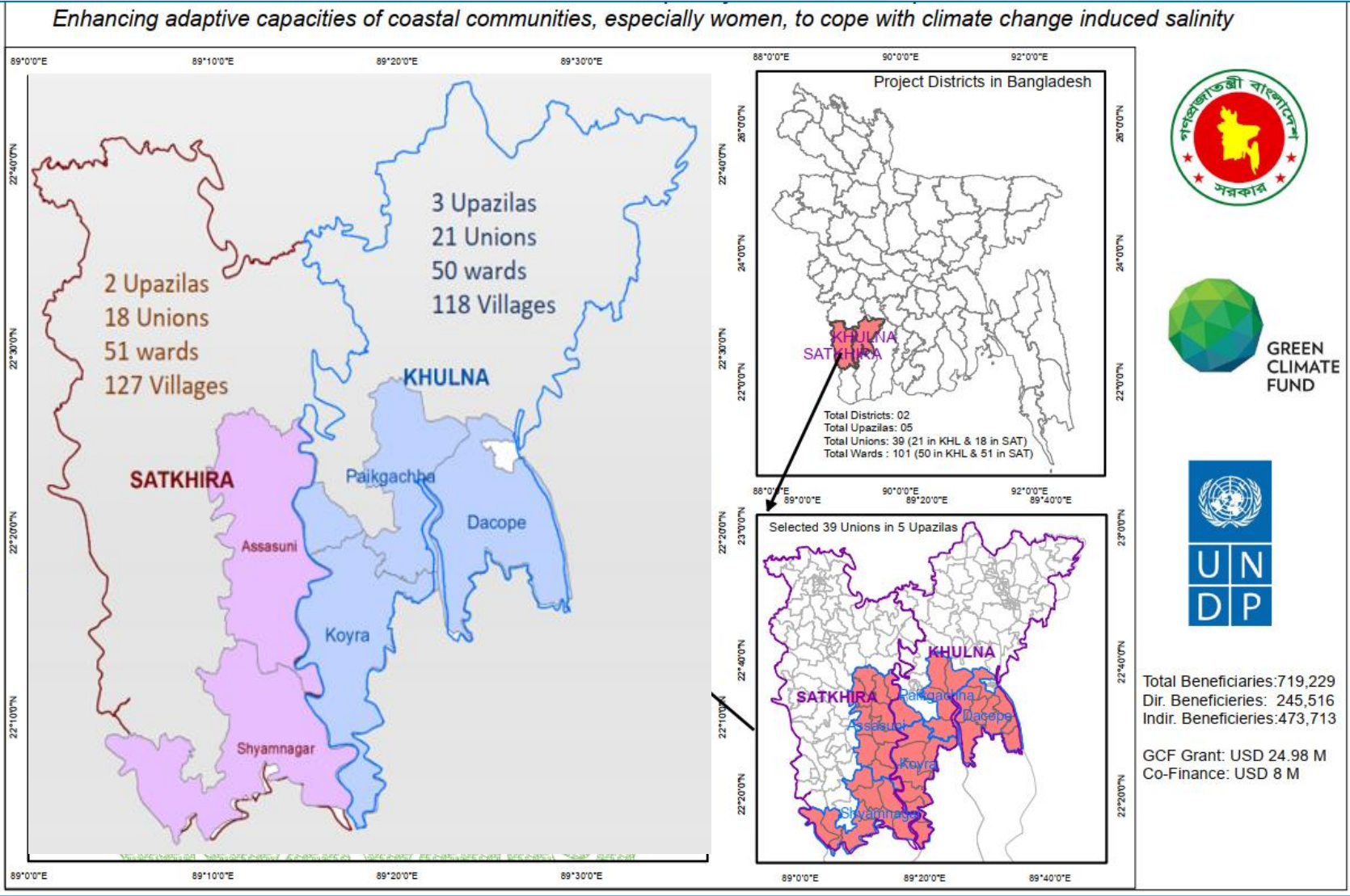
Date: 03 August 2021

Gender-responsive Coastal Adaptation (GCA)

Project area map

Enhancing adaptive capacities of coastal communities, especially women, to cope with climate change induced salinity

Key Targets of the project

01 — 01. Livelihood & EWS

- **245,516** males & females - timely, gender-responsive EWS
- **25,425** women- alternative, resilient livelihoods
- one volunteer group with 15 people/ward - capacity building
- Scaled up to **43,000** beneficiaries with co-finance
- Social auditing - across **39 unions**

02 — 02. Water

- **13,308** household RWH systems
- **228** community-scale RWH systems
- **19** institutional-scale RWH systems
- **41** pond embankments

03 — 03. Ins. Capactiy Building

- **405** MoWCA/DWA and **120** DPHE staffs
- **150** students each in 10 high schools and
- **150** non-school going boys and girls

Intervention statistics

Location	# of Union	# of Ward	Types and No. of Livelihood groups								Total Groups	No. of HHs
			Sesame	Homestead Gardening	Hydroponics	Aqua Geoponics	Plant Nursery	Crab Farming	Feed Processing	Crab Nursery		
Dacope	9	22	32	44	91	10	8	0	0	0	185	4625
Koyra	7	16	25	38	77	5	10	0	0	0	155	3875
Paikgacha	5	12	7	12	2	9	8	82	7	2	129	3225
Khulna	*21*	*50*	*64*	*94*	*170*	*24*	*26*	*82*	*7*	*2*	*469*	*11725*
Assasuni	10	30	46	76	202	31	15	0	0	0	370	9250
Shyamnagar	8	21	0	23	38	6	4	94	11	2	178	4450
Satkhira	*18*	*51*	*46*	*99*	*240*	*37*	*19*	*94*	*11*	*2*	*548*	*13700*
Grand total	39	101	110	193	410	61	45	176	18	4	1017	25425

Project Summary Table

Location	# of Union	# of Wards	#of HH	Target Beneficiary Households	HH based RWHS	Proposed Technology								Community based Pond Water Treatment System (Sky-hydrant)
						Community-scale RWHS				Institution-scale RWHS				
						in buildings		in buildings with		in buildings		in buildings with		
						Small Tanks (25 HHs)	Medium Tanks (50 HHs)	Small Tanks (25 HHs)	Medium Tanks (50 HHs)	Large Tanks (75 HHs)	Very Large Tanks (100 HHs)	Large Tanks (75 HHs)	Very Large Tanks (100 HHs)	
Dacope	9	22	9166	3752	980	1	9	2	10	0	2	0	0	12
Koyra	7	16	10235	4075	1729	7	14	4	19	0	0	2	1	1
Paikgacha	5	12	6327	5687	3212	8	15	1	23	0	2	2	0	0
Khulna	*21*	*50*	*25728*	*13514*	*5921*	*16*	*38*	*7*	*52*	*0*	*4*	*4*	*1*	*13*
Assasuni	10	30	16695	13007	6096	14	28	7	43	1	3	1	3	14
Shyamnagar	8	21	13841	4413	1291	6	4	2	11	0	0	1	1	14
Satkhira	*18*	*51*	*30536*	*17420*	*7387*	*20*	*32*	*9*	*54*	*1*	*3*	*2*	*4*	*28*
Grand total	39	101	56264	30934	13308	36	70	16	106	1	7	6	5	41

Project output - 3

- Strengthened institutional capacities, knowledge and learning for climate-risk informed management of livelihoods and drinking water security.

  ❑ Strengthen MoWCA's technical and coordination capacities for design and implementation of gender-responsive, climate-resilient coastal livelihoods

  ❑ Strengthen DPHE capacities for climate-risk informed management of drinking water solutions across the Southwest coast

  ❑ **Establish knowledge management, learning and M&E mechanisms to promote long-term, adaptive capacities of coastal communities**

Assinment

- Web-based MIS applications with M&E dashboard for tracking day to day progress of the project in terms of implementation and budget expenditure with custom visualization of location specific data for GCA project's information collection, storage, analysis, reporting, dissemination, flexible and secure interchanging data and having
  - A dynamic digital mechanism for exchanging the best practices and knowledge among the wider range of stakeholders
  - Well responsive GIS based API for collecting and visualizing the data from field.
  - Voice SMS and bulk SMS alert system for the project beneficiaries

- A website for the GCA project that will host to cloud or on-premises server as an interactive portal

- A robust and user-friendly mobile based application (Android) for form development, field deployment to collect and manage data and dissemination of data/info.

- Integrate a regional (Khulna & Satkhira district) database management system for water installations with geolocations and catchment statistics; the database should be compatible with DPHE's database management system.

Specific Tasks:

- Interactive project website
- Project's data collection app (Android)
- Develop a web GIS -based MIS allocation and M&E Dash board
- Develop an Interactive knowledge portal
- DPHE's regional database for installed water sources

Task 1

1. Web-based MIS system for GCA project's information collection, storage, analysis, reporting, dissemination, flexible and secure interchanging data and having

- Develop a centralized, dynamic, and integrated web-based information management system for entire project operations such as:

- Registering the targeted beneficiaries' profile for livelihood, water, EWS, GoB and other stakeholders and track all beneficiaries training records for individual & groups, delivered input sources, materials, and assets

- Predesigned users' approval-based data input, verification and validation mechanism in the DBMS that should have different user level management and application allowing access, data insertion, modification and deletion based on user's profile rights set by the designated team of the project.

- Web based custom forms/ questionnaires generation application for time-to-time data collection (including geodata) through synching questionnaire in handheld devices at field.

- Ward level production cycle monitoring, secondary market profiling and financial inclusion data insertion system enabling the connection with each WLGs through beneficiary code/s. It will help the beneficiaries cost benefit analysis, market linkage with Joyeeta foundation/another platform for livelihood component.

- Live complain management system for all types of water sources and reflection on dashboard.

- Financial tracking and monitoring all responsible party (RP) NGOs and GoB part.

- Risk assessment track of safeguard component in any cycle period of livelihood and water component.

- Develop a user-friendly M&E dashboard, accessible to different stakeholders, in two different languages (English and Bangla), and with varying levels of access and authority.

- Dashboard should have a reporting module to support different type of reporting and export mechanism. The report should be generated for both predefined reporting and customized reporting asked by query builder. Such as disaggregated data on any interventions at year, month, areas, and gender level.

- Web-based platform that contains and tracks down the achievement of performance indicators and targets of major planning and reporting documents in use by the GCA programme and implementation team such as the Results Framework, revised implementation plans, programme based budgets, and relevant information on state of operations.

- The system should contain the logic models of the above documents (outcome and output performance indicators, their targets, budget allocations showing data from all sources, aggregate statistics and summary visuals which illuminate what is and is not working.

- The beneficiary status will be tracking on map in concerned ward under each union, upazila and District with relevant input information.

- Rigorous analysis of beneficiary input status with custom report generation (table, marker map, graph charts etc) in interoperable and exportable formats (CSV, Excel, Doc, Pdf, jpeg etc)

- Tracking of women livelihood groups (WLGs) and Water User groups (WUGs) training records. Each WLG contains 25 beneficiaries and Water user groups contain varied number of beneficiaries according to the type of installations (**Annex I**)

- Users (based on the set permission) should be able to search for, view and/or download data, report and documents.

- The system must be designed in a way that all core monitoring and evaluation tasks can be easily undertaken by GCA staff. It will be basically a management dashboard that enable to explore the information by drilling down and provide custom reports. The custom reporting should cover data searching, comparative analysis on different parameters, i.e. upazila/unions, projection analysis through configurable parameters like geographical location, constituency, indicator/s, period/cycle, year, month etc.

- Custom generated information or message push system for handheld devices to disseminate contextual or emergency and early warning events.

Plz see the ToR for details

- A digital knowledge (both primary and secondary) repository in MIS and pushing mechanism for dissemination among wide range of stakeholders including remote beneficiaries through handheld devices. The repository will be capable to store documents, audio and video contents, infographics and etc and open with any compatible application on the site.

- Users (based on the set permission) should be able to search for, view and/or download data, report and documents.

- Voice SMS and masking SMS alert system use to all beneficiaries and wide range of stakeholders for EWS & knowledge dissemination.

- Application compatible with latest web technologies and should be W3C compliant, use XHTML and MVC pattern.

- Application should have offline using excel template to online and vice-versa data and/or object synchronization option.

- Application should allow full auditing of all occurrences in the system (time, event, users, log-in success/ failed, user and machine/pc, IP).

- Ensured secure hash algorithm - 2 (SHA-2) technics for all confidential information and system users IDs and password.

- RDBMS should be used 3rd normalizations and more specific SQL for faster data processing and presenting

- The data architecture should be multi layers and need to build using both RDBMS (Relational Database Management System) and Not only Structure Query Language (NoSQL).

- System will provide data platform to support data export/import/view in open, non-proprietary form such as xml, csv, json etc.

- Deploy the on-premises platform with load balancer keeping scalability issue in deployment.

- Structure and unstructured big data handling capacity in back-end platform.

- Provide a database administration module, allowing for advanced user management, with a staggered set of privileges for different users as well as user authorization, tracking/authorizing changes to results hierarchy, database download, online backup, and other necessary features;

Task 2

2. A website for the GCA project that will host to cloud or on- premises server as an interactive portal

- Create a dynamic, secure website for GCA project with administrative control panel to manage all contents/pages/documents/media contents for the web site. KM and ICT team will provide the website reference, design idea, contents and decide the number of pages for website's menu, sub-menu and sections.

- Displayed reports on web portal from Internal MIS application by using APIs technique and integration with existing National and International network portal.

- The software developed must run optimally (page load time below 3-5 seconds) on a PC connected to a network with minimum network bandwidth of 56 kbps and easy accessibility and full responsive for any device. The system including the database must provide at least 5000 concurrent accesses.

- Any users should be able to sign up on the portal with credentials, the system administrator or super user will set the access role for user, like public, admin etc.

- Registered users should be able to download and upload documents based on the access role/s and system administrator's approval.

Task 2

- System administrators should be able to delegate the approval role to any other user through mail notifications.

- The website should be capable of hosting discussion or allowing users to make comment regarding any report published on the website.

- Implement a basic "blog" function with integrated twitter and Facebook posting (GCA has active Twitter, Facebook page and YouTube channel; website should facilitate streaming of information between these different platforms)

- Public Users should be able to search for, view and/or download report and documents.

- The site should display some of the analytical statistics on central database in an interactive way and change with every scrolling.

- The website should be build using a content management system (CMS) that is well established (preferably Joomla, Drupal, Perl etc.)

- In web-portal has opportunity to login access the MIS application and should be displayed on control opportunity for donor, researcher, and internal and other stakeholders.

3. M&E dashboard for tracking day to day progress of the project in terms of implementation and budget expenditure with custom visualization of location specific data

- A robust and easy to use during questionnaire development, field deployment, and data management.

- The software must be able to create questionnaire with close and open-ended answer format such as numeric, multiple choice, ranking; Easy and user-friendly synchronization of remotely questionnaire update should be ensured.

- The app must allow field user insert photograph/audio/video taken with the mobile device camera with GPS location receiving option while within the questionnaire. However, manual entry of GPS and attachment of photograph/audio/video must allow, if necessary.

- As the survey will conduct GCA project wide, different field users may need different questionnaire as per location, organization, period etc. The questionnaire must be quite easy to distribute to the ward facilitators/field user according to the structure of the particular survey campaign.

- The tool must support the update of the questionnaire already at the field level and synchronize without hampering or compromising already captured data.

- The app must support basic questionnaire navigation abilities, such as the possibility to move backwards in an interview, to pause an interview and resume it at the last answered question, and to complete a questionnaire in a non-linear way by moving from one non-sequential module to another. However, there must be facilities for the questionnaire designer to impose restrictions on navigation, if necessary.

- Custom message or information dissemination mechanism from management to field ward facilitators.

- For field users, the app should be as intuitive and easy to use and handle unlike paper questionnaire. Surveyors should be able to move through a digital instrument as effortlessly as they would through a paper counterpart and should be able to understand how to use the software environment without special instruction or additional technical skills.

- The interface should be user-friendly for the average field staff, and the tools for accomplishing all survey tasks must be straightforward and intuitive.

Task 3

- Through the interface, field users can view status of all assigned tasks and track the progression of ongoing survey works.
- The interface must save all captured information in the offline mode. A customized feature must be incorporated whenever the device connected to internet.
- The interface must allow the field users to take backups to the external storage to avoid loss of data before exporting the results in case of shortage of storage in exceptional cases.
- For survey managers, the app should provide tools for survey management and for the prompt export of data into various interoperable formats, e.g .pdf, .xls, csv, jpeg, .png etc.
- Survey managers at various levels should have the means to track the progress of a survey through web-based M&E dashboard.
- The data managers must be able to manage through an easy-to-use interface with creation of users, assigning different level of role, management of data storage, configuration of the questionnaire creation tool with tracking of all assignments with history.
- The integrated GCA M&E dashboard must be developed for quick navigation through different visualization and easy management of overall apps capability.
- The app must provide mechanism for Data Quality control by allowing data manager to check quality component like Relevance, Accuracy, Timeline and Punctuality, Comparability, Coherence etc.
- The results of the survey must support all major visualization software/application and ready to customize as per visualization standards. The followings are desired characteristics of the require mobile app for field level survey.
- The captured data at field level export to a storage server with pre-configured and credentials so that field user able to transfer data with minimal interaction.
- The apps must support secure data transfer within devices. Data transfer features should be powerful in performing and tracking the success of data transfer.
- <u>The Hardware and software needs:</u> The mobile apps must support at least. 11 Pie (API level 30). Must be able to receive the GPS location of object. The mobile device must have audio-video capturing ability.

Task 4

- **Develop an integrated water sources/installation database for coastal districts for DPHE**
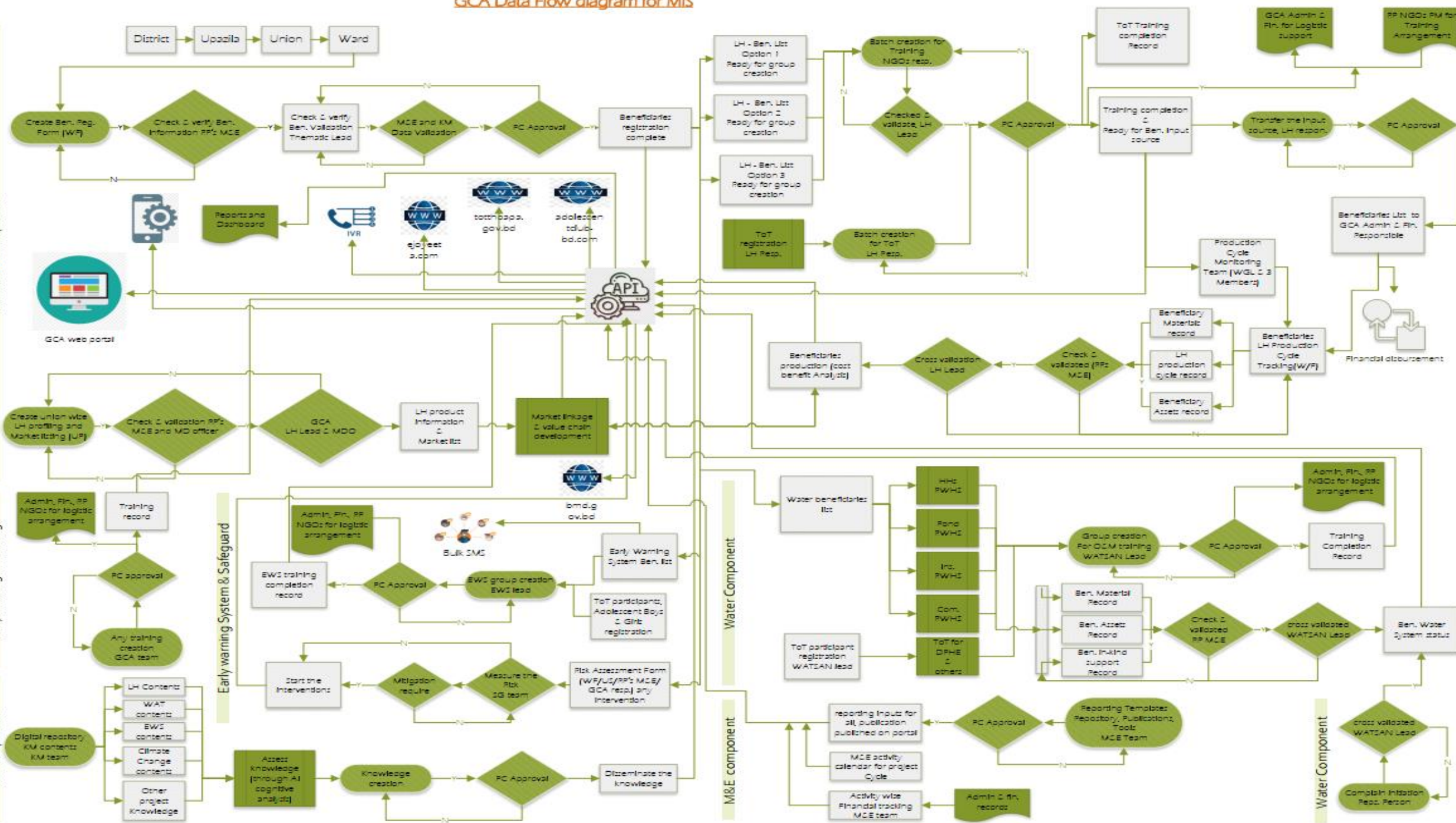   - Develop a separate GIS based water installations/source database under GCA project.
    - Conduct technical need assessment at DPHE's ICT unit for making the water database compatible with DPHE.
    - Host the water database on DPHE's server and ensure interoperability with GCA web portal

GCA Data Flow diagram for MIS

Task 5 :Training & Knowledge Transfer

- Pre-launching trial and relevant bug fixing are the sole responsibility of the firm.

- The firm has to facilitate a workshop with GCA team for knowledge transfer.

- Providing authentic access to client experts to source code and documents are mandatory.

- Developing user guideline (in English and Bangla) and tutorials for role wise users manual
    - Technical Training Manual   - User Training Manual
    - Hosting Specification Document   - Implementation Plan
    - SRS (Software Requirements Specification)   - Data Dictionary
    - Class Diagram

- Process How Diagram and other necessary documents and will finally handover all those along with accepted version of source code to GCA after before expiree of the contract.

- Firm will provide Technical Training to ICT, M&E and KM team of GCA for configuring and managing technology.

- Firm will provide three separate training to MoWCA and DWA staffs: DPHE staffs and three responsible parties (PNGOs) staffs on the operational use of the system.

Task 5 : Training

SL	Agency	Number of training	Number of estimated participants	No. Of days for each training	Venue/Location
1	GCA-PMU staffs	1	15	2	Dhaka
2	DWA & MoWCA	1	15-20	1-2	Dhaka
3	DPHE	1	10-15	1-2	Dhaka
4	RPs (PNGOs)	3	(i) Dacope – 35 (ii) Paikgacha – 21 (iii) Koyra – 27	2-3	Dacope, Paikgacha and Koyra Upazila of Khulna District
5	RPs (PNGOs)	2	(i) Assasuni – 44 (ii) Shyamnagar – 33	2-3	Assasuni and Shyamnagar Upazila of Satkhira District

- The firm must address all the issues and feedbacks from the 9 training workshops at PMU-GCA, DWA, PNGOs.
- Firm has to arrange training venue, food and logistics.

Task 6: Security

- The firm should follow any of the industry standard secure development methodology such as (but not limited to) **Comprehensive Lightweight Application Security Process (CLASP)** by the **Open Web Application Security Project (OWASP)** etc.

- Firm should consider (but not limited to) common vulnerabilities such as **SQL Injection, Cross Site Scripting (XSS), session fixation, code injection** etc.

- Firm will undertake responsibility for the Input Validation Controls, Authorization/Authentication Control and other security controls in place in both test and production environment of application.

- Find more in published ToR

Task 7: Maintenance and support

- Final review of the rectified beta version by project management unit (PMU), upload the full working system to open access (on a server to be specified by the project) to allow data input and access by internal and external users and system will be facilitated all approval process through our office 365 email accounts.

- Continuous health check of database, tuning database, tuning codes & queries and mitigating the issues.

- Recording, managing reporting Issues and user level application related technical problems received through the method prescribed by GCA, develop and deploy necessary solutions.

- Providing active and operation support to data center in application/DB.

- Regular database tuning and application configuration support to hosted environment.

- Updating training manual adjusting the changes in the system.

- Fixing all bugs in the system irrespective of its nature and complexities.

- Continuous support in data exchange to the system by the various user groups.

Task 8: Site and dashboard UX & UI

- The site should be device compatible, browser independent and mobile responsive

- System presentation language will be English bit data, repots, analytics and values can be both of Bangla and English.

- Site and dashboard color and design fashion will follow the GCA's branding scheme and will also comply look and feel of other GCA knowledge and logistical products.

- Find more in published ToR

Technology Specifications

- ASP. Net, Java
- PHP 7x; Open-source development framework, e.g. Laravel
- Python 3.x, Django
- Apache Spark
- Apache Panda
- Apache Kafka
- RDBMS (MySQL/ PostgreSQL / MS SQL)
- Java Script, jQuery, React, AngularJS and AppML
- REST APIs
- NoSQL (MongoDB/neo4)
- Visualization tools: Apache Superset, QGIS
- Geodatabase, GeoServer
- Should be developed in Agile and Scrum methodology.

Infrastructures

- Domain, SSL certification, System infrastructures and application installation & hosting configurations

- Domain: The license will be purchased for 4 years.

- SSL certifications: for 4 years

- System Infrastructures services: (2 Servers in Dhaka and Khulna based with fault tolerance & load balancing, power management with online UPS, LAN, cooling management (AC), Server rack, Dell/HP monitor, keyboard & mouse)

- Sever room dimension: 5ft x 8ft x 9ft

- Local area Network (LAN) LAN, cooling management (AC), Server rack, Dell/HP monitor, keyboard & mouse:

- Application installation & hosting configurations

- Find more in published ToR and see the amendments in Annex of Pre proposal meeting minutes.