

Government of the People's Republic of Bangladesh
Survey on Non-Human Consumption of Selected Crops &
Food Loss & Waste Project
Bangladesh Bureau of Statistics (BBS)
Parishankhyan Bhaban, E-27/A, Agargaon
Sher-e-Bangla Nagar, Dhaka-1207, Bangladesh

Terms of Reference (TOR)
for
Firm Hiring of Development for Mobile Application (CAPI System) and
Web Monitoring Application for Data Collection, Supervision &
Monitoring, Data Management & Data Processing.

Package No:
SF-1



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1. Introduction

The Bangladesh Bureau of Statistics (BBS), as the national statistical agency, is responsible for the collection, compilation and dissemination of all official statistics of Bangladesh to meet and supply the information needs of other agencies of the government and stakeholders within and outside the government at the national level. The Statistics Act, 2013 entrusted BBS with the responsibility of preparing and developing official statistics in Bangladesh. Survey on Non-Human Consumption of Selected Crops & Food Loss & Waste Project under the Agriculture Wing of BBS to generate agriculture statistics. Initiatives have been taken to collect data through the project.

2. Rationale

Erratic and conflicting data are potentially capable of misguiding policy planners. Also, the use of inconsistent data can misdirect government decision making. Reliable and accurate information system or data tracking is essential for monitoring & evaluating and improving services. Decision-making is critically dependent on the timely availability of accurate, real-time and sound data. BBS is taking different steps to collect accurate data from the field, which will not only establish a compact foundation for project target but also will be helpful to build impactful decisions in the future.

Therefore, BBS calls for proposal both technical & financial from IT firm, who have the capacity to conduct this assignment. The findings from this assignment will provide critical input to inform a strategic direction for Digital Bangladesh.

3. Objectives of the Assignment

Bangladesh Bureau of Statistics (BBS) is seeking a reputable service provider for "**Firm Hiring of Development for Mobile Application (CAPI System) and Web Monitoring Application for Data Collection, Supervision & Monitoring, Data Management, Data Processing and Reporting**". This will help project office to quick deploy of data collection, create resourceful reports, review nationwide current situation and so on.

- Development of Mobile and Web Monitoring Application.
- Development of a platform for central Supervision & Monitoring, Data Management, Data Processing and Reporting.
- Training of usage of Mobile and Web Monitoring Application.

The service provider has to identify the proper process and implement the right solution by:

- Understand the business need and processing needs.
- Gather, analyze, and validate the information.
- Define the requirements and prototypes for the new system.
- Evaluate the alternatives and prioritize the requirements.
- Examine the information needs of end-user and enhances the system goal.



4. Scope of Work

The key Scope of this Service assignment is to Development of Mobile Application (CAPI System) and Web Monitoring Application for Data Collection, Supervision & Monitoring, Data Management, Data Processing and Reporting and Implementation Training. The selected service provider shall collaborate with BBS team members to implement the following activities:

4.1. Mobile Application Development (CAPI System):

- a) Develop Android Mobile Application (CAPI System) for Data Collection, Supervision and Monitoring for Survey using RDBMS.
- b) The mobile application interface should be user friendly and dynamic. Must adhere to platform specific UI standards.
- c) The mobile Application should have a login facility. Based on the logged in user's permission, application components will be available to the user.
- d) The mobile Applications must have access control and be protected by user id and password.
- e) Data Collectors will capture the GPS location of each enumerated household using the Application;
- f) Data Collectors will receive the particular Questionnaire form into his/her TAB using the applications.
- g) Data Collectors can collect, check and even edit data both in online and offline with the facility of sending offline data when the TAB is online.
- h) Data Collectors can review collected forms in offline mode and if required, edit/ update the collected data. The partial data saving option should be incorporated and the system will send the complete data after 3 hours interval automatically, when the tabs are in online.
- i) The supervisors can check the data and if need they can return the data to the enumerators for editing.
- j) There should be skipping options for some questionnaires and also mandatory fill-up features for some questionnaires.
- k) Inter-question validation must be ensured and added question panel for adding a set of questions.
- l) The questionnaire will be displayed by modules in the application which must be displayed on the screen one by one/chronologically with swapping and navigation features.
- m) The backend should be Web/mobile Applications (up-to-date version) for managing, monitoring and decision-making for survey data.
- n) The data collection panel should show the progress of filling up the questionnaire during data collection.
- o) Intelligent dashboard must be in the application for a different level of users with some graphical and different features of smart analysis.
- p) Once the data collection from each household is fully completed, the data will be stored in encrypted format in the TAB and after confirmation, a copy of that will be sent to the server.

- q) The mobile application should support diverse types of household questions like short/long text, Geo-location (GPS enabled with latitude/longitude) numerical, multiple choice including provisions for mandatory or optional question, and so on.
- r) There should be an option to synchronize CAPI data with the server-based web application on the availability of the internet connectivity.
- s) The application should have an internal notification system to send and receive notification from Project Office.
- t) The application should be integrated with GEO code (published by BBS).
- u) The application should support version control of forms and the system must notify users (enumerators) upon publishing new versions of forms.

4.2. Web Monitoring Application Development

- a) Develop Web Application for Data Collection, Supervision & Monitoring, Data Management, Data Processing and Reporting of Survey.
- b) The interface should be user friendly with easy to access dashboard.
- c) Application should be lightweight and rich client-side scripting.
- d) Any web interface of this application should be fully responsive.
- e) The Application should be centralized, web-based solution and support cross browser platform (Chrome, Internet Explorer/ Microsoft Edge, Firefox, Opera etc.).
- f) Front-end development tool should be open source to avoid any license purchase and Back-end central database should be Oracle or SQL Server.
- g) Must have role-based user authentication and central user access control system to multilevel user creation and privilege set-up options by system admin.
- h) Must have intelligent dashboard for different level of users with some graphical and different features of smart analysis.
- i) Must have option for user registration and geo-code management and must have data analysis functionality.
- j) Monitoring facilities of data collection with the multiple supervision levels.
- k) Different types of data table, related dynamic charts and information will be displayed with download facilities in the supervision dashboard according to the requirements of Authority.
- l) Generate real-time progressive data collection report (e.g. data collector wise report, date/month/year wise report, error wise report, area wise collection report, complete/incomplete report etc.) via map and grid-based view etc.
- m) Features to review detail report from the Map against a specific data collector for a specific area.
- n) Detect fraudulent data from the map by reviewing data set's GPS coordinates.
- o) Data export and download facility from the system.
- p) Internal notification system to send notification to specific/ all data collectors and receive notification.
- q) Supervisory levels can monitor the survey data and will also be able to give feedback so that the data collector can update.
- r) Application should have fraudulent data finding feature.
- s) Application should have data edit feature with data validation logic same as mobile application.

- t) Any other development requirements of web application according to the project authority for the successful implementation of the project.

4.3. Administrative Features and Dashboard

The web-based admin module will have all the necessary parts of the application that will be used by the administrator of the application. Some part of the admin module will also be available for organization admins. The web application should be browser and operating system friendly and independent. It should be compatible for major web browsers of all resolutions as well as being responsive so that the design is not broken in mobile phones, tablets, or different browsers.

It should contain all necessary components to meet management requirements and users should be able to perform the following tasks:

a) Supervising/Monitor:

BBS authority should have the option to easily monitor all the real time data from Network Operation Center (NOC) Room. Supervising and monitoring level users should be incorporated to oversee the submitted data within their jurisdiction. BBS Authority will review the live data sent to the server by data collectors.

b) Notification:

BBS should be able to give notification/ announcement to specific/all data collectors. And data collectors should also have the option to send feedback to BBS.

c) Fraudulent data

Admin Module should have feature to find fraudulent data in the system.

d) Data add/edit/delete:

Admin Module should have data add/edit/delete feature with data validation logic.

e) User management:

This module should allow managing all the user information and their access controls. BBS Administrator will be able to manage all users. Platform should also allow creating accounts for web, mobile so that they can start accessing the system instantly. Accounts might be disabled for all levels of users by the system administrator.

f) Role management:

The Admin Moduleshould allow setting roles to the users. Each user should have its access in the application based on the permission assignment.

g) Permission management:

All the application modules and sub-modules with action items be controlled by the role-based permission. The system should have an easy way to manage the permissions for each role.

h) Report generation:

Dynamic data collection report generation should be available with report download facility. The system should be able to generate reports based on the real time data. Types of reports available for each user will depend on the user rights set by administrator.

i) Data Migration:

There should be Data Migration Module to easily export/ retrieve data using standard readable formats (csv, xlsx, etc.). This data will be used for reporting and other purposes.

j) **Verification of Data:**

The application should have functionality that will allow supervisors/ reviewers/ monitors to see all the data from specified location on the map as well as the detailed information and verify the data.

k) **Feedback:**

The system should notify management / admin users for any real time feedback submitted by the field level users. For any problems or issues mentioned in the feedback, the management user can take necessary action.

l) **Compatibility with the Network Operation Center (NOC) room of BBS:**

The applications must be compatible with the NOC room features and the output of the application should be displayable like census and survey results displayed in the NOC room.

4.4. Guidelines for System Development and Design

a) **Application Compatibility:**

The both applications must be compatible with the Oracle Exadata or SQL Server as Central Database and latest RedHat Linux or Microsoft Server as OS.

b) **Type of Data:**

The applications must be able to collect and store multiple type of data, like- single choice; multiple choice; geo location; image; normal text; live date and time etc.

c) **Handset Compatibility:**

The Applications must be compatible with updated version Android of Tablet Device and Web Browser.

d) **Screen Resolution:**

The Applications must able to fit for any screen size of PC, Laptop and Tab that is supported by Android and Web Applications.

e) **Unicode Support:**

The Applications must have to support Unicode Bangla.

f) **Online Synchronization:**

The Web and Mobile applications must have the ability to synchronize with particular online server and upload data when it will connect with the internet.

g) **Integration:**

There should be an option to integrate CAPI and web application with third party application (If required).

h) **SSL Certificate**

IT firm will provide SSL Certificate license for project timeline for secured protocol of the Web Application.

i) **VAPT Certificate**

IT firm will provide VAPT Certification for Web Application from BCC, the firm will bear the testing cost.

j) **Docker Environment**

The system should be developed in the docker environment.

k) **Other Guidelines**

- It should have web services-based Architecture to ensure flexibility and scalability.
- The system shall be designed in a simplified manner to avoid the need for specialized users and high maintenance overheads.
- The system should be robust to cope with errors during execution and cope with erroneous input.

- The system should be designed in such a way that it can be extended for larger dataset and map points without changing the core architecture and implementation.
- The web application and mobile app should have a unique yet consistent look and feel and align with BBS. The use of font colors and layouts should be consistent and should follow a common theme.
- The web application and mobile app should be easy to navigate, or in other words, to be able to find the expected data/ information/ section within the soonest possible time.

4.5. Technology specification

The vendor will follow widely used open source-based technologies, frameworks, platforms and guidelines. Following are some technical specifications which vendor should consider as reference but not as the ultimate method of implementing. Technology Specification may change in real-time based on the context of the project and future trend.

- a) Common data platform.
- b) Open-source PHP/ any updated version Framework.
- c) Rule-based authorization support.
- d) Bootstrap, jQuery and Ajax for best UX.
- e) Oracle/ MSSQL/ or any updated version open-source RDBMS.
- f) Future technology change, iterative prototyping and agility in framework design are the generic expectation.

4.6. Hosting Requirements

Service may host into cloud or self-hosted server (as per the mutual understanding of project authority) and all hosting related costing (ex: server rent/ space rent, database license purchase, domain purchase, server/hosting bandwidth, operating system purchase etc.) will bear by consultant for completion of the tasks. Hosting may require for 20 (twenty) months (± 2 months). The system may be hosted in BBS, if BBS can provide the hosting related environment.

4.7. Training

Technology will be transferred through intensive training on CAPI Mobile Application & Web Application Administration. Training will be focused on capacity building of project personnel to operate, update and maintain the application.

- 1) The consultant will provide master trainer training on Web and Mobile Applications Administration for BBS Officials (Approx. 85 participants) 1 (One) days in BBS Head Quarter Dhaka for each phase of data collection.
- 2) Also, the consultant will provide the technical support team (5 personnel) with full time engagement during training and data collection period in each phase.
- 3) The Consultant will provide pre-test (piloting) training for pre-test users for 1 (One) days in BBS Head Quarter, Dhaka.
- 4) The Consultant will provide different manuals. Have to provide soft copy and hardcopy of Training manual, User Manual, Operation Manual and any other related documents.

4.8. Other works and services

- a. Technical Support for databases (update, backup, restoration and maintenance) will be up to the contract period, which will start from the date of final installation and delivery.
- b. Troubleshooting, tuning, data export-import etc. for databases.

- c. System should be developed in a way to support English and Bengali language. The system also supports the voice to text input for description related fields.
- d. User Id should be 04 Digit (District Code 02 Digit + Enumerator SL. 02 Digit by District) With System Generated Password. Verification Code should be 08 Digit (Geolocation: District Code 02 Digit + City Corporation/others area Code 02 Digit + Upazila/Thana Code 02 Digit + Enumerator SL. 02 Digit by District).
- e. The forms rendered in the application should support duplication, export/ import, skipping, range, allowed values, table look-up for data fetching, calculations, and repeating sub-structures.
- f. The application should be facilitated with in-memory database (i.e. redis) capability to support low-latency read/write operations for real-time data entry and retrieval.
- g. Technical Support for installation, configuration, and deployment of application servers.
- h. Technical support for the Mobile and Web Application (deployment of updates) will be up to the contract period, which will start from the date of final installation and delivery.
- i. Bug fixing and upgrading of the Web Application and Mobile Application.
- j. IT firm will provide Google Maps API usage up to the free limit according to Google's Policy.

4.9. Data Management and Processing:

- The consultant will provide full data set and partial data whenever necessary.
- The consultant will clean the data according to the instruction of the project authority.
- The consultant will ensure full time physical presence of Data processing expert in project office during data editing and cleaning time.

5. Maintenance of the platform

The consultant will provide 06 (six) months maintenance and support after the end of total two phases data collection task.

6. Timeline

The total duration of the assignment is 20 (Twenty) Months. In where 14 (Fourteen) months for 2 (Two) phase data collection and rest 6(Six) months for support. In where each phase will continue for 07 (seven) months [or As per the requirement of Project office] commencing from the date of contract signing. The hired service provider is requested to fill the Sample Activity Gantt Chart in below format:

Activities	Weeks																Responsibility
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	n th

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7. Deliverable and work schedule

The key deliverable for the Consultant will be to prepare and submit a comprehensive report containing the following:

Deliverables for Phase 01:

- The consultant will provide a tested mobile application (CAPI Application) as per the requirement and within the required time frame of the client to operate the Survey-1. The approximate number of Enumerators is 650, Supervisors is 160 for this phase.
- The consultant will provide a prepared Web Monitoring Panel as per requirement and within the required time frame of the client;
- During implementation of User Acceptance Test, there will be arranged at least one piloting as per the requirement of client. Consultant will provide necessary training of mobile application to piloting users during the time of piloting in BBS Head Quarter;
- The consultant will provide 02 (two) Master Trainers for 01 (One) days training program on web and mobile Applications for Survey-1. The venue of the training will be in BBS HQ;
- Also, the consultant will provide the technical support team (minimum 5 personnel) with full time engagement during training and data collection period in survey-1.
- The consultant will assist Enumerator & Supervisor through call center or online chatting tools or others way for the use of the mobile application (CAPI Application) and web application in his/her device during data collection period (approximate 30 days);
- Have to provide soft copy and hard copy of Mobile & WEB User Manual with related information;
- All soft copy of documents will be provided through Hard disk drive (SDD);
- Final Set of Collected data.
- All source code with the system must be handed over to the project authority through Pen drive/ Hard disk drive (SDD).

*** Note that all kinds of training related expenditures will be borne by project office, BBS. Except remuneration and travel with accommodation cost of the Master Trainer (provided by consultant firm).

Deliverables for Phase 02:

- The consultant will provide a tested mobile application (CAPI Application) as per the requirement and within the required time frame of the client to operate the Survey-2. The approximate number of Enumerators is 650, Supervisors is 160 for this phase.
- The consultant will provide a prepared Web Monitoring Panel as per requirement and within the required time frame of the client;
- During implementation of User Acceptance Test, there will be arranged at least one piloting as per the requirement of client. Consultant will provide necessary training of mobile application to piloting users during the time of piloting in BBS Head Quarter;
- The consultant will provide 02 (two) Master Trainers for 01 (One) days training program on web and mobile Applications for Survey-2. The venue of the training will be in BBS HQ;
- Also, the consultant will provide the technical support team (minimum 5 personnel) with full time engagement during training and data collection period in survey-2.
- The consultant will assist Enumerator & Supervisor through call center or online chatting tools or others way for the use of the mobile application (CAPI Application) and web application in his/her device during data collection period (approximate 30 days);
- Have to provide soft copy of Mobile & WEB User Manual with related information.

- All soft copy and hard copy of documents will be provided through Pen drive/CD/DVD Media.
- Final Set of Collected data
- All source code with the system must be handed over to the project authority through Pen drive/CD/DVD Media.

*** Note that all kinds of training related expenditures will be borne by project office, BBS. Except remuneration and travel with accommodation cost of the Master Trainer (provided by consultant firm).

Other Deliverables:

- i. The consultant firm will submit an inception report that include detail team mobilization, final detail action plan with timeline and specific milestone using Gantt Chart.
- ii. The consultant firm will develop and finalize System Requirement Specification (SRS) within signing the contract in consultation with the concerned officers of BBS. Architectural Design document of the Application System and other related documentation should be submitted.
- iii. Development of Web and Mobile Application including full application, rolled out for field testing, piloting and data verification. After completing piloting, the testing dataset will provide to client.
- iv. The consultant firm will provide smart LED display (Screen size: 65 inches or more in any international brand and model; Resolution: Minimum 4k UHD (3840*2160)) for full time data monitoring from project office and provide an AC (Minimum 2 ton in any reputed brand) for the data analysis/server room. After completion of project the project team will handover these capital to Agriculture Wing, BBS.
- v. The consultant firm will provide updated mobile application (based on piloting feedback), full technical support for final data collection. The consultant will ensure full time physical presence of Data processing expert in project office during data editing and cleaning time. After completing the final data collection then clean data set will provide to client.
- vi. The firm will be responsible for System maintenance and support for next 06 (six) months with free of cost.

8. Coordination

A Monitoring Consultant/Data Processing Expert of the project will provide necessary support to the IT Firm related with project information, relevant documents and assist to maintain linkage which will be provided by consultant. On the other hand, an assigned “Project Manager” needs to be made available by the Firm to present information and coordinate with BBS. A reasonable number of meetings need to be organized to present the design and develop the solution by incorporating data and information.

9. Qualifications and Experience of Service provider

- a) The service provider should have legal entity (Updated Trade License, VAT, Tax Clearance Certificate) for working in Bangladesh for at least 5 years.
- b) Must have minimum 03 (Three) years' sound experiences in development and management of mobile application in the local context.
- c) Must have minimum 03 (Three) years' sound experiences in development and management of web-based applications integrated with Oracle/ SQL Server/ MySQL database in the local context.



- d) Must have proven experience in delivering at least 03 (Three) similar type of system development for statistical survey data collection for Bangladesh Govt. with a completion certificate.
- e) Must be experienced of successful implementation of the system to rollout at least 03 (Three) nation-wide statistical survey data collection project including Bangladesh Government/autonomous body with a completion certificate.
- f) Must have proven training providing experience in 64 districts at a time with skilled IT professional with any Government Organization.
- g) Must have a pool of domain experts capable in design and develop a secure and standardize Web Application and CAPI system as well as data backup, restore and access security control management.
- h) Experience of similar type of system development in BBS will give preference.
- i) Must have liquidity asset/ credit line certificate for at least TK 35 lac
- j) Similar experience of having minimum amount of BDT 50 lac (Fifty Lac) under atmost 2 (two) contract with Government organization within last 5 (five) years.
- k) Must be a Member of Bangladesh Association of Software and Information Services (BASIS).
- l) Must have Audit report for the last 03 (Three) years by a renowned chartered firm.

Team Composition

Sl.	Positions	Assignment		
		Number	Estimated Professional Staff Month	Total Staff Months
1	Project Manager/ Team Leader	1	10	10
2	System Analyst	1	4	4
3	Software Engineer (Mobile Application)	2	4	8
4	Software Engineer (Web Application)	2	4	8
5	Database Administrator	1	4	4
6	Data Processing Expert	1	4	4
7	Support Engineer	1	4	4
Total		9	-	42

Key Positions responsibility and qualification Requirements

The project considers the following resources are the key experts. The responsibility and qualification Requirements for the key expert are given below:

Project Manager/Team Leader (1 Nos)

- Be responsible for overall management of the project activities
- M.Sc. in Computer Science/IT/CSE/CIT or related equivalent. Master degree in those field will be given preference.
- At least 10 (Ten) years of demonstrated experience working in the projects of similar size and nature.
- At least 05 (five) of these years should consist of working as Project Manager/Team Leader.
- Demonstrated knowledge and experience in the area of Training, education or similar programs.
- Prior experience of working with Government organizations and structures.

System Analyst (1 Nos.)

- Be responsible for gathering client requirements, understanding & documenting the requirements, requirement analysis & system design, client communication etc.
- Minimum B.Sc. in Computer Science/IT/CSE/CIT or related equivalent degree.
- At least 10 (Ten) years of experience in related field.
- Experienced on web-based and mobile application analysis and development.
- Prior experience of working with gov. IT project.

Software Engineer (Mobile Application) (2 Nos)

- Be responsible for designing, developing, and modifying the Mobile Application with arranging the needed functionalities accordingly.
- Minimum B.Sc. in Computer Science/IT/CSE/CIT or related equivalent degree.
 - ii) Minimum 5 (five) years experiences in related field.
- iii) Progressive Experience on Mobile application development.

Software Engineer (Web Application) (2 Nos)

- Be responsible for designing, developing, and modifying the Web Application with arranging the needed functionalities accordingly.
- Minimum B.Sc. in Computer Science/IT/CSE/CIT or related equivalent degree.
- Minimum 5 (five) years experiences in related field.
- Progressive Experience on Web application development.

Database Administrator (1 Nos):

- Be responsible for maintaining database, data security and solving any problems that may occur with them.
- Should have at least 5+ years of experience in related field.
- Minimum B.Sc. in Computer Science//IT/CSE/CIT or related equivalent degree.

Data Processing Expert (1 Nos):

- Be responsible for data editing, data cleaning, data processing, data analysis, table generation and reporting.
- Minimum B.Sc. in Computer Science/IT/CSE/CIT or related equivalent degree.
- At least 5 years of experience in related field.

Support Engineer (1 Nos):

- Be responsible for implementing the applications and to provide necessary supports to run the applications smoothly.
- Should have at least 3 years of experience in related field.
- Minimum B.Sc. in Computer Science//IT/CSE/CIT or related equivalent degree.
- Support engineers will work at the client's office BBS HQ, Dhaka.

NB: A technical support team must be present at the project office during the data collection period to provide real-time solutions to technical issues. Additionally, The Data Processing Expert shall work under the direct supervision of the Project Director at the project office during data cleaning and coding period.

10. Reporting Obligations:

The Consultant shall provide or submit all kinds of reports related to assignments as and when required by the Project Director including the followings:

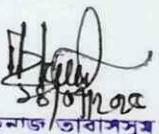


- Inception report
- Piloting Report with raw data.
- Final Data Report with raw data.
- Any other report required by procuring entity (if any).

11. Conclusion:

The Agriculture Wing of BBS is conducting the Non-Human Consumption of Selected Crops & Food Loss & Waste Project. Using the statistics obtained through the mentioned project will be very helpful in the SDG monitoring as well as in taking necessary measures to improve the quality of the country's agricultural sector and other government services by the concerned departments.

In view of the above, Consultant Firm has to design, develop, implement Mobile and web application-based solution for Data Collection, Supervision & Monitoring, Data Management, Data Processing and Reporting for two surveys under Non-Human Consumption of Selected Crops & Food Loss & Waste Project. Apparently, the proposed technical proposal has to reflect the visualization, deep level understanding of the processes, system requirement/sizing, development platform including capability of adopting future technologies.



মেহেন্দি তাবাসুর
প্রকল্প পরিচালক
নির্বাচিত কসলোর নন-হিউমান কনজোড়শন এবং
কসলোর কাত ও অপচক নিরূপণ অরিপ্ত প্রকল্প
বাংলাদেশ পরিসংব্যান বুরো
পরিকল্পনা মন্ত্রণালয়।