Government of the People's Republic of Bangladesh
Bangladesh Poverty & Livelihood Statistics (BPLS) 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, Validation, Data
Management & Data Processing.

Package No:
SF-1

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প্রকল্প পরিচালক
বিপিএলএস প্রকল্প, বিবিএস
পরিকল্পনা মন্ত্রণালয়, ঢাকা।

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

1. Introduction

The Bangladesh Bureau of Statistics (BBS), as the national statistical organization, 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. Bangladesh Poverty & Livelihood Statistics (BPLS) Project under the National Accounting Wing of BBS is going to conduct Household Income and Expenditure Survey (HIES) and developing Poverty Maps. Initiatives have been taken to collect data through the project.

2. Rationale

Inconsistent 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, Validation, 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, Validation, 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, Validation, Data Management, Data Processing and Reporting and Implementation Training. As business requirement changes over time, the Consultant must accept 15% additional changes which should be delivered with no time extension. The selected service provider shall collaborate with BBS team members to implement the following activities:
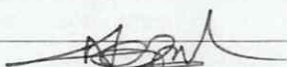
4.1. Mobile Application Development (CAPI System):

a) Develop Android Mobile Application (CAPI System) for Data Collection, Supervision and Monitoring, Validation for (i) Listing and Main HIES Survey (ii) Community Survey using Relation Database Management System (RDBMS).

b) The mobile application interface should be user friendly and dynamic. Must adhere to platform specific User Interface (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 in 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.

i) The supervising officer/District Coordinator can check the data and if need they can return the data to the enumerators for editing. After editing enumerator will be able to resend data to the supervising officer.

j) There should be skipping options for some questionnaires and also mandatory fill-up features for some questionnaires, including numerical calculation.

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) Smart 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.

v) Any other development requirements of Mobile Application Development (CAPI System) according to the project authority for the successful implementation of the project.

4.2. Web Monitoring Application Development

a) Develop Web Application for Data Collection, Supervision & Monitoring, Data Management, Validation, 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 and Validation 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.
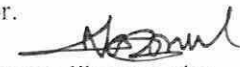
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l) Generate real-time progressive data collection report (e.g. data collector wise report, date/month/year wise report, error wise report, area wise collection report, complete/ incomplete report etc.) via map and grid-based view etc.

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/Monitoring:**
BBS authority should have the option to easily monitor all the real time data from server by users, control, create, edit or delete application users and their access, generate and view data collection reports etc. 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 Module should 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:**
System should have utility to export data in various industry standard formats like csv, slsx, dta etc.

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 should be compatible with the RDBMS or PE requirements.

b) **Type of Data:**

The applications must be able to collect and store multiple type of data, like- single choice; multiple choice; numeric; 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) **Data Review and Validation System:**

There should be a feature to review and approve every data by supervising officer.

i) **Data Rejection System:**

During data collection if there any inconsistency found, Supervising officer should be able to send back data to the enumerator. After necessary editing enumerator will be able to resend the corrected data to the supervising officer.

j) **SSL Certificate:**

IT firm will provide wild card SSL Certificate license for project timeline for secured protocol of the Web Application.
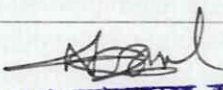
k) **VAPT Certificate:**

IT firm will provide VAPT Certification from BCC or PE requirements, the firm will bear the testing cost.

l) **Docker Environment:**

The system should be dockerized (prefarable)/ real-time server environment (as per system design).

m) **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.

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4.5. Technology specification

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

    a) Open-source technologies/ tools whenever applicable;
    b) Flutter, Dart, Java etc. for Mobile app development;
    c) Golang/ .Net/ Java/ Restful PHP/ Json for API development;
    d) Oracle/ MSSQL/ Postgres/ MySQL etc for RDBMS;
    e) .Net/ Java/ PHP for desktop monitoring web app development;
    f) Docker for containerization/ Real time server
    g) Agile iterative development method needs to be followed.

4.6. Hosting Requirements

Service may host into cloud/ BDCCL/ National Data Centre (NDC)/ self-hosted server (as per the mutual understanding of project authority) and all hosting related costing will bear by Project Office of the tasks. Hosting may require for 16 (Sixteen) 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. 15 participants) 7 (Seven) days in BBS Head Quarter Dhaka/ Any Training center near about Dhaka for data collection.
2) Also, the consultant will provide the technical support team (minimum 2 personnel) with full time engagement during training and data collection period.
3) The Consultant will provide one (01) day training program for pre-test (piloting) related data collectors and one (01) day training program for community survey related data collectors in BBS Head Quarter/ Any training center near about Dhaka.
4) The Consultant will provide different manuals. Have to provide soft copy and 300 (three hundred) hardcopies of training manual, user manual, operational manual & 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 which will be delivered to enumerator through SMS. 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. Project team should be able to identify enumerator's live location at any time.

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.

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5. Maintenance of the platform

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

6. Timeline

The total duration of the assignment is 14 (fourteen) Months. In where 14 (Fourteen) months for 18 (Eighteen) terms data collection and rest 6 (Six) months for support. 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	

7. Deliverable and work schedule

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

Deliverables:

- 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. The approximate number of concurrent user load can be 1000/second.
- The consultant will provide a prepared Web Monitoring Panel as per requirement and within the required time frame of the client. Monitoring panel should have multi-level user access.
- 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. After completing piloting, the testing dataset will provide to client;
- The consultant will provide 02 (two) Master Trainers for 01 (One) days training program on web application and 07 (seven) days training program on mobile Applicatons for Survey. The venue of the training will be in BBS HQ/ Any training center near about Dhaka;
- Also, the consultant will provide the technical support team (minimum 2 personnel) with full time engagement during training and data collection period in survey.
- The consultant will assist Enumerator & Supervising Officer/ District/Divisional Training Coordinator 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. Support request needs to be addressed within 15 minutes (approximate 14 months);
- Have to provide soft copy and hard copy of Mobile & WEB User Manual including complete Video tutorials;
- All soft copy of documents will be provided through Hard disk drive (SDD);
- Have to provide micro data of the survey as convenient form required by project office.
- All source code of the system must be handed over to the project authority through Hard disk drive (SDD) with complete installation guideline and tools requirements.

*** Note that all kinds of training related expenditures will be born by project office, BBS except remuneration, travel cost, accomodation cost of the Master Trainer (provided by consultanting firm).

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Other Deliverables:

i. The consulting 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 consulting 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. The consulting 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.

iv. The firm will be responsible for System maintenance and support for next 06 (six) month with free of cost.
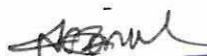
8. Coordination

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 Updated Trade License, Updated Tax Clearance Certificate VAT Registration Certificate.

b) The service provider must have general experience at least 5 years.

c) Must have minimum 03 (Three) years' sound experiences in development and management of mobile application in the local context.

d) Must have minimum 03 (Three) years' sound experiences in development and management of web-based applications integrated with Oracle/SQL Server/ MySQL/ PostgreSQL database in the local context.

e) Should have experienced of successful implementation of the system to rollout at least 2 (two) nation-wide statistical survey data collection project including Bangladesh Government/autonomous body.

f) A pool of domain experts must be capable of designing and developing a secure and standardized mobile-responsive web application and CAPI system, as well as data backup, restore, and access security control management.

g) Experience of similar type of system development in BBS will give preference.

h) Must have liquidity asset/credit line certificate for at least TK 80 lac.

i) Similar experience of having minimum amount of BDT 70 lac (Seventy Lac) under 2 (two) contracts in any Government organization within last 5 (five) years.

j) Must be a Member of Bangladesh Association of Software and Information Services (BASIS) (if applicable).

k) 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	15	15
2	System Analyst	1	6	6
3	Software Engineer (Mobile Application)	2	5	10
4	Software Engineer (Web Application)	2	5	10
5	Database Administrator	1	3	3
6	Data Processing Expert	1	12	12
7	Application Tester	1	3	3
	Total	9	-	59

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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 & ensure smooth running and functional application.
- 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.
- Minimum 5 (five) years experiences in related field.
- 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/related equivalent degree or any other subject.
- At least 5 years of experience in related field.

Application Tester (1 Nos):

- Be responsible for ensuring software quality through comprehensive testing, including validation of business logic, data consistency, and data integrity. Develop and implement validation rules aligned with business requirements. Perform white-box testing to confirm that data is stored accurately and in the correct columns within the database tables.
- Should have at least 5 years of experience in Software Quality testing;
- Minimum B.Sc. in CS/CSE/IT/ related equivalent degree or any other subject.

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.

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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
- Listing Report
- Sample Household Report
- Piloting Report with raw data.
- Final HIES Report with raw data.
- Final Community Survey Report with raw data.
- Data Processing Report (Details)
- Any other report required by procuring entity (if any).

11. Conclusion:

The National Accounting Wing of BBS is conducting the Bangladesh Poverty and Livelihood Statistics (BPLS) Project. Using the statistics obtained through the mentioned project will be very helpful in the SDG monitoring as well as in taking necessary steps to irradicate poverty, updated weight for consumer price index-CPI, inflation, and consumption data for GDP compilation.

In view of the above, Consultant Firm has to design, develop, implement Mobile and web application-based solution for Data Collection, Supervision & Monitoring, Validation, Data Management, Data Processing and Reporting for Bangladesh Poverty and Livelihood Statistics. 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.

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