



Government of the People's Republic of Bangladesh
Program on Agricultural and Rural Transformation for Nutrition,
Entrepreneurship, and Resilience in Bangladesh (PARTNER)
Department Agricultural Marketing (DAM)
Ministry of Agriculture

Terms of Reference (TOR)

For

“Planning, Design, Development, Upgradation, Deployment, Support &
Maintenance of Smart Krishi Market System”

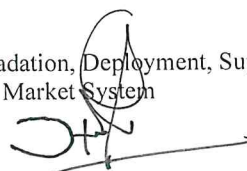
Date: 25-09-2023

1. Background

“Smart Bangladesh” is an integral part of the government’s Vision 2041—which promises a prosperous and equitable middle-income Bangladesh. The Honorable Prime Minister outlined the Smart Bangladesh having four pillars– (a) Smart Citizen; (b) Smart Government; (c) Smart Economy; and (d) Smart Society. In alignment with the goal of Smart Bangladesh, the services of the government should be designed to be more citizen centric and automated which will reduce the hassle and difficulties which service providers and service recipients are facing right now. There are various digital systems and solutions in pipeline targeting vision 2041. Agriculture and farmers are the lifeblood of Bangladesh. Bangladesh is on the ladder of development with the confidence of Smart Bangladesh. Starting from agriculture, Bangladesh is now a role model of the world in socio-economic development. The agricultural products of this country have ensured our food security and are now being exported abroad. Modernity has come in agricultural production with the far-sighted steps of the present government.

In this age of information technology and globalization, the worldwide marketing system has undergone a revolutionary change. Online based business commerce i.e. e-commerce or e-business is now popular all over the world. Even in Bangladesh, which is on the highway of economic development, online shopping has become very popular in the last few years. There are numerous online based businesses in the field of agricultural products. There are also numerous small agribusinesses that cannot stand the lack of proper guidance and a credible platform. Managing an online portal in person is extremely complex and expensive. Moreover, as there is no System to monitor and control the quality of agricultural products available online, the general consumer and the leading marketers suffer from a kind of risk and insecurity in buying and selling. As a result, despite the huge potential, agro-based online business and entrepreneurial development is not as expected. According to Section 2 (15), 4 (f) and Section 6 of the National Agricultural Marketing Act 2018, the Department of Agriculture Marketing has a mandate to control, monitor and license the online based agribusiness. Developing a government- sponsored online platform for agricultural products would be a landmark step in the agricultural marketing System. Such a platform would be beneficial for all including farmers, agro traders, importers, exporters, processors, women entrepreneurs, consumers and organizations involved in the transportation of agricultural products. Sometimes the farmer can sell his produce by bargaining online. Even farmers in marginal and difficult communication areas can easily reach the buyer of their choice. Small scale traders, processors, exporters and general consumers will be able to buy products directly from the farmers of their choice. The impact of middlemen will be reduced substantially so that the buyer can buy the product at a comparatively expected price. Farmers and traders of all classes, large and small, will be able to buy and sell goods with equal rights. The fair price of the farmer will be ensured. Agricultural entrepreneurs will be created. Consumers are also not interested in general purchases as there is no regulatory body and there are lack of trust about the quality of their products as those who trade online with agri products.

As a result, despite the potential, the sector is not improving. If the Department of Agricultural Marketing, as the controlling body, brings such a common platform to ensure quality, huge revenue and entrepreneurial development is possible from this sector. Moreover, rural women will also be able to trade various home-processed agricultural products in the same way and be a part of the socio-economic development of the country. Even if the overall communication system of the country is out of order during different disasters, it will be possible to keep the transaction or business of perishable products like agricultural products normal through this system. The development of a regular and regulated supply chain System in the overall agricultural product marketing System will be expected to bring about a revolutionary change in the agricultural marketing System of the entire country.



2. Objective of the Project

Its main objective is to develop high-quality and high-capacity software for an integrated and automated **Smart Krishi Market System** and implement it in all offices under Department of Agriculture Marketing (DAM), including the field level. To increase dynamism and transparency in all activities by implementing software called “**Smart Krishi Market System**” for an integrated agricultural market management:

- a) In the 8th Five Year Plan and National Agriculture Policy-2018, Digital Bangladesh will be built, food security will be achieved, agricultural productivity will be increased and high value crop production will be increased due to profitability, rural economy will be developed, poor farmers and agricultural marketing System will be developed, income and employment will be increased.
- b) Development of agribusiness, commercialization of agriculture and reform of existing market infrastructure and development of new market infrastructure at rural level with the facility of direct market access to poor farmers, home production to ensure women's empowerment, the government has taken a strong stand on post-harvest management, agriculture/food processing, encouraging greater participation of women in marketing and decision making, greater participation of women in market transactions, introduction of value chains and efficient marketing Systems.
- c) In the National Agricultural Policy 2018, emphasis is placed on value chain of agricultural products for proper market management, encouragement of digitization of agricultural markets and markets, taking necessary steps for quality testing of agricultural products, reduction of post-harvest losses in modern transport and transportation systems. Emphasis has been laid on the collection and dissemination of up-to-date information on the wholesale and retail market of agricultural products and agro-products to the consumers, promotion and dissemination of broadcasting services in popularization of packaging / grading/ labeling activities, etc.

3. Objectives of the Assignment

The overall objectives of this proposed Planning, Design, Development, Upgradation, Deployment, Support & Maintenance of Smart Krishi Market System for Department of Agriculture Marketing (DAM) are mentioned below:

- a) To provide one stop service to farmers, traders, wholesalers, retailers and consumers who are connected with agriculture, agribusiness and consumption of agricultural products.
- b) To connect farmers to the market with large customers;
- c) To increase the use of this online platform as a means of direct communication between importers, exporters, farmers and small entrepreneurs in this country;
- d) To ensure maximum security of the software and user data so that no hacker can damage the system.
- e) To launch Bengali and English version of the software to ensure domestic and international user to ensure international standards of buying and selling at farmer, dealer, wholesaler, retail trader and consumer level;
- f) To ensure User Interface (UI) as much user friendly as possible.
- g) To manage operational management, System administration and application maintenance centrally.
- h) To integrate with the other systems in order to carry out standard API stacks which will save time and be easier to implement.
- i) To conduct training, knowledge transfer, capacity development and operationalization in structured, methodical and measurable manner.
- j) To develop content management system through user interface instead of backend operation.

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- k) To incorporate an in-built mechanism for users to provide feedback, ensuring continuous improvement and adaptability of the system.
- l) To design the system with a forward-looking approach, ensuring it can handle growth in terms of users, data, and transactions.
- m) To integrate tools for real-time analytics and reporting to assess platform performance, user engagement, and other key metrics.
- n) To establish robust disaster recovery plan and business continuity measures, ensuring uninterrupted service and data protection.

4. Scope of work

4.1 Requirement Analysis and design:

- ✓ Collect requirements for Smart Krishi Market System and conduct a feasibility study of the System.
- ✓ Provide concrete development plan with all required Designs (System design, UI Design, Logical Design, Database Design, Architecture Design etc.) which should include context diagram of the proposed System, Sequence Diagram, Use Case Diagram, Process Flow Diagram along with an appropriate project implementation plan.
- ✓ Bidder must prepare SRS and submit to concerned authority as per ISO/ITEE template. The bidder must develop the system/application according to the approved SRS.

4.2 Architecture & Standard Development:

The establishment of appropriate standards and guidelines for the agriculture sector e-Government Architecture covering business processes, information/data formats and application technologies under the Whole of Government (WoG) approach is of paramount importance.

4.3 Development of the Platform:

The solution will include platform components, specific solution components, Core Services, and Shared Services as under.

- a) **Web Application Development:** Design and development of the System along with a responsive UI and easily navigable web portal ensuring the designed UX.
- b) **Programming Language:** Any programming language may be used to develop the System. However, the following popular languages are preferred such as Frontend: React.js, Angular, Vue.js Backend: Java, Node.js, ASP.NET (C#), PHP (Laravel), If the firm has an alternative development language, the firm may provide the details on the proposed language.
- c) **Database:** The database for the application is recommended to be implemented using popular open-source database such as MySQL, MariaDB and PostgreSQL etc.
- d) **Mobile Apps Development:** Development and deployment of Android and iOS mobile apps.
- e) **Integration:** The platform/solution will have integration scope to share data and service as an integrated service among all stakeholders (i.e., National ID, BTRC, Ministry DSDL System etc.) using standard API technology.
- f) **Language:** The System will be developed in Bangla and English language using open-source platform and provide different user level security.

6 Architecture & Standards Development

Development of the Architecture & standard development of **Smart Krishi Market System**, TOGAF (The Open Group Architecture Framework) will be used as the core architecture development methodology. The consultant will develop enterprise principles, standards, frameworks, artifacts and best practices as per Bangladesh National Digital Architecture (BNDA) guidelines. The consultant will use TOGAF 9++ components which are: ADM (Architecture development Method), ADM Guidelines & Techniques, Architecture Content Framework, Enterprise Continuum, Reference Models, Architecture Capability Framework. They will need to develop a detailed baseline business architecture, identify required catalogs of Business Building Blocks (such as Organization/ Actor catalog, Driver/ Goal/ Objective catalog, Role catalog, Business Service/Function catalog, Location catalog, Process/ Event/ Control/ Product catalog and Contract/Measure catalog etc.).

The consultant will need to provide Statement of Architecture Work, validated data principles, Baseline Data Architecture, Target Data Architecture (such as Business data model, Logical data model, Data management process models, Data Entity/ Business Function matrix etc.), Data Architecture requirements (such as Gap analysis results, Data interoperability requirements, Relevant technical requirements, Constraints on the Technology Architecture, Updated business requirements etc.).

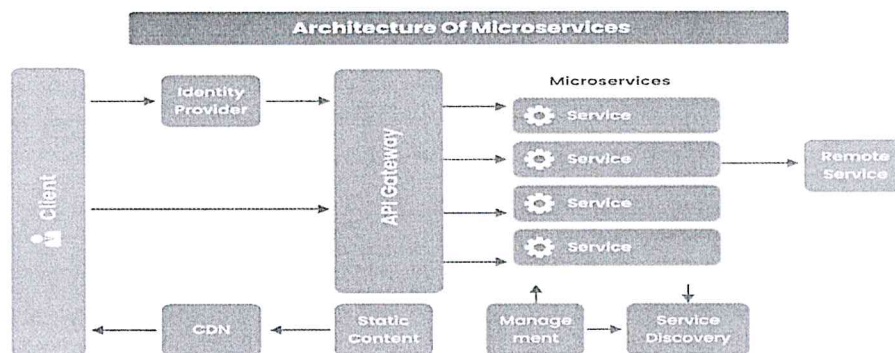


Figure: Micro-service Architecture

6.1 Standards & Guidelines:

Architecture standards and guidelines should provide the methods and tools for assisting in the acceptance, production, use, and maintenance of **Smart Krishi Market System** platform. Standards and guidelines should be based on an agile model supported by best practices and a re-usable set of current architecture assets tested/validated by AEM (Adobe Experience Manager). DAM is expecting the following standards and guidelines to be prepared in collaboration with stakeholder's acknowledgement.

- Data standards and guidelines
- Application standards and guidelines
- Integration standards and guidelines
- Data and application security standards and guidelines
- Technology standards and guidelines
- Deployment standards and guidelines
- UI Standard and UX journey guidelines
- Capacity development guidelines
- Data usage & distribution policy and management etc.

4.4 Capacity Development:

Capacity development of the stakeholders (i.e., Government/non-government agencies, industry, academia etc.) should be done according to the needs of front-end users before UAT and the needs of back-end operation team after OAT so that users and Systems administrators can run the application properly. Refresher trainings will be necessary from time to time due to periodic refinements of the solution and changes in operating personnel. The effectiveness of the capacity building activities shall be monitored through a feedback mechanism; necessary actions/modifications shall be taken to address those.

4.5 Payment Method:

The bidder must develop payment gateway which should use government approved payment gateway like ekpay developed by a2i. Security measures shall be given paramount importance through setting encryption standards, transaction monitoring tools, fraud detection measures, etc. In addition, alternative mode of payments shall also be made available.

4.6 Support & Maintenance:

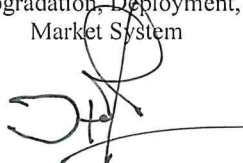
Provide extensive 24x7 support services for upgradation of the system. Similarly provide full range of support services during the tenure of the contract for the upgraded System as per SLA and AMC. Feedback mechanism of users, disaster data recovery plan, version upgradation, etc. shall be ensured for smooth operation.

5 Functional Requirements

Comprehensive requirements for **Smart Krishi Market System** have to be collected, compiled and gaps analyzed. Workshops will need to be arranged for stakeholders and Technical Experts to review the Current System and the gap analysis.

- a. Portal Development
- b. Wholesale Management
- c. Retail Management
- d. Farmer Profile management
- e. Product Listing
- f. Wholesale-wise selling
- g. Auction-wise selling
- h. Single product auction
- i. Instruction/ Manual
- j. Transportation System (live tracking, logistics integration, etc.)
- k. Market trend and insight
- l. Admin /Super admin features
- m. Others user management
- n. Product Management (including wish list and recommendations)
- o. Order Management (with refund and return tracking options)
- p. Communication Management (feedback, notification, alert, etc.)
- q. Reports and Analytics
- r. Payment Gateway
- s. Dashboard
- t. Common Module Management
- u. Frequently Asked Questions (FAQs)
- v. Support Services (bug reporting and complaint management)
- w. User Manual and A/V Tutorial

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7 Functions and Features

The major modules functional features are described hereunder which are required to be considered in scope finalization of this “**Smart Krishi Market System**”. All processes and reports should have advance searching option as per requirements. The System will be bilingual. Citizen can choose the language as their comfort and continue with the procedures.

- ❖ The System have to develop in bilingual in English and Bangla language
- ❖ The mobile version should be made after the web version. So that in the future if any kind of update is required in the web version, it can be updated as soon as possible.
- ❖ The web version will have different versions of Android and iPhone for mobile applications. To ensure the identity of the genuine user, system shall have registration feature through National ID Card/Smart Card and verification through Mobile OTP.
- ❖ The payment System should be made according to international standards, so that there is no problem in the transactions of all parties as per the guidelines of Bangladesh Bank;
- ❖ Software should be developed following micro services architecture so that any developer company can update the software;
- ❖ Coding System should be optimized while developing the software. The coding must be done in a single repository principal manner in order to control the traffic to a greater extent with the Software and not to cause any problems with the Software;
- ❖ The software System should be designed in light of the requirements of the Department of Agricultural Marketing so that the software System can handle at least 50,000 (fifty thousand) user requests per second;
- ❖ All traffic needs must be considered when developing the software so that users can use all pages appropriately;
- ❖ While developing the software, the response of the System should be within nanoseconds, so that the users are interested in using the System;
- ❖ All errors and omissions in the development of the software shall be disclosed to the public remotely. So that users do not face any problem while using the software. In addition, the web and mobile application of the software must be made suitable for long-term use;
- ❖ In designing the software, the software must be user-friendly in the design plan, so that if any new feature is added later, no previous feature will be broken;
- ❖ New software should be designed according to coding micro services architecture to ensure all types of logistic support, include the maximum number of features, ensure maximum security and be made up-to-date;
- ❖ Real time AI Based dashboard for all Users: Artificial intelligence platforms have to use for transforming the decision-making processes with AI dashboards.
- ❖ Development of AI chatbot to provide support different types of service recipient and users:

8 Mobile Application Requirements

- The mobile application version of the System should be developed for Android and iOS.
- The mobile app should have the capability of displaying System notifications
- Functionality for registration options for service recipients
- App should enable compact view of services for service recipients.
- There should be option to operate in both online and offline mode with features to auto synchronization with the central database with apps local database on the availability of the Internet connectivity.
- Payment Gateway

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- Support Services
- The app should support multimedia content like videos, images, and audio clips.
- The application should be able to integrate with device-specific features where needed.
- The mobile application must have all required features for best user experience as given in web version
- The app must be compatible with a range of device and software versions

9 Capacity Development

The consultant shall deliver a plan for training of the **Smart Krishi Market System**. It is required that the consultant works in partnership with Department of Agriculture Marketing (DAM) and other stakeholders identified by the DAM to ensure knowledge transfer and further build local capacity for maintenance of the System including trouble shooting, analytics and other advanced features.

a) Operational Training: 20 persons

The consultancy firm should arrange batch wise day long operational training in two batches (10 persons in each batch)

b) Training of Trainers (ToT): Around 250 persons

The consultancy firm should arrange batch wise one day long ToT training. Around 25 persons in a batch with Audio-visual tutorial for the end user and must be linked in the Portal. (Only trainer will be provided by the consulting firm).

10 Security Management

This System will contain different Agriculture related product which is highly valuable & crucial for both farmer/buyer/consumer and government. So, the solution needs to have security features to handle all types of data confidentiality, authentication, authorization etc. The **Smart Krishi Market System** has to ensure this security features for data encryption & VPN features.

11 Non-Functional Requirements

11.1 Integration

The firm is responsible for delivering comprehensive integration services. This entails connecting different e-service streams within both the government and business sectors. The firm must develop a robust integration plan that ensures the proposed solution is well- designed, capable of meeting existing integration requirements, and can seamlessly integrate with future systems.

- Coordinate internal and external agencies to facilitate service delivery and integration activities.
- Integrate both the Ministry and the District Commissioner offices into the system, enabling the issuance of registration and renewal certificates through the software.
- Define the system's integration scope and prepare the required documentation.
- Outline the integration process and develop the necessary documentation, supported by diagrams.
- Coordinate with service providers and relevant stakeholders involved in the integration process.
- Execute the integration according to the defined scope.
- Develop the necessary APIs for system integration.
- Conduct integration testing and implement the integration successfully.

11.2 Quality Assurance and Testing Activities

- The consulting firm will establish a Sandbox environment for system testing.
- Conduct functional and non-functional testing, installation testing, compatibility testing, smoke and sanity testing, security testing, regression testing, unit testing, integration testing, system testing, load testing, software performance testing and acceptance testing at each phase of the project.
- Providing comprehensive testing reports, including the relevant testing conducted and its resolutions.

11.3 Maintenance & Support Period

Provide extensive 24x7 support services for upgradation of the system. Similarly provide full range of support services during the tenure of the contract for the upgraded system as per SLA and AMC.

It may be stated that the support services period will be started immediately with the date of operation. The firm will provide all necessary support to ensure smooth operation during the warranty period. It may be mentioned here that some change requests (CR) based on the end users review and feedback at this warranty period may be required to be accepted and CRs will be adjusted through a predefined development cycle. Obviously at this stage, those CRs must be considered aligned to the Terms of Reference (TOR) of the assignment.

In this support services period technical support, continuous training, timely reporting, receiving end user's feedback and measuring the overall performance of the application are the important factors that should be taken care of by the firm at this stage.

- Providing maintenance and support services for the Service.
- Resolving all system bugs, regardless of their complexity.
- Developing, documenting, and reporting change documents, and managing source code and version control as well as providing source code with version control to PE after deployment.
- Implementing approved changes while ensuring no risks are posed to existing integrated services.
- Conducting comprehensive testing at all levels before implementing changes in the production environment.

11.4 Hosting Requirements

Bangladesh Government is providing an extensive and standard hosting facility for all types of government organization applications and software that is named as National Data Center under Bangladesh Computer Council (BCC). It may be mentioned here that the firm developed application will be hosted in a government provided data center i.e., National data center (NDC). Before hosting the firm submits a hosting requirement specification to DAM for this software. The firm must host software in the NDC. Necessary technical/technology and quality upgradation support will be provided by the firm during hosting time, warranty period and AMC period. Domain and hosting costs will be borne by DAM.

11.5 Support & Maintenance during the AMC period:

After successfully completed sixteen (16) months' support and maintenance for Smart Krishi Market System end. The Annual Maintenance Contract (AMC) needs to be done after the end of the maintenance and support period. AMC period the Consulting Firm must do the following tasks:

- Fix any software problems within 5 days.
- Fix any security issues (including virus attacks and other security problems) within 48 hours.

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- Maintain back-up, Restore and recovery of data.
- Assist the client in maintaining and enhancing the system through transfer of knowledge as required.
- Do required modification of the EHMS software for smooth operation.
- Add/modified/delete any module/field/process as required.
- Adjusting and updating the system to meet security tests, load tests, or IT audits conducted by the client.
- Incorporating and streamlining the system to align with updated development tools, languages (Android and iOS version), databases, and ensuring the availability of APIs for integration with other services.

11.6 User Acceptance Test (UAT)

User Acceptance Test (UAT) is a very vital and essential phase in the application development lifecycle. At this phase, all types of users must test the developed application by themselves and have to provide detailed feedback/test report. Based on the UAT report, the firm has to update the application accordingly to ensure user satisfaction by making it more users friendly. Here, it is expected that, considering the type of users and their role in the application, the firm must propose a comprehensive UAT plan in their technical proposal which may cover the following:

- UAT activities to be performed (planning, designing test cases, selection of testing team, executing test cases and documenting, Bug fixing, sign-off etc.)
- Types of user wise roles and test items distribution
- Resource requirement
- Activity wise time requirement

12 Tools and Technologies to be used.

The consultancy firm is recommended to choose the appropriate tools and technologies to be used for the development and implementation of the Web-based application. The selected firm has to consult with the DAM to finalize the tools, technologies, framework, and platform with the approval of the same authorities' consent. The main components of the software will be web-based application. It should be run in Windows/Linux operating system at the user end and should be compatible with all major browsers such as - Internet Explorer, Firefox, Google Chrome, Opera etc. The System UI should be compatible with Tab & Smart Phone browsers and in case of Mobile Apps should be support both Android and IOS. Understanding the details scope of this project, firm is requested to submit a comprehensive plan in their technical proposal following the table format mentioned below.

Issues/Phases/Purpose	Used Technology/Tools	Justification for Use	Alternative Tool Technology
Project Management			
Version Control			
System Requirement Analysis			
System Design			
Development (Client End)			
Development (Server End)			
API/Web Service			
Apps			
Testing			
Integration			

Issues/Phases/Purpose	Used Technology/Tools	Justification for Use	Alternative Tool Technology
Hosting and Development			
Documentation			
QA			
Help Desk/Support			
Reporting			
Communication			
Security			
Database Management			
Continuous Integration (CI/CD)			
Monitoring and Analytics			
UX/UI Design			
Backup and Recovery			
Scalability Tools			

13 Team Composition

Applicants are expected to provide the structure; responsibility matrix, and CVs of the proposed team members stating names, highest qualification, professional certification, length of experience, role/function(s) and location of technical staff and other related information. The information should be duly signed by the concern member(s) with the confirmation of accuracy and availability during the assignment tenure. It will carry a high score in terms of the following specific criteria: i) general qualification of the Key Professional(s); and ii) adequacy for the assignment.

SI	Position	Minimum Requirement No Persons
1	Project Manager	1
2	Working Expert in Agriculture Sector	1
3	Team Leader	1
4	System Analyst	1
5	Database Administrator/Database Expert	1
6	Business Analyst	1
7	Sr. Software Engineer	3
8	Software Engineer	5
9	App Developer- Android & iOS	2
10	API Expert	1
11	UI/UX Expert	1
12	Technical Document Writer	1
13	Tester/QA Engineer	2
14	Quality Controller	1
15	Training Expert	2
16	System Administrator	1
17	DevOps specialist	1
18	Solution Architect	1
19	Infrastructure support Engineer	1
20	Security Expert	1
21	Support Engineer	6
22	Support Manager	1
	Total	36

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14 Qualification of the Resource Personnel

SL	Position	No of Person	Minimum Qualification
1	Project Manager	1	<ul style="list-style-type: none"> i) Minimum academic requirement is graduation in Computer Science and Engineering/ICT preferably having a degree from a reputed university. ii) Minimum 5 years of experience in managing large scale IT projects with minimum total of 10 years of experience in ICT industry. iii) Past Experience in leading such an assignment, role including software design and development, preferably in Bangladesh Government IT projects. iv) Must have minimum 2 (Two) e-Government application/ Digital Service application (For design, development, deployment and implementation) project for the public sector with the Govt. Organization. v) ITIL/PMP/Prince2 certification is preferable. vi) Strong leadership abilities with a documented track record of leading diverse teams to meet project objectives.
2	Working Expert in Agriculture Sector	1	<ul style="list-style-type: none"> i) Bachelor/Master's degree in BBA/MBA/IT/ICT/CS/Engineering related field ii) Preferable in related Certification/Degree in any reputed institution. iii) Minimum 10 years of working experience in Agriculture Sector with a focus on modern agricultural technologies, trends and best practices iv) Should possess deep understanding and practical experience with local agricultural practices, challenges, and regulatory standards v) Sound knowledge about information systems and their application in the agricultural domain.
3	Team Leader	1	<ul style="list-style-type: none"> i) Minimum graduate in Computer Science and Engineering/ICT relevant disciplines from any University. ii) At least 15 years of demonstrated experience in projects of similar size and nature, of which 5 years in the capacity of Project Manager or Team leader. iii) Minimum 5 IT /ICT enabled software projects management (Design, Development and Implementation) experience iv) Must have minimum 2 e-Government application/ Digital Service application (For design, development, deployment and implementation) project for the public sector with the Govt. Organization. v) Strong leadership, communication, stakeholder management, and problem solving skills.
4	System Analyst	1	<ul style="list-style-type: none"> i) Bachelor's degree or higher in Computer Science and Engineering/ICT preferable having a degree from a reputed University. ii) Should have minimum 10 years of profound experience in the field of System analysis and design for ICT based application or Software Development project. iii) Proven track record of working on a minimum of 5 ICT enabled software projects in roles primarily focused on system analysis

SL	Position	No of Person	Minimum Qualification
			<p>and design.</p> <p>iv) In which 2(two) should be for the e-Government application /Digital Service application (For Analysis and design) project will be preferable.</p> <p>v) Familiarity with modern system analysis tools and methodologies</p>
5	Database Administrator/Database Expert	1	<p>i) Minimum graduate in Computer Science and Engineering/ICT relevant disciplines from any reputed University. Having additional Degree/Certification in the field of database administrator or database management will be preferable.</p> <p>ii) At least 10 years of experience in database design. Data normalization, data analysis, and database management. This includes proficiency in installing, configuring and troubleshooting SQL Database systems on RDBMS such as Oracle, MS SQL Server, PostgreSQL, MySQL, and familiarity with NoSQL databases, etc.</p> <p>iii) Expertise in backup and recovery procedures, performance tuning, and security measures related to databases.</p> <p>iv) Must have minimum 4 ICT enabled application or software or applications projects experience in the field of Database related skills.</p> <p>v) Professional Database Administration certification will be an advantage</p> <p>vi) Knowledge of Windows Server and Linux environments</p> <p>vii) Demonstrated ability to implement robust database security protocols to prevent unauthorized access, breaches, and data leaks</p>
6	Business Analyst	1	<p>i) Bachelor's degree in Business Administration, Economics, Statistics</p> <p>ii) 3+ years of experience as a Business Analyst or related role</p> <p>iii) Strong analytical skills and attention to detail</p> <p>iv) Excellent communication skills, including the ability to communicate complex concepts to both technical and non-technical stakeholders</p> <p>v) Strong value management skills and the ability to work effectively in a team environment</p> <p>vi) Proficiency in Microsoft Office, including Excel, PowerPoint, and Visio</p> <p>vii) Requires the excellent analytical ability and strong judgment and decision-making abilities</p>
7	Sr. Software Engineer	3	<p>i) Minimum graduate in Computer Science and Engineering / ICT relevant subjects</p> <p>ii) Minimum 10 years of experience in the field of IT solution development.</p> <p>iii) Must have experience in web and mobile application development with a solid understanding of multiple programming languages, tools and technologies.</p> <p>iv) Must have minimum 4 ICT enabled application or software project experience in the field of web-based software programming/coding/scripting as a core development team member.</p>

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SL	Position	No of Person	Minimum Qualification
8	Software Engineer	5	<ul style="list-style-type: none"> i) Minimum graduate in Computer Science and Engineering / ICT relevant subjects ii) Minimum 3 years of experience in the field of IT solution development. iii) Must have minimum 2 ICT enabled application or software project experience in the field of web-based software programming/coding/scripting as a core development team member.
9	App Developer-Android & iOS	2	<ul style="list-style-type: none"> i) Working with Flutter technology ii) Minimum graduate in Computer Science and Engineering/ICT relevant disciplines from any University. iii) Must have minimum 03 years of profound experience in the field of android apps & iOS design and development iv) Experience with Android SDK including proficiency with the latest Android versions v) Familiarity with Apple's design principles, interface guidelines, and experience developing using the latest iOS versions. vi) Experience working with remote data via REST, JSON and third-party libraries and APIs. vii) Working knowledge of the general mobile landscape, architectures, trends, and emerging technologies viii) Solid understanding of the full mobile development life cycle. ix) Experience with offline storage, threading, and performance tuning x) Experience with iOS frameworks such as Core Data, Core Animation, etc. xi) Strong knowledge of security best practices specific to mobile app development. xii) Professional certification is essential.
10	API Expert	1	<ul style="list-style-type: none"> i) Minimum graduate in Computer Science and Engineering / ICT relevant subjects ii) Minimum 3 years of experience iii) Must have minimum 3 ICT enabled application or software project experience in the field.
11	UI/UX Expert	1	<ul style="list-style-type: none"> i) Minimum graduate in Computer Science and Engineering / ICT relevant subjects. ii) Minimum 6 years of experience in the field of IT solution User interface design and Experience. iii) Must have minimum 4 ICT enabled application or software project experience in the field of user experience design. iv) In which minimum 2 should be for the' e-Governance application/Digital Service will be preferable. v) Proficiency in using UI/UX design software such as Adobe XD, Figma, Sketch, and other related tools
12	Technical Document Writer	1	<ul style="list-style-type: none"> i) Minimum graduate in any Computer Science or ICT relevant discipline. ii) Should have minimum 5 years of profound experience in field of technical documentation with a total of 8 years industry experience.

SL	Position	No of Person	Minimum Qualification
			<ul style="list-style-type: none"> iii) Must have technical documentation experience for minimum 2 ICT enabled applications or software projects as core team member. iv) Ability to collaborate closely with developers, product managers, and other stakeholders to ensure accurate and comprehensive documentations.
13	Tester/QA Engineer	2	<ul style="list-style-type: none"> i) Minimum graduate in ICT relevant subject from any University. Having master's degree or specialization diploma/degree/certification in software Quality Assurance/Software Testing/relevant subject will be preferable. ii) Should have minimum 5 years of profound experience in the field of software Quality assurance in web-based application or Software development with a total of 8 years industry experience. iii) Must have minimum 2 ICT enabled applications or software project experience in the field of software Quality assurance. iv) Proficiency in both manual and automated testing tools and methodologies v) Ability to draft and execute test plans, test cases, and ensure their comprehensive coverage. vi) Familiarity with agile framework and regression testing is required. vii) Sound knowledge of various software QA methodologies, tools and best practices.
14	Quality Controller	1	<ul style="list-style-type: none"> i) Minimum graduate in ICT relevant subject from any University. Having master's degree or specialization degree/certification in software Quality Assurance/Software Testing/relevant subject will be preferable. ii) Should have minimum 7 years of profound experience in the field of software Quality assurance in web-based application or Software development with a total of 10 years industry experience. iii) Must have minimum 3 ICT enabled applications or software project experience in the field of software Quality assurance. iv) Proven expertise in both manual and automated testing methodologies, tools, and processes. v) Familiarity with agile frameworks and regression testing is essential.
15	Training Expert	2	<ul style="list-style-type: none"> i) Minimum graduate in any disciplines from any reputed University. Having specialized degree or diploma in relevant field will be preferable. ii) Should have minimum 5 years of profound experience in the field of user training of web-based application or Software. Same experience for the e-Governance application or Digital Service for the government organization will be considered as an added skill and expertise. iii) Demonstrated ability to design and implement comprehensive training programs, including crafting training materials, manuals, and conducting hands-on sessions. iv) Proficiency in using training software and tools, and

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SL	Position	No of Person	Minimum Qualification
			understanding of online training platforms and e-learning solutions.
16	System Administrator	1	<ul style="list-style-type: none"> i) A bachelor's or master's in Computer Science and Engineering/ICT related Subject preferably having a degree from a reputed university. ii) Must have minimum 8 years of profound experience in the field of infrastructure management with a total of 15 years of industry experience. iii) Minimum 5 years of profound experience Develop and maintain infrastructure in cloud environments to power different standard networks ensuring the highest security standards and best practices. iv) Professional certification is essential. v) Demonstrated expertise in managing both Windows and Linux based server environments, including the deployment, maintenance, and troubleshooting of associated services. vi) Strong understanding of network configurations, protocols, and security practices, along with practical experience in firewalls, VPNs, and intrusion detection/prevention systems. vii) Knowledge of backup, disaster recovery, and continuity planning.
17	DevOps specialist	1	<ul style="list-style-type: none"> i) B.Sc. in computer science/ engineering or equivalent ii) Professional skills in designing & deploying scalable, highly available, cost-effective, fault-tolerant systems & infrastructure on AWS using EC2, RDS, IAM, S3, ELB, VPC, EBS, Route 53, Auto-Scaling, CloudWatch, etc. services. iii) Professional knowledge in Containerized platform (Docker). iv) Minimum 5 years of relevant experience. DevOps experience in Government large system / experience in managing project hosted in data center. v) Professional skills in MySQL/PostgreSQL (Including Replication); vi) Professional skills in Linux (RHEL, CentOS); vii) Professional skills in Load Balancer (Nginx, HAProxy)
18	Solution Architect	1	<ul style="list-style-type: none"> i) B.Sc. in computer science/ engineering or equivalent ii) Minimum 10 years of relevant experience including implementation of Kubernetes platform and microservice architecture in any Govt. project. iii) Experience with IT architecture methodologies iv) TOGAF, further formal certification in architecture preferable v) Strong understanding of security principles and their application in solution architecture vi) Experience with Cloud Platforms such as AWS, Google Cloud, or Azure for deploying AI solutions is an advantage.
19	Infrastructure Support Engineer	1	<ul style="list-style-type: none"> i) Minimum graduate in Computer Science /ICT/CSE/Software Engineering or ICT relevant disciplines from any University. Having master's degree or specialization diploma/degree/certification in ICT/Cyber/IT infrastructure or relevant subject will be preferable. ii) Minimum 3 years of experience in leading IT solution

SL	Position	No of Person	Minimum Qualification
			<p>infrastructure team with a total of 5 years of experience in infrastructure management.</p> <p>iii) Working experience with Cloud infrastructure, data center management are expected.</p> <p>iv) Knowledge and experience in virtualization technologies, server and storage infrastructure, and networking best practices</p> <p>v) Proven ability to diagnose and troubleshoot infrastructure issues, as well as implement solutions and preventive measures.</p> <p>vi) Familiarity with IT service management frameworks (e.g., ITIL) is beneficial</p> <p>vii) Proven ability to diagnose and troubleshoot infrastructure issues, as well as implement solutions and preventive measures</p>
20	Security Expert	1	<p>i) B.Sc. in computer science/ engineering or equivalent with advance training on data and system security or equivalent</p> <p>ii) Minimum 8 years of relevant experience in managing Government projects</p> <p>iii) Certification on information, system or network security would be an added advantage</p> <p>iv) Multi-Domain knowledge, Security Frameworks and Methodologies understanding, Public Cloud knowledge</p> <p>v) Ability to assess vulnerabilities, recommend mitigation measures, and ensure compliance with security standards.</p>
21	Support Engineer	6	<p>i) Minimum graduate in Computer Science and Engineering/ICT /any disciplines from any reputed University</p> <p>ii) Should have minimum 3 years of profound experience in the field of helpdesk or Call Centre</p> <p>iii) Help desk support service for the software maintenance support service/help desk will be preferable</p>
22	Support Manager	1	<p>i) Minimum graduate in Computer Science and Engineering/ICT from any reputed University</p> <p>ii) Should have minimum 8 years of profound experience in the field of helpdesk or Call Centre</p> <p>iii) Help desk support service for the software maintenance support service/help desk will be preferable</p>

15 Timeline

No	Title	Duration (Month)
01	Software Design, Development and Deployment with capacity Development.	8 Month
02	Support and Maintenance Period	16 Month
Total: Twenty-Four Month		24 Month

16 Experience, Resources & Eligibility Criteria

- Must have 8 years experiences in working experience in software development.
- Must have Valid RJSC Incorporation Certificate, Updated Trade License, TIN, VAT, BASIS

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Membership certificate.

- Must have a minimum turnover of 2 crore in each of last three years financial audit report.
- Must have project completion certificate of a minimum of 5 (five) projects in last 5 (five) years in the field of web or application development out of which at least 3 (Three) projects must be in digitization/automation of a government service/function where all the design, development, implementation and maintenance support (covers SDLC full cycle) service were provided.
- Each completed project shall have a minimum value of Tk. 50 (fifty) lacs
- Must have three web application/software development in government public service delivery sector with completion certificate.
- Must have software implementation training experience in all divisions of Bangladesh shall be getting the preference. Firms must submit their work order and completion certificates.
- Documents demonstrating the management and operational capacity of the firm (Brochure, Company Profile and other documents describing company expertise, strength and experience, core functions, products and services, similar assignment or project experience, availability of relevant professional staff and experience among applicants' staff/resources to carry out this assignment.)
- List (Name, designation, years of experience, number of projects, expertise) of IT personnel who will be engaged to perform the assignment.
- The minimum amount of Liquid asset/Line (s) of Credit of the firm shall be Tk. 75 lacs (certificate for proving available liquid asset must be issued 03 (three) Months from the date of tender invitation).
- ISO 9001/ ISO 27001/CMMI L3/CMMI L5 Certified firms will be given preference.
- Must have experience in developing highly secure mobile applications (both Android and iOS) for the government of Bangladesh that supports data encryption and end-to-end secure protocol in the last three years.
- Should have experience of software development which would maintain the standard for compatibility SQTC testing assessment certification from Bangladesh Computer Council (BCC).
- The prepared software must meet the requirements to get SQTC certificate from BCC (no need to submit previous job's SQTC certificate).
- Should have minimum of 50 (Fifty) full-time ICT personnel in company payroll related to system analysis, design, development, integration, testing, QC, training, Network engineering, implementation engineering and Data Entry Operator.

17. Expected Deliverables

Sl.	Deliverable Type	Deliverables	Time in Month
1	Project Inception Report	Inception Report including Work plan	1 st Month
2	System requirement specification (SRS), Gap Analysis Report, System Design Description (SDD)	System Requirements Specification (SRS) with System design, System Design Description (SDD), Architecture documentation.	
3	Software Development (Phase-1) Mobile Apps Development (Phase-1)	➤ Phase-1 Deliverable report. Test plan and test cases.	2 nd -3 rd month

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4	UAT (Phase-1) UAT Feedback incorporation (Phase-1)	➤ UAT Report, Feedback mechanism report	4 th - Month
5	Software Development (Phase-2) Mobile Apps Development (Phase-2)	➤ Phase-2 Deliverable report	5 th - 6 th Month
6	UAT, SQTC (Phase-2) UAT Feedback incorporation (Phase-2)	➤ UAT Report ➤ SQTC Report from BCC ➤ Security Audit Reports	7 th Month
7	Final Deployment with source code, OAT and Go live	➤ TOT Training Report ➤ Deployment ➤ Bug Fixing ➤ OAT ➤ Functional Traceability Matrix ➤ Integration (All integrated Application as per identified) Traceability Matrix ➤ Source code ➤ User Manual ➤ User Tutorial in A/V Model ➤ Backup and recovery strategy	8 th Months
8	Performance Metrics Support and Maintenance service	Report including system uptime, response times, etc.; scalability report; load testing results Support and Maintenance report every 3 months; security implementation details	9 th -24 th Month

18 Payment Schedule


Sl.	Deliverables/Reports	Time of Submission/after date of contract signing	Payment (% of total contract amount)
1	Inception Report including Workplan	15 Days	05%
2	System requirement specification(SRS) with Gap Analysis Report , SDD and Prototypes.	01 Month	20%
4	Software Development and Mobile Apps Development (Phase-1) UAT (Phase-1), UAT Feedback incorporation	3 Months	40%
5	Software Development and Mobile Apps Development (Phase-2) UAT, SQTC (Phase-2), UAT Feedback incorporation	3 Months	20%
6	Final Deployment with source code and Go live: ✓ Bug Fixing ✓ Functional Traceability Matrix ✓ Integration (All integrated Application as per identified) ✓ Source code	15 Days	10%

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Sl.	Deliverables/Reports	Time of Submission/after dateof contract signing	Payment (% oftotal contract amount)
	<ul style="list-style-type: none"> ✓ User Manual and Video Tutorial ✓ TOT Training Report 		
7	Performance Metrics; Support and Maintenance Service, every 3 months reportsubmission	16 Months	05%

19 Conclusion

Department of Agriculture Marketing (DAM) has the mission of ensuring the best Government Online Digital Services to make the life of farmers, traders, wholesalers, retailers and consumer. Planned digitalization implies the broad use of computers, and embodies the modern philosophy of effective and useful usage of Information & Communication Technology in terms of implementing the promises in education, health and poverty reduction under “Smart Bangladesh” initiative. This will include all classes of people and will not discriminate people in terms of technology. In view of the above, the consultancy firm has to design, develop, implement, maintain a complete platform of **Smart Krishi Market System**. Obviously, the proposed technical proposal has to reflect the visualization, deep level understanding of the processes, System requirement/sizing, development platform, Quality Assurance (QA) plan including capability of adopting future technologies.


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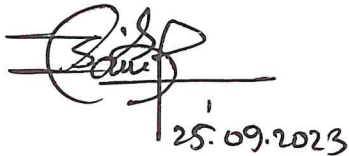
মোঃ আল আমিন সরকার
প্রোগ্রামার
কৃষি বিপণন অধিদপ্তর
খামারবাড়ি, ঢাকা।


২৫/০৯/২৩

মোঃ জৌফিক আরেফীন
পরিচিতি নং-২১৫০
ডেপুটি প্রোগ্রাম ডিরেক্টর
“প্রোগ্রাম অন এগ্রিকালচারাল এ্যান্ড
ফরম প্রসেসিং ইন বাংলাদেশ (পার্টনার)” প্রকল্প
কৃষি সম্প্রসারণ অধিদপ্তর, খামারবাড়ি, ঢাকা।


২৫/০৯/২০২৬

মোঃ হানিফ
সিস্টেম এনালিস্ট
বাংলাদেশ কৃষি গবেষণা কাউন্সিল
ফার্মগেট, ঢাকা-১২১৫।


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মোঃ শরিয়ুল সোহান
সহকারী প্রশিক্ষক
বাংলাদেশ কম্পিউটার কাউন্সিল
তথ্য ও যোগাযোগ প্রযুক্তি বিভাগ


২৫/০৯/২৩

মোঃ শাহবাজ হাদী
সিনিয়র মনিটরিং অফিসার
পার্টনার, ডিএএম
খামারবাড়ি, ঢাকা।