

Government of the People's Republic of Bangladesh
Program on Agricultural and Rural Transformation for Nutrition, Entrepreneurship, and
Resilience in Bangladesh (PARTNER-DAM Part)
Department of Agricultural Marketing
Khamarbari, Farmgate, Dhaka-1215.

Reques for Expression of Interest (EOI) [Re-tender]

1.	Ministry/Division	: Ministry of Agriculture
2.	Agency	: Department of Agricultural Marketing (DAM)
3.	Name of Procuring Entity	: Agency Program Director, Program on Agricultural and Rural Transformation for Nutrition, Entrepreneurship, and Resilience in Bangladesh (PARTNER-DAM Part), Department of Agricultural Marketing (DAM)
4.	Invitation for	: Selection of Firm for “Planning, Design, Development, Upgradation, Deployment, Support & Maintenance of Smart Krishi Market System” .
5.	Invitation Reference	: 12.02.0000.549.43.017.23.52 Date: 22/01/2024
6.	EOI Submission Deadline	: EOI shall be submitted on or before 05/02/2024 at 2:00 PM in sealed envelope delivered to the undersigned and be clearly marked on outer envelope “Request for Expression of Interest for Design, Development, Upgradation, Deployment, Support & Maintenance of Smart Krishi Market System”.
7.	Procurement Method	: Selection under a Fixed Budget Selection (SFB)
8.	Budget and Source of Fund	: GOB (Development), IDA (World Bank)
9.	Project Code	: 224374700
10.	Name and Address of Receiving EOI Document	: Agency Program Director, Program on Agricultural and Rural Transformation for Nutrition, Entrepreneurship, and Resilience in Bangladesh (PARTNER-DAM Part) Room No-513, Front Building, 4 th Floor, Department of Agricultural Marketing, Khamarbari, Farmgate, Dhaka-1215.
11.	Place of Opening EOI Document	: Date: 05/02/2024 Time: 2.30 P.M, Place: Conference Room, Front Building, 4 th Floor, Department of Agricultural Marketing, Khamarbari, Farmgate, Dhaka-1215.
12.	Brief Description of the Assignment	: The proposed Smart Krishi Market System is to be developed 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 at the field level. To increase dynamism and transparency in all activities by implementing software called “Smart Krishi Market System” for an integrated Krishi Market Management. The system has the following modules: Portal Development, Wholesale Management, Retail Management, Farmer Profile management, Wholesaler / Buyer Management, Admin /Super admin features, others user management, Product Management, Order Management, Communication Management, Reports and Analytics, Dashboard, Common Module Management, CapacityDevelopment, Support & Maintenance Service.

13.	Eligibility of Firms	: 1. Must have 8 years experiences in working experience in software development. 2. Must have Valid RJSC Incorporation Certificate, Updated Trade License, TIN, VAT, BASIS Membership certificate. 3. Must have a minimum turnover of 2 crore in each of last three years financial audit report. 4. 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. 5. Each completed project shall have a minimum value of Tk. 50 (fifty) lacs 6. Must have three web application/software development in government public service delivery sector with completion certificate. 7. 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.) 8. List (Name, designation, years of experience, number of projects, expertise) of IT personnel who will be engaged to perform the assignment. 9. 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). 10. ISO 9001/ ISO 27001/CMMI L3/CMMI L5 Certified firms will be given preference. NB: Joint Venture not allowed.
14.	Details Information of EOI and Proposal	: Firms are requested to submit 01 (one) original copy of EOI with necessary documents at the Program office between 9.00 a.m-2.00 pm within the deadline. In addition, soft copy of EOI (in zipped folder)/must be submitted at partner.dam@gmail.com or pendrive with the original document. The procurement shall be regulated as per PPA-2006 and PPR-2008. For submitting proposal details Terms of Reference (ToR) can be obtained from Tender menu at www.dam.gov.bd .
15.	Name of Official Inviting EOI	: Dr. Mohammed Abdullah Al-Farouque
16.	Designation of Official Inviting EOI	: Agency Program Director
17.	Address of Official Inviting EOI	: Room No-522, Front Building, 4 th Floor, Department of Agricultural Marketing, Khamarbari, Farmgate, Dhaka-1215.
18.	Contact Details of Official Inviting EOI	: Dr. Mohammed Abdullah Al-Farouque Agency Program Director, Telephone: 02-55028258 E-mail: partner.dam@gmail.com
	Note	: The procuring entity reserves the right to accept or reject any packages or all EOI.

Handwritten signature and date: 22/01/2024

(Dr. Mohammed Abdullah Al-Farouque)

Agency Program Director

Program on Agricultural and Rural Transformation for Nutrition,
Entrepreneurship, and Resilience in Bangladesh

(PARTNER-DAM Part)

Department of Agricultural Marketing (DAM)

E-mail: partner.dam@gmail.com

Phone: 02-55028258




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: 22-01-2024


২২/০১/২০২৪



নাম





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 is 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.



ATSH



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.

TOR – Planning, Design, Development, Upgradation, Deployment, Support & Maintenance of Smart Krishi Market System



- 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, and 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.
- g) **Piloting the System:** Before deploying the live system, it is necessary to pilot the system and mobile apps on smaller group of users for identifying and fixing potential bugs/issues.

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 have to integrate with government approved payment gateway as per selection of DAM. 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

TOR – Planning, Design, Development, Upgradation, Deployment, Support & Maintenance of Smart Krishi Market System



ATSI



5.1 Portal Development:

The Portal should have the following modules and features:

- ✓ Header: Showing logo, Hotline/ Helpline Number, Dual language, Current date/time, and accessibility.
- ✓ Upper Navbar Section: Agri-market product page link, agriculture related gov. website link, farmer, wholesale buyer & agency profile, agribusiness related other link, policy & privacy.
- ✓ Side Navber section: Agri-product category & sub-category users can easy to find pursuing products or items.
- ✓ Showing day-to-day updated Bangladesh market directory product price range.
- ✓ Showing some user-needed tutorials, and instruction mobile app links.
- ✓ Users/wholesalers can easy to find season-related product items which are most demanding in the local market.
- ✓ Website to users easily find his/her searcher-related similar products.
- ✓ Users also get near-location products & information.
- ✓ Users can read the daily blog with agri & market-related content which is helpful to increase their knowledge
- ✓ Footer section also has important links related to user needs like contact, privacy policy, how to sell/buy products, agri-related website links
- ✓ Display a list of all content pages with search and filter options.
- ✓ Page Details View
- ✓ Ability to edit the content of each page, including text, images, and formatting.
- ✓ Manage Announcements: Display and manage important announcements or updates for users.
- ✓ Schedule Announcements: Set dates for when announcements should be displayed.
- ✓ Page History and Logs: View logs of content page activities and changes.

Product Page:

- ✓ Banner Section: Showing offer product & promotion.
- ✓ Meta Tag/ keywords: showing some product categories for users can easily find various items.
- ✓ Product: showing the latest item, best deal, search-related products, near-location products,
- ✓ District ways products.
- ✓ Small banner for showing marketing & promotions.
- ✓ Mobile app link QR code.

Product Searching Page:

- ✓ Search bar: user can write any product name. Here are some advanced search options.
- ✓ District-wise, price ranges-wise, product type-wise, rating-wise, upload date-wise, searching.
- ✓ Showing Products with product's short details like product name, amounts, price, location, how many people view this product, etc.
- ✓ Showing how many products have in searching products related
- ✓ Product view page:
- ✓ Product sell way two types:
 - Direct selling.
 - Auction/bidding.

a) Direct selling:

- ✓ Product details: Product images, product name, total product amount, price per quantity, less amount of buying quantity, product delivery date, product produces location, showing last buying time.



- ✓ Users or wholesale also view how many people view this product, & add to their wishlist.
- ✓ Add quantity of product pricing amount system auto calculated product total price. And selected delivery district.
- ✓ Users can also see related products list. Recently upload products, zones-wise

b) Auction/bidding:

- ✓ Product details: Product images, product name, total product amount, Auction/bidding price per quantity, less amount of Auction/bidding quantity, product delivery date, and product produces location, showing last buying time.
- ✓ Users or wholesale also view how many people view this product, & add to their wishlist.
- ✓ Add quantity of product auction/bidding amount auto calculated. And selected delivery district.
- ✓ Users can also see related products list. Recently upload products, zones-wise.

Login page:

- ✓ Log-In Process insert registered mobile number and Password (8 digits).
- ✓ Forget password option users can easily recover their account with OTP verification.
- ✓ This has some login-related tutorials and instruction process ways.

Sign Up page:

- ✓ On register page, showing two types of user register options
 - a) Farmer
 - b) Wholesaler or retailer.
- ✓ Sign-Up Process, a user inserts an unregistered mobile number and Password (8 digits).
- ✓ Create an account with OTP verification.
- ✓ This has some sign-up-related tutorials and instruction process ways.

Others information:

- ✓ Price Scroll must be displayed both Wholesale and retail prices which will be integrated with <https://dam.gov.bd>
- ✓ Farmers, Agro entrepreneurs, Market directory (Integrated with Digital Service Platform), and registered farm will be shown on the home page.
- ✓ All kinds of Price related menus will be added to the homepage and integrated with <https://dam.gov.bd>
- ✓ There will be a video tube, focusing on videos of successful and large farmers, entrepreneurs, farmers, exporters, and also their interviews. Training of different farmers arranged by DAM and various video tutorials; DAM documentary will be displayed live in 24 hours.
- ✓ Real-Time Market Insights: Provide real-time data on market trends, demand, and prices to help farmers make informed decisions.
- ✓ Secure Transactions: Provide a secure payment gateway that ensures safe transactions between buyers and sellers.
- ✓ Logistics Support: Integrate logistics services to facilitate product transportation from farms to buyers.
- ✓ Promotions and Discounts: Allow farmers to offer promotions or discounts on their products to attract buyers.
- ✓ Social Sharing Integration: Allow users to share product listings and purchases on their social media accounts.







- ✓ Customer Support: Provide responsive customer support channels to assist users with any issues or inquiries.
- ✓ Newsletter Signup: Encourage visitors to subscribe to your newsletter for updates, tips, and promotions. Include a simple signup form with fields for their email address.
- ✓ Educational Resources: Provide resources like farming guides, market insights, and best practices for both farmers and buyers.

FAQ Page

Contact Us Page

5.2 Wholesale Management:

- ✓ Comments and reply options for both buyers and sellers. The summary of their buying and selling information will be displayed after completion of the process. Only district admin can see their conversation and make necessary replies and comments between buyers and sellers. One seller can make his conversation more than one person at a time. One buyer cannot see the other buyer's conversation with the same seller.
- ✓ In the comment and reply, features of the photo & Video upload option must be incorporate.
- ✓ Buyer can also make their demand of commodity, grade, quality & quantity in this platform, according to their demand of commodities, the system will make linkage/notifications between the buyer and similar sellers.
- ✓ Product grading option. Admin can fix the grading of products. When a seller advertises his commodities and a buyer makes a demand of his commodities, they can select the grade of those commodities.
- ✓ Farmers/Farms/Entrepreneurs can advertise and buyers can make the demand of his products on the portal with single and multiple pictures and videos.
- ✓ Messenger option so that buyers and sellers can communicate with the DAM.

5.3 Retail Management:

- ✓ Search and multiple filter options so that buyers can easily find stores, owners, product, product wise shop, location wise shop etc. (Ex- category, subcategory, district, product etc.).
- ✓ There are two types of business type one is countrywide and another is local. Local means own district.
- ✓ Entrepreneur can fix his delivery locations during registrations. Also, he/she can change delivery locations at any time.
- ✓ Stores registration options by mobile OTP and Email according to prescribed form of DAM.
- ✓ Divide the stores into groups (10-15 stores in each group) in their own district and countrywide mode and each group has to be displayed in the app randomly from time to time. Groups will be with randomly selected stores. Stores will display randomly among themselves when re-displaying the same group. One of the groups will be the feature group (Super Admin can make this group for promotion purpose only) that will be determined by the super admin.
- ✓ Buyers can make orders, showing cart, voucher etc for check transaction from each store.








- ✓ Two categories of stores will be displayed in the front page. The categories will be separated by two individual tabs. Special promotion or campaign can be separated by lucrative slider promotion or campaign can be one or above at a time.
- ✓ Payment gateway option for each store. So that buyers and seller can make their transaction easily. All the transaction will be controlled by the super admin panel.
- ✓ Each store can be introduced with banner like as mobile app, name and location. Admin can change stores name, banner and locations.
- ✓ Dashboard for individual user, entrepreneur, district, upazila, division and super admin user. Special dashboard will be needed for this transaction.
- ✓ From the entrepreneur dashboard they can add product, add price, individual photo of the product, edit their previous provided information etc. When they change their product or add the product information both in the web page and app, it will be change mandatory.
- ✓ Informative super admin, district admin, divisional admin dashboard template will be provided by DAM.
- ✓ View and edit personal details such as name, email, contact number, and address.
- ✓ Access a list of past orders, order details, and tracking information.
- ✓ Order List and Search: Display a list of all past orders with search and filter options.
- ✓ Order Details View: Clicking on an order provides more detailed information.
- ✓ Order Number and Date: Display the order number and date of each order.
- ✓ Order Status: Indicate the current status of the order (processing, shipped, delivered, etc.).
- ✓ Product List and Details: List products included in the order with names, quantities, and prices.
- ✓ Total Order Amount: Display the total amount paid for the order.
- ✓ Tracking Information: If available, show tracking details for shipped orders.
- ✓ **Wish list:** View and manage products added to the wish list for future reference.
- ✓ Wish list Items: Display a list of products added to the customer's wish list.
- ✓ Product Details View: Clicking on a product provides more detailed information.
- ✓ Product Name and Image: Display the product name and an image for each wish list item.
- ✓ Product Price and Availability: Show the price of the product and its availability status.
- ✓ **Account Balance and Payments:** Check the account balance and view transaction history for payments.
- ✓ **Helpline/Communication Preferences:** Manage communication preferences and subscriptions for notifications.

5.4 Farmer Profile management

- ✓ Overview section can provide a snapshot of the farmer's recent activities, sales, and key performance indicators (KPIs).
- ✓ Products short Info: Farmers can manage their product listings here.
- ✓ Running bidding products info.
- ✓ Inventory Management allows farmers to keep track of their inventory levels.
- ✓ Profile verification by using NID, mobile, passport, and license number.
- ✓ Graphical view of all selling products.
- ✓ Analytics: Provide insights into the farmer's performance, including sales trends, customer demographics, and most popular products. This data can help farmers make informed decisions.
- ✓ Instruction page link gives instructions to farmers on how to manage their account settings, update profile information, change contact details, and set preferences.
- ✓ Product upload by different criteria's







- ✓ Additional Details: Any specific details relevant to the product (harvest date, packaging, etc.)

5.4.1 Product Listing:

- ✓ Upper section shows a short overview of product status, quantity, total selling, save products, running products, etc.
- ✓ Search and Filter Options: Include a search bar and filters (category, price range, etc.) for a farmer too easy to find out their products.
- ✓ Sort Options: Provide sorting options (price, popularity, etc.) to help find products.
- ✓ Product Availability Status: Indicate whether the product is currently available or sold out.
- ✓ Pagination Controls: Include pagination controls at both the top and bottom of the product listing.
- ✓ Edit and Delete Links: These links allow the farmer to quickly edit or remove a specific product from their listing.
- ✓ Add New Product Button: A button that allows the farmer to navigate to the product upload page and add new products to their listing.

5.4.2 Wholesale-wise selling:

- ✓ Upper section shows a short overview of buyer status, quantity, total number of buyers, rejected sold products, running selling, etc.
- ✓ Wholesale-wise Order List: A list of wholesale orders with order ID, date, buyer's name, total order amount, etc.
- ✓ Search and Filter Options: Include a search bar and filters (category, price range, etc.) for a farmer too easy to find out their product orders.
- ✓ Status: This column shows the status of each wholesale order (Pending, Accepted, Shipped, etc.).
- ✓ Action: Depending on the status of the order, this column provides appropriate action buttons.
- ✓ Accept Button: This button allows the farmer to accept a pending wholesale order. Once accepted, it triggers notifications to the buyer and updates the status to "Accepted."
- ✓ View Details Button: This button allows the farmer to view the details of an accepted or shipped order.

5.4.3 Auction-wise selling:

- ✓ Upper section shows a short overview of auction status, quantity, total number of auctions, rejected sold products, running auctions, etc.
- ✓ Wholesale-wise Order List: A list of wholesale orders with order ID, date, buyer's name, total order amount, etc.
- ✓ Search and Filter Options: Include a search bar and filters (category, price range, etc.) for a farmer too easy to find out their product orders.
- ✓ Status: This column shows the status of each auction order (Pending, Accepted, Shipped, etc.).
- ✓ Action: Depending on the status of the order, this column provides appropriate action buttons.



✓ Accept Button: This button allows the farmer to accept a pending auction offer. Once accepted, it triggers notifications to the buyer and updates the status to "Accepted."

✓ View Details Button: Allow the farmer to access more information about each auction product.

5.4.4 Single product auction:

✓ Product Image: Display a high-quality image of the auction product.
✓ Product Name: Clearly state the name of the product being auctioned.
✓ Description: Provide a comprehensive description of the auction product's features and qualities.

✓ Starting Bid: Display the initial bidding amount for the product.
✓ Current Bid: Show the current highest bid for the product.
✓ Time Left: Indicate the time remaining until the auction ends.
✓ Bid Now Form: Allow potential buyers to enter their bid amount and place a bid.

✓ Bid History: Display a history of bids placed on the product, showing bidder names and bid amounts.

✓ Place Bid Button: A button that allows buyers to place bids directly.

5.4.5 Instruction/ Manual: This page is designed to offer users a combination of written instructions and video tutorials to help them navigate and use platform effectively.

✓ Detailed Instructions: Provide step-by-step instructions and explanations for each topic.

✓ Visual Aids: Incorporate images, screenshots, or diagrams to illustrate complex processes.

✓ Tips and Best Practices: Offer tips and suggestions to help farmers optimize their experience on the platform.

✓ Search Functionality: Implement a search bar to help farmers quickly find information on specific topics.

5.4.6 Farmer Profile:

✓ NID Verification Status: Display the verification status of the farmer's NID information (verified or pending).

✓ NID Information Form: Allow farmers to enter their NID details for verification purposes.

✓ Basic Information: Display the farmer's name, father & mother's name, contact details, and National Identification (NID) information.

✓ Address Information: Display the farmer's address, including street, city, state, and postal code.

5.5 Wholesaler / Buyer Management

✓ NID Verification Status: Display the verification status of the user's NID information (verified or pending).

✓ NID Information Form: Allow wholesale to enter their NID details for verification purposes.



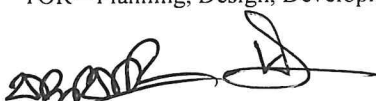
- ✓ Basic Information: Display the wholesale's name, father & mother's name, contact details, and National Identification (NID) information.
- ✓ Address Information: Display the wholesale's address, including street, city, state, and postal code.
- ✓ Inventory Management
- ✓ Password management
- ✓ Profile update
- ✓ Order history management

5.6 Transportation System:

- ✓ Transportation Information: Displays existing transportation information that the wholesaler will be added.
- ✓ Allow the wholesaler to add new transportation information.
- ✓ If transportation information exists, display editable fields for updating information.
- ✓ Provide fields to input details such as transportation company name, contact, vehicle type, capacity, etc.
- ✓ Display a list of transportation partners or services that the platform offers for delivery.
- ✓ Allow wholesalers to choose from available transportation partners when making a purchase.

5.7 Admin /Super admin features

- ✓ Access to an overview of the entire platform's activities, statistics, and key performance indicators.
- ✓ Platform Overview: Display key metrics, such as total users, active listings, total orders, revenue, etc.
- ✓ Quick Links: Direct links to important sections like User Management, Product Management, Reports, Settings, etc.
- ✓ User Management Snapshot: Summary of user activity, new registrations, and active users.
- ✓ Product Management Snapshot: Overview of new products listed, pending approvals, and popular categories.
- ✓ Order Management Snapshot: Summary of new orders, pending shipments, and completed orders.
- ✓ Recent Announcements: Display recent announcements or important updates for users.
- ✓ Reports and Analytics: Graphs or charts showcasing platform performance, sales trends, user behaviour, etc.
- ✓ Settings and Configuration: Access to platform settings for customization and adjustments.
- ✓ User Support Requests: Notifications or summaries of user support requests and inquiries.






- ✓ Platform Health Status: Indicators showing the health of the platform, such as server status, uptime, etc.
- ✓ Platform Updates: Information about recent updates, enhancements, and upcoming changes.
- ✓ Contact Information: Super Admin contact details or support channels for platform-related inquiries

5.8 Others user management

User Management: Manage user accounts, including creating, editing, and disabling accounts.

- ✓ User List and Search: Display a list of registered users with search and filter options.
- ✓ User Details View: Clicking on a user's profile provides more detailed information.
- ✓ User Roles and Permissions: View and manage roles and permissions assigned to each user.
- ✓ Add New User: Option to manually add new users to the platform.
- ✓ Edit User Details: Ability to edit user information, such as contact details.
- ✓ Change User Roles: Change the roles assigned to users (e.g., from farmer to wholesaler).
- ✓ Disable User Account: Option to temporarily disable or block user accounts.
- ✓ User Activity Log: View logs of user activities and interactions on the platform.

5.9 Product Management

- ✓ Oversight of product listings, ensuring compliance and quality.
- ✓ Product List and Search: Display a list of all products with search and filter options.
- ✓ Product Details View: Clicking on a product provides more detailed information.
- ✓ Quality Control: Monitor product quality, images, and descriptions to ensure compliance.
- ✓ Edit Product Details: Ability to edit product information, images, and descriptions.
- ✓ Manage Product Categories: Add, edit, or delete product categories for better organization.
- ✓ Product Listing Audit: View logs of product listing activities and changes.

5.10 Order Management:

- ✓ Monitor and manage orders, including tracking, fulfilment, and customer support.
- ✓ Order List and Search: Display a list of all orders with search and filter options.
- ✓ Order Details View: Clicking on an order provides more detailed information.
- ✓ Order Status: Indicate whether orders are pending, processed, shipped, or delivered.
- ✓ View Customer Details: Access buyer information, shipping address, and contact details.
- ✓ View Product Details: Display details of products included in the order.
- ✓ Order Tracking: show tracking details for shipped orders.
- ✓ Order History and Logs: View logs of order activities and changes.

5.11 Communication Management

- ✓ Manage email notifications, announcements, and communication with users.

TOR – Planning, Design, Development, Upgradation, Deployment, Support & Maintenance of Smart Krishi Market System



- ✓ Announcements and Notifications: Display a list of recent announcements and notifications.
- ✓ Create New Announcement: Option to create and schedule new announcements for users.
- ✓ View and Manage Notifications: Access notifications sent to users and manage their content.
- ✓ Communication Preferences: Allow Super Admin to manage user communication preferences.
- ✓ User Feedback and Surveys: Manage user feedback, surveys, and response templates.
- ✓ Scheduled Communications: View and manage scheduled announcements and notifications

5.12 Reports and Analytics:

-
- ✓ Access detailed reports and analytics on platform performance, user behaviour, and more.
 - ✓ Display a list of available reports and analytics categories.
 - ✓ Provide a summary of key metrics, such as user growth, sales, and more.
 - ✓ Graphs and Charts: Visualize data using graphs, charts, and other data visualization tools.
 - ✓ Filter and Date Range Options: Allow the Super Admin to specify the time period and filters for each report.
 - ✓ Export Data: Provide options to export report data in different formats (e.g., CSV, PDF).
 - ✓ User Behaviour Insights: View user interactions, click-through rates, and engagement patterns.
 - ✓ Sales Performance Analysis: Monitor sales trends, top-selling products, and revenue generation.
 - ✓ User Demographics: Access insights into user demographics and preferences.
 - ✓ Custom Report Creation: Option to create custom reports based on specific metrics.
 - ✓ Report History and Logs: View logs of report generation activities and changes.


5.13 Dashboard

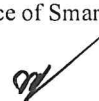
-
- ✓ District wise admin dashboard, super admin dashboard, user dashboard, farmers/entrepreneurs/farm's/user's dashboard. All kinds of features can be managed by an individual's dashboard. Super admin dashboard must be customized in such a way that all kinds of editing, additions, removing can be done from this dashboard.
 - ✓ Arrange for displaying all vegetables, fruits, fish etc. (according to order) from the admin panel. In the same way, the store owner should also have the option to sort their product groups in order. (Both wholesale & retail)
 - ✓ When adding a product from the admin panel, have the option to keep the product open for all stores or open for specific stores/Farmers. If a specific store is attached to the product from the admin, no other stores cannot add that product. (Both wholesale & retail).
 - ✓ Export to Excel and print options on all types of databases (Print & Database format will provide from DAM).

5.14 Common Module Management

-
- ✓ Notice Template Management
 - ✓ Ensure one Time Password (OTP) based User registration; (Mobile & Email)
 - ✓ Notifications for each dashboard.

TOR – Planning, Design, Development, Upgradation, Deployment, Support & Maintenance of Smart Krishi Market System






- ✓ SMS and email alert system for special activities.
- ✓ Management of the SMS Gateway.
- ✓ Management of the payment gateway.
- ✓ Integration with private transport agency/courier/delivery service agency for providing delivery service effectively.
- ✓ Customize delivery method and charge option prescribed by PE.
- ✓ All transactions history, report generation, filter, search options must be included in all dashboards.
- ✓ Configure platform settings, such as shipping options.



राशि
२



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.).

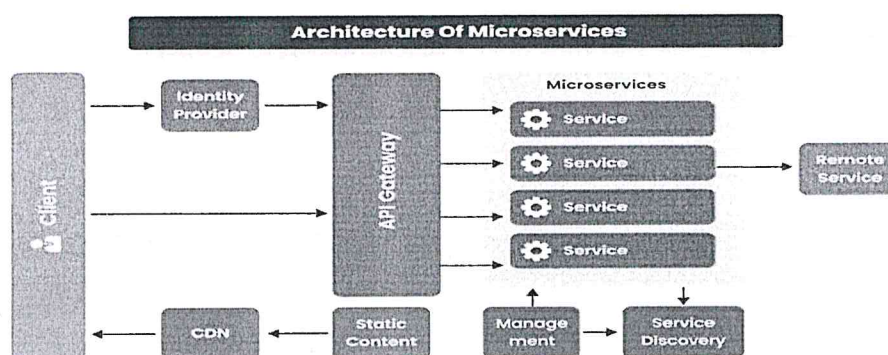


Figure: Micro-service Architecture

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.

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

TOR – Planning, Design, Development, Upgradation, Deployment, Support & Maintenance of Smart Krishi Market System



- 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, like the camera (for scanning documents, if required), GPS (for location-based services), etc.
- 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 (25 persons from each Batch based on the location in district or region)

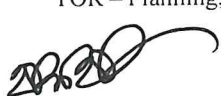
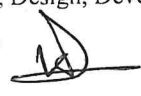
The consultancy firm should arrange batch wise one day long ToT training. Around 25 persons in a batch with Audio-visual tutorial for the end user and must be linked in the Portal. (Only trainer will be provided by the consulting firm).

10. API integration with others system

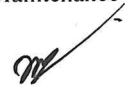

The following are the key expectations on interoperability requirements:

For system-to-system communication it will be necessary to provide combined easy and managed API access with full API governance and analysis:

SI	External System	Organization	Integration Scope
1	NID	Election Commission	The Firm/Service Provider needs to analyse the integration scope and do the necessary enhancement if required to integrate with NID for verify the Farmers, traders, wholesalers, and retailers.
2	Passport	NTMC	For international traders, wholesalers.
3	SMS	BTRC	For SMS Gateway
4	Payment gateway and A Challan	Finance Division	The Firm/Service Provider needs to analyse the integration scope and do the necessary enhancement if required to integrate with Payment gateway and A Challan
5	Transport /courier	Track Lagbe /Others	To transport the product from farmer to buyer / Consumer.

NTM
2

SI	External System	Organization	Integration Scope
5	Others related system and organization	As per defined	As per needed

11. Security and Privacy Policy

The consultant should submit an extensive “**Security and Privacy Plan**” including comprehensive security architectures in their technical proposal for this “**Smart Krishi Market System**” considering the following issues:

- Project technical scopes.
- Functional and nonfunctional requirements and ultimate objectives.
- Concerned service provider organization’s operational environments and capacity.
- User roles, Accessibility, Authentication, Authorization and Accountability.
- Importance of data management & data privacy.
- Strength of technologies to be used for development, operate & maintenance.
- Deployment & hosting.
- Service recipients and providers’ security, confidentiality and privacy.
- A checklist of security measures to be taken for this solution.
- Overall security standards which should be applicable for an e-government system.
- Apart from these, the consultant should keep in account the following considerations as well as consultant should provide a checklist based on system and hosting security plan (i.e., fraud, hacking, money laundering etc.) & the test report of that checklist.

12. 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.

12.1 Application and System Security:

It will be programmed within the application itself in order to implement a user group. To eliminate the security threats, authentication and authorization have to be built into the security design of the application with password and/or multi-factor access control that will limit intruders or unauthorized users to retrieve any information, use modules, or generate reports, etc.

Following security measures should be considered:

- Must have self-encryption technique
- Two-step verification
- Session auto logout

TOR – Planning, Design, Development, Upgradation, Deployment, Support & Maintenance of Smart Krishi Market System

- Secured Password Policy Platform, etc.

12.2 Server/Machine Security:

It refers to physical limitation to access a machine and generally would require an additional login in order to gain access.

12.3 User/User Group-level Security:

Since the system is a web and mobile based application where users are managed by separate managements at different locations, a multi-layered user right policy is needed to be applied.

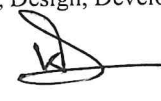
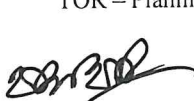
12.4 File/Database Security:

Unauthorized user activity at the database resources must be blocked. Both user level security and data level security should be ensured. There must be also a secured document system, etc.

12.5 Fault Tolerance and disaster management:

Fault of the system and hardware may cause collapse in the whole system. One server will be kept a cold backup so that faults in one server could easily be recovered. Hosting of the application outside the country will work as a mirror copy and Disaster recovery site.

- The consultant should follow any of the industry standard secured development methodology such as (but not limited to) Comprehensive Lightweight Application Security Process (CLASP) by OWASP etc.
- The consultant should consider (but not limited to) common vulnerabilities such as SQL Injection, Cross Site Scripting (XSS) etc.
- Consultant will undertake responsibility for Input Validation Controls, Authorization/Authentication Control and other security controls in place in both testing and production environment of application.
- The following vulnerabilities must be checked and ensured security from the beginning:
 - a. Cross Site Request Forgery (CRSF)
 - b. Cross Site Scripting (XSS)
 - c. Session hi-jacking
 - d. Session Fixation
 - e. SQL Injection and Code Injection
 - f. Input Validation/Filtering
 - g. Output Escaping
 - h. Secure File Access
- The consultant shall minimally provide Access control, Authentication and accountability security mechanisms for backend operations of the System.
- The proposed security solution shall be scalable and should not affect the performance by creating a bottleneck or single point of failure to the overall system.



- o The system should provide tamper-proof audit trails and logs for administrator or auditor to check for the actions committed by users. The audit trails shall consist of following details but not limited to:
 - a. Login and logout
 - b. Attempts to access unauthorized resources
 - c. User profile changes
 - d. Past audit events.
 - e. Track all actions performed on documents attached/uploaded.
 - f. The system should have provision to assign the access rights of other resources on need basis to authorized users.
 - g. Information in the System that is deemed to be sensitive shall be encrypted and protected from accidental and/or unauthorized modification.
 - h. The System shall provide automatic session disconnection for inactive user after session time [Proposed best practice session time] is over.
 - i. The system shall protect the audit trails from being modified by unauthorized personnel or privileged users.

13. Non-Functional Requirements

13.1 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.

13.2 Dashboard requirements:

- o Ensure the system is capable to manage large number of users efficiently. Ensure different user grouping & tree/subgrouping facility for efficient user management.
- o Ensure date wise dashboard presentation history saving with keeping note, loading, removing facility so that monitoring user can compare the performance with respect

The bottom of the page features several handwritten signatures and initials. From left to right, there are three distinct signatures, followed by the initials 'JKR', and finally two more signatures on the right side.

to another dashboard information. Also, user can view all those selected dashboard presentation in run time.

- Ensure user facility to set/arrange his default dashboard view and settings.
- Ensure user facility for printing and exporting dashboard and presentation view.
- Ensure user login access through mobile apps to web apps and web apps to mobile apps. Also, user can logout web apps by his mobile apps and vice versa.
- User can change his password efficiently.
- Linkage multiple dashboard presentation from single dashboard presentation information using its different values.
- Presentation, Report, Dashboard layers of a dashboard system should have grouping & tree/subgrouping facility for efficient management.
- Provisioning custom date range / month range / year range selection facility with month wise and year wise dashboard selection criteria.
- Ensuring efficient data loading facility.

All above functionalities are not limited to and as proposed by the consultant for modernization.

13.2.1 Data analysis and visualization tools:

The consulting firm will use a data analysis and visualization tools for Department of Agriculture (DAM) authority so that the admin user can monitor information in an actionable and meaningful way. The data visualization tools will focus on a specific type of chart or map or any required data. This feature's design will be formed with various charts and graphs on a single screen providing "Smart Krishi Market System" related information which will be presented in real time. The admin user can take any decision based on that dynamic data and analysis the findings of this system. These visualizations will make it easy for DAM authority to understand and forecast the trends and decisions through visuals when it comes to analyzing big datasets and understand the insights collected.

13.2.2 Service Portal:

The consulting firm will develop a unified portal for all kinds of users of this system for sharing information, getting & providing services, FAQ, upload contents, searching, reporting, payment, and so many tasks according to the access of users. Service Portal allows the users to interact and mobile/web-friendly service experience. This portal will interact with parts of all platform features. It should be developed based on more modern technologies.



- The Portal should have standard and document uploading panel using HTML structure and also using proper DDL.
- The Portal should have its own document/content management system from admin panel where documents can be listed/uploaded using various filters. Users with proper permission will be able to modify/remove standard and guideline documents as needed. Also, for each revision, system should track versioning properly.
- The Portal should have management dashboard and usage analytics and shares the data to the stakeholders and administrators
- The Portal should provide efficient search mechanism to allow users explore their queries navigating through different standard catalogues or tools of interest allowing options like keywords, different types of filters.
- FAQ for most commonly asked questions and answers.

13.2.3 Service access point management:

The solution will provide different facilities to the service recipients to access the platform by different way from any place any time. The system will have many dynamic facilities to enable/disable different service mode, service access point, service counter etc. like below but not limited to:

- Web Portal
- Mobile Apps
- Digital Centre

13.2.4 Highly Optimized Database:

The portal databases are needed to be highly optimized and normalized so that performance stays high as the data volume increases.

13.2.5 High Scalability:

The portal framework will be scalable in order to sustain more and more users as it grows. “Smart Krishi Market System” is going to handle a large volume of information as well as large number of users in the following days. To handle this large amount of data, the consulting firm need to pay a great effort on infrastructure management “**Smart Krishi Market System**” service delivery Platform.

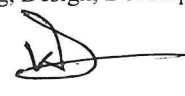
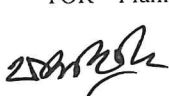
13.2.6 High Availability:

The portals should have a very high availability rate. There should be real-time monitoring of server health and in document of any trouble, backup servers should be available to continue providing services as needed

- Monitor the operating system, database, application, application server and the integration among them to ensure the availability of “**Smart Krishi Market System**” service delivery Platform
 - To implement the load balancer, database replicator, cluster software etc. to ensure high availability computing environment as and when required
 - Update the security settings and version of the operating system, database, application, application setting to ensure secure computing environment and service.
 - Develop and maintain installation and configuration procedures and system standards.

The consulting firm shall have to satisfy the following resourcefulness to ensure infrastructure services;

- Configure necessary staging & production server.
- Security: Protection & security of content, hosting environment, servers, network elements, access & network must be ensured.
- Ensure necessary configuration and management of IP addresses & bandwidth arrangement as collaborated derived requirements with DAM to accommodate scalability, user growth & integration to other systems.
- Provide version control solution, user feedback recording system, incident management mechanism, CMS & DB tuning services for the aforesaid systems.
- Continues server monitoring sizing and tuning.
- Maintain system uptime as per standard SLA.
- Server configuration as a continuous job of operation as and when required.
- Data Migration as an active support assignment during integration.
- Change Management of both application and infrastructure



13.3 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.

13.4 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.

13.5 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.

13.6 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.

TOR – Planning, Design, Development, Upgradation, Deployment, Support & Maintenance of Smart Krishi Market System



- 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.

13.7 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

14. Common Services Configuration Module

Common Services Configuration		
Module 1: Information service management		
Feature	Features description	Integration
1.Content management	Manage digital content dynamically Using system's control panel.	
2. Smart search	Text content searching option having intelligent search suggestion.	
Module 2: Complaint management		
Features	Feature description	Integration
1. Add Complaint	Any user or service consumer can add Complaint as a registered user or anonymously	
2. Add Complaint types	There can be different types of Complaint. It can be service specific or any other issue specific. The system will have option to add Complaint types. Complainer will select Complaint type to lodge the Complaint. For service specific Complaint, the Complaint should put service application ID for tracking the service status to manage the Complaint.	
3.Configuration (Add, update Complaint)	There will have options to add, update Complaint Management Officer (CMO), Appeal Officer (AO) and other settings to manage Complaint management module.	

Management Officer (CMO), Appeal Officer (AO), other settings)		
4. Assignment of CMO, AO with specific jurisdiction	Assign CMO, AO with specific jurisdiction like assign CMO, AO for any organization, department, section or Complaint types	
5. Notification	There will have a setting to send notification from different steps of Complaint life-cycle. The notification will be in 3 mediums: Email, SMS and System generated.	
6. Complaint feedback management	After resolving a Complaint, the Complainer will share his/her feedback with rating. This is very crucial to enrich the service process and ensure better Complaint management.	
Common Services Configuration		
Module 3: Access Control Management		
Features	Feature description	Integration
1. Multi-Layer Access Control Mechanism	The system will have system access control panel. Every system user will be assigned to one or multiple roles. Every role should be assigned to a set of actions or activities. The system admin will have provision to assign roles to users and to assign set of actions/activities to roles.	
2. Document archiving	There will be large number of documents stored in the system over the time. So, need to archive documents with proper indexing and mapping to faster and to ensure efficient document management	
Common Services Configuration		

15. Solution Architecture

Solution architecture plays a useful role at the initial stage of understanding of the solution ideation, solution design, and solution implementation plan. Here the solution architecture is expected to establish the complete understanding of the business context. i.e., service delivery and receiving process in digital form, the vision, objectives and ultimate requirements of this solution for “**Smart Krishi Market System**”.

This architecture should define the process of developing and documenting covering the context of the proposed e-Service solution including all impactful and applicable architecture domains such as Micro-Service approach, accessibility, business, data, application, technology, integration, cross cutting issues like security, management operation etc. The consultant shall submit a technical proposal which may include business architecture, information architecture, application architecture, and technology architecture focusing on the scope mentioned in this TOR.

TOR – Planning, Design, Development, Upgradation, Deployment, Support & Maintenance of Smart Krishi Market System

16. 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 an option to auto synchronization with the central database with apps local database on the availability of the Internet connectivity.

17. 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.

a) Operational Training: 20 persons

The consultant should be arranged batch wise day long operational training in two batch. Around 10 persons in a batch.

b) Training of Trainers (ToT): Around 250 persons (25 persons from each Batch based on the location in district or region)

The consultant should be arranged 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).

18. 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. In order to ensure the security of the system the consulting firm will have to ensure the following.

Injection

Injection flaws, such as SQL, NoSQL, OS, and LDAP injection, occur when untrusted data is sent to an interpreter as part of a command or query. The attacker’s hostile data can trick the interpreter into executing unintended commands or accessing data without proper authorization.

Broken Authentication and Session Management

Application functions related to authentication and session management are often implemented incorrectly, allowing attackers to compromise passwords, keys, or session tokens, or to exploit other implementation flaws to assume other users’ identities temporarily or permanently.



JKM
2



Insecure Direct Object References

This issue occurs when an application provides direct access to objects based on user-supplied input. As a result of this vulnerability attackers can bypass authorization and access resources in the system directly, for example database records or files.

Security Misconfiguration

Security misconfiguration is the most commonly seen issue. This is commonly a result of insecure default configurations, incomplete or ad hoc configurations, open cloud storage, misconfigured HTTP headers, and verbose error messages containing sensitive information. Not only must all operating systems, frameworks, libraries, and applications be securely configured, but they must be patched and upgraded in a timely fashion.

Insecure Cryptographic Storage

This is a common vulnerability that occurs when sensitive data is not stored securely. Insecure Cryptographic Storage isn't a single vulnerability, but a collection of vulnerabilities.

Insufficient Transport Layer Protection

Not all traffic flowing between two endpoints is properly secured, which makes it possible for attackers to perform man-in-the-middle attacks. We have to implement HTTP Strict Transport Security in all browsers, which makes it possible to better enforce secure connections. Additionally, implementation of Certificate and Public Key pinning in browsers is necessary where applicable.

Invalidated Redirects and Forwards

Invalidated redirect vulnerabilities occur when an attacker is able to redirect a user to an untrusted site when the user visits a link located on a trusted website. This vulnerability is also often called Open Redirect.

Sensitive Data Exposure

Many web applications and APIs do not properly protect sensitive data, such as financial, healthcare, and PII. Attackers may steal or modify such weakly protected data to conduct credit card fraud, identity theft, or other crimes. Sensitive data may be compromised without extra protection, such as encryption at rest or in transit, and requires special precautions when exchanged with the browser.

Using Components with Known Vulnerabilities

Components, such as libraries, frameworks, and other software modules, run with the same privileges as the application. If a vulnerable component is exploited, such an attack can facilitate serious data loss or server takeover. Applications and APIs using components with known vulnerabilities may undermine application defenses and enable various attacks and impacts.

Broken Access Control

Restrictions on what authenticated users are allowed to do are often not properly enforced. Attackers can



exploit these flaws to access unauthorized functionality and/or data, such as access other users' accounts, view sensitive files, modify other users' data, change access rights, etc.

Insecure Deserialization

Insecure deserialization often leads to remote code execution. Even if deserialization flaws do not result in remote code execution, they can be used to perform attacks, including replay attacks, injection attacks, and privilege escalation attacks.

Insufficient Logging & Monitoring

Insufficient logging and monitoring, coupled with missing or ineffective integration with incident response, allows attackers to further attack systems, maintain persistence, pivot to more systems, and tamper, extract, or destroy data. Most breach studies show time to detect a breach is over 200 days, typically detected by external parties rather than internal processes or monitoring.

19. Support & Maintenance

- Provide support service for current system and new developed system under structured SLA and Change Management Architecture.
- Continuous health check of Database and database back-up, tuning database, tuning codes & queries and mitigating the issues.
- Updating training manual adjusting the changes in the system.
- Managing database security/ integrity and backup procedures
- Fixing all bugs in the system irrespective of its nature and complexities.
- Fixing Authentic Data entered into the system following a structured authorization system.
- Enhance and/or re-arrange existing feature of extended development of any supplementary feature within the existing technology framework complying with core SRS.

20. User Acceptance Test (UAT)

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

- UAT activities to be performed (planning, designing test cases, selection of the 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

TOR – Planning, Design, Development, Upgradation, Deployment, Support & Maintenance of Smart Krishi Market System



- activity wise test case, test results/ deliverables
- detail user feedback/test reports
- System update plan

21. Management and Migration of Legacy Data

Under the process of service to e-Service transformation, during e-Service activation or deployment, it may be necessary to move the legacy data of prevailing services. In this case, the consultant may require performing different relevant activities that may include data collection, softcopy conversion, data filter, data cleansing, data verification, data process, data entry, data migration and overall data management. Here, it is expected that the consultant will propose their detail data management and data migration plan for this e-Service application considering the estimation of legacy data mentioned below which will be required to migrate into the developed application.

The plan may cover the amount of data to be migrated, activities to be performed, number of resources to be used, required time for different data migration phases for different activities (data collection, hardcopy to softcopy conversion, data entry, data transformation from soft copy, data filtration, data cleaning, data verification) etc.

22. Operational Acceptance Test (OAT)

Operational readiness of “**Smart Krishi Market System**” needs to be evaluated before releasing to the production through Operational Acceptance Test (OAT). It should ensure the smooth operation in its standard operating environment. It will confirm that the product, system, service or process meets operational requirements such as performance, security, reliability, stability, maintainability, accessibility, interoperability, backup and recovery. The consultant should submit an OAT completion report.

23. SDLC Approaches & Methodology

Considering the current context of digital government implementation of Bangladesh, we’ve proposed agile with dev.-ops SDLC methodology for the development of this integrated service delivery platform. Under the scope of this SDLC methodology, for effective, efficient, timely and fruitful development of this system and achieving early release as a tangible result, the scope of this assignment can be divided into multiple parts (components & modules) based on priority and dependency of the modules and features to be developed and released.

In the inception phase, the parts of the components/modules will be defined by the concerned authority (implementing agency) discussing with the vendor.







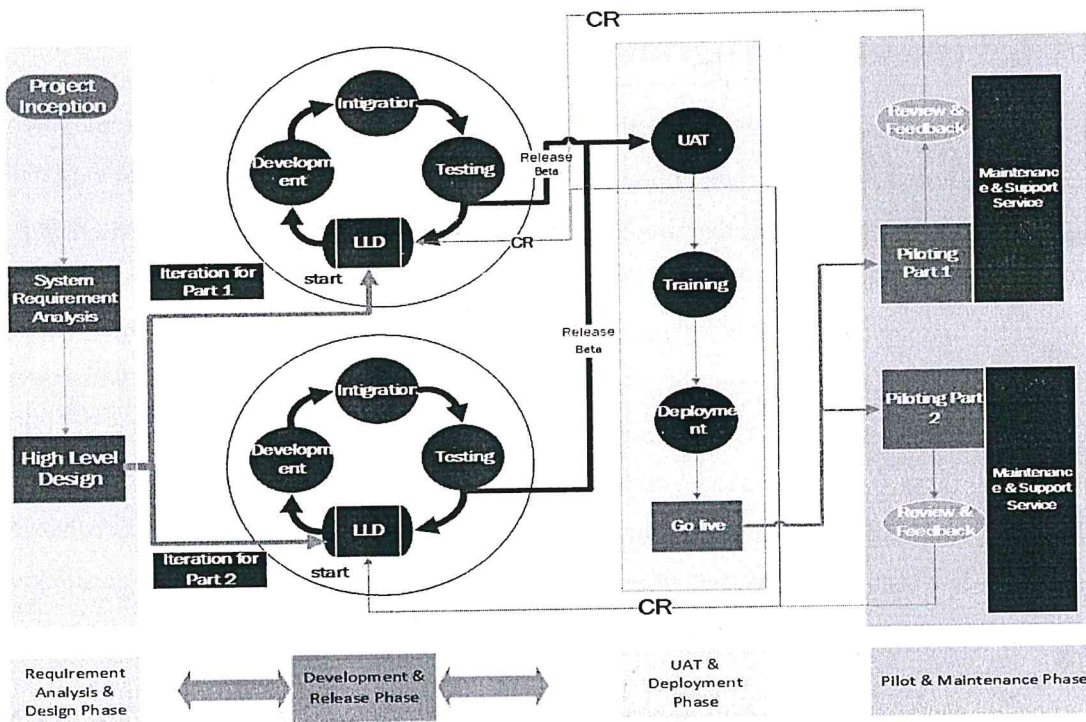


Figure: Sample Hybrid SDLC Methodology (Dividing scopes into two parts)

a) **Phase-1: System Analysis & Design**

Project Inception:

Deliverables: Proposed Project Management Plan with time schedule indicating Milestone, Resources plan, Gantt Chart, Clearly Mansion the Slack time, Overhead, Risk and its mitigation plan etc. Time-slot (Deliverables, Deployment, Maintenance) according to TOR.

System Requirement Analysis:

Deliverables: Software Design Document (SDD), Software Requirement Specification (SRS), Functional Requirement Specification (FRS), User Story, Use Case, E-R diagram. Also estimated time-slot for each module.

High-level System Design (HLD):

Deliverables: High-level design document or HLDD, all levels of DFD, Database Template Design and UI based non-functional prototype/ Mock. Share the QC reports.

b) **Phase-2: Development & Release:**

Based on the priority, importance and dependency, the assignment scope will be divided into two or multiple Parts as per organizational consideration and decision. Each Part will be completed through an iteration. The iteration process may follow the scrum process with several sprints of Agile Methodology. The iteration includes several steps such as LLD (Low Level Design), Development, Integration, Testing, Review and Release. For detail clarification the "Iteration 1" steps for Part 1 are described below:

23.1.1 Iteration 1 for Part 1:

TOR – Planning, Design, Development, Upgradation, Deployment, Support & Maintenance of Smart Krishi Market System

[Handwritten signatures]

ATSI

[Handwritten signatures]

Deliverables: Low-level design (LLD) is a component-level design process in which the actual software components, modules and functional requirements are designed. This process can be used for designing data structures, required software architecture, source code and ultimately performance algorithms. The consulting firms will have to submit a report on LLD based on which development will be started.

23.1.2 Development:

Deliverables: Developed features/modules/components/ applications, code documentation, database and related files, Git Repository (For code-review, understanding), algorithm & interface related documents, development & versioning report, Test Design, Test driven development (TDD) approach should be included at this stage to ensure smooth development etc.

23.1.3 Integration

Deliverables: Integration testing reports, test-cases, Integration activity report, User manual

23.1.4 Testing

Software testing process is one of the most vital phases through which it will be expected to evaluate each and every functionality of the proposed software application with an intent to find whether the developed application's functional features meet the specified requirements or not.

The consulting firm should prepare an extensive testing plan so that any functional failure can be detected and corrected timely and properly. The scope of the software testing should include the examination of code as well as the execution of the code in various environments and conditions as well as examining the aspects of the code; does it do what is required.

The consulting firm must propose a comprehensive testing plan in their technical proposal for this e-Service application starting from development to deployment that is covered in the full test life cycle. This testing plan should cover all the standard testing approaches applicable for this e-Service solution which may include phase wise testing activities like test scripting, test documents, testing tools, testing process, test log, result and report formats i.e. expected test deliverables. The consulting firm should submit a testing plan which may include standard test approaches. Some are mentioned below as examples for reference.

For functional testing, there shall be performed:

- Unit Testing
- Smoke testing
- Integration Testing
- System Testing
- Regression testing
- Localization
- Interoperability

For non-functional testing, there shall be performed:

- Performance Testing
- Volume Testing
- Scalability
- Load Testing
- Stress Testing
- Compliance Testing
- Portability Testing

Deliverables: Test Plan, Test Scripts, Test Logs, All Tests Reports, Feedback.

Note: Based on the Test reports and received feedback (Change Request) the LLD, version, developed application may be changed accordingly.

23.1.5 Release:

Deliverables: Released application modular/part wise with appropriate versions control mechanism and details Release notes of each release

23.1.6 Iteration 2 for Part 2:

For another part i.e., another same iteration may be started based on the mobilized team's availability and mobilization plan. Like for iteration 1, the engaged team for LLD will be released almost just after entering into the development step, so that team could be assigned for the LLD of iteration 2. In the same way, the development team of iteration 1 will be engaged mostly till integration, therefore a part of this team can be mobilized for the development phase of iteration -2. Therefore, based on the availability of adequate resources, engagement and mobilization plan, the consulting firm may run both parts i.e. 1 and 2 almost simultaneously at different development iteration plans. In this document, iteration -2 will follow the same steps as Iteration -1 to deliver the part and release it as a BETA version for UAT and deployment.

23.2 Phase-3: UAT & System Deployment

As soon as one iteration releases any developed application after completing the predefined steps and processes, this released version will be entered into this immediate phase i.e. UAT and system Deployment. The basic objective of this phase is to receive user feedback, adjust them, take final consent or acceptance of the user, and ensure system testing for deployment, training and taking final deployment actions to GO LIVE. There may be basically 3 major steps are involved in this phased which are described hereunder:

23.2.1 User Acceptance Test (UAT):

Deliverable: User Acceptance Test report of module/tasks of all features in application is met clearly. After UAT, submit a showcase/piloting report.

23.2.2 Operational Acceptance Test



Bug fixing and modification due to smooth operation of the product. Bug fixing report and updated operational manual.

23.2.3 User Training

Deliverables: Training Manual, Training Plan, Training Feedback, Training Report

23.2.4 Deployment

Deployment is a very important step in the SDLC before going LIVE where different types of necessary and standardized activities should be performed as per predefined plan. The deployment plan should be prepared in a comprehensive manner choosing the appropriate deployment method and right deployment checklist. Automating the deployment process as much as possible is a wise decision at this step. For ease deployment, we can use an automation server (i.e: Jenkins). Obviously adopting continuous delivery and using an integration server is necessary. Deployment preparation also may include checking that the required server is running smoothly and configuring the staging environment properly. At this step, there are various testing processes that should be performed as a part of the obvious process. Finally, this deployment process may continue with copying the updates to the production environment, running any necessary scripts, setting changes for live and testing on the live server before going LIVE.

23.2.5 Go Live

Successful deployment of any developed and tested application will lead finally to the “GO LIVE” state. The inauguration of the application may take place immediately when it enters into this stage. As inauguration is the formal session to expose or open the application to the end users/citizen, therefore proper consent of the concerned implementation Organization/Agency is required before going LIVE.

23.3 Phase-4: Support & Maintenance

The consulting firm will provide all necessary support to ensure smooth operation in the pilot phase. It may be mentioned here that some change requests (CR) based on the end users review and feedback at this piloting stage may be required to be accepted and CRs will be adjusted through predefined development cycles. Obviously at this stage, those CRs must be considered aligned to the Terms of Reference (ToR) of the assignment avoiding major functional changes that may create alternation on architecture, database structure and development complexity. In this document, CRs related to UI and UX, frontend scripting and content presentation level may be accepted. In this piloting phase, 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 consulting firm at this stage.

24. Tools and Technologies to be used.

TOR – Planning, Design, Development, Upgradation, Deployment, Support & Maintenance of Smart Krishi Market System



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			



नमः




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			

25. 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

TOR – Planning, Design, Development, Upgradation, Deployment, Support & Maintenance of Smart Krishi Market System



26. 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

TOR – Planning, Design, Development, Upgradation, Deployment, Support & Maintenance of Smart Krishi Market System

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>


TOR – Planning, Design, Development, Upgradation, Deployment, Support & Maintenance of Smart Krishi Market System

JKH
2

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 Mobile 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.

TOR – Planning, Design, Development, Upgradation, Deployment, Support & Maintenance of Smart Krishi Market System




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

TOR – Planning, Design, Development, Upgradation, Deployment, Support & Maintenance of Smart Krishi Market System

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, HA Proxy)
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

TOR – Planning, Design, Development, Upgradation, Deployment, Support & Maintenance of Smart Krishi Market System

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 is 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 Expert an added advantage</p> <p>iv) Multi-Domain knowledge, Security Frameworks and Methodologies understanding, Public Cloud knowledge. Frameworks and Methodologies understanding, Public Cloud knowledge</p> <p>v) Ability to assess vulnerabilities, recommends mitigation measures, and ensures compliance with security standards.</p>
21	Support Engineer	6	<p>i) Minimum graduate in Computer Science and Engineering/ICT</p> <p>ii) /Any disciplines from any reputed University 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>

27. Technology Specification

The consulting firm will follow the TOGAF 9.x or similar open source-based technologies, frameworks, platforms and guidelines. Following are some technical specifications which the consulting firms should consider as reference but not as the ultimate method of developing “Smart Krishi Market System” Platform.

- TOGAF compatible or similar open-source platform to ensure enterprise level management
- e-Service bus (Enterprise Service Bus)
- PHP, Laravel, Node JS or any other language at back-end or server-side scripting layer

TOR – Planning, Design, Development, Upgradation, Deployment, Support & Maintenance of Smart Krishi Market System

- React, Next JS, View JS or similar types open source for front end.
- API centric enterprise level design using JSON or other data delivery format.
- Micro service architecture following micro-service design approach.
- Secure interaction with Core-service and shared service using dynamic token
- API lifecycle, policy and community governance using proper analytics
- Multi-tenancy support in platform
- SAML2 bearer grant type, JWT assertion grant type and NTLM-IWA grant type
- Messaging protocol support e.g., AMQP 1.0, STOMP, MQTT, HTTP
- OAuth2 token revocation support
- OAuth token introspection
- SAML 2.0 or above based Single Logout, metadata profile and
- assertion query/request profile
- OpenID connect based session management, discover and dynamic client registration
- White label login and registration process
- Rule-based authorization support for SSO
- Support for multi-option/multi-step authentication
 - X.509 Authentication
 - 2-factor authentication (2-FA) (hardware based or soft OTP)
 - Time-based one-time password (TOTP) based authentication
- Apache Maven, Apache Ant and Oracle JDK
- Maven or Gradle build is recommended to use.
- Enterprise Linux to host all application
- Bootstrap, jQuery and Ajax for best UX
- Oracle 12c or higher RDBMS or Any Similar Open-Source DB.
- MySQL, MongoDB or any other NoSQL database as/when required with proper justification
- Redis, Memcached, CDN or Varnish for caching and faster data delivery
- Must ensure load balancing for scalability and failover for high availability of service endpoints
- Code Version Controlling using GIT or Bitbucket in private mode
- GIT issue board or Jira or Asana for issue tracking and feature change management
- Notification to web and mobile with current and future OS of corresponding devices must





be ensured

- Future technology change, iterative prototyping and agility in framework design are the generic expectation

28. Timeline

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

29. 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 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 developments in government public servicedelivery 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 Development 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

TOR – Planning, Design, Development, Upgradation, Deployment, Support & Maintenance of Smart Krishi Market System

২৩

(BCC) (No need to Submit Previous Jobs SQTC Certificate).

- The prepared software must meet the requirements to get SQTC certificate from BCC (No need to Submit Previous Jobs 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.

30. Expected Deliverables

The consulting firm must complete the assignment within a stipulated timeline based on the proposed SDLC methodology. The assignment timeline can be divided in three below phases that is – Development, UAT and Maintenance & Support. As the entire assignment’s functional scope will be divided into 2 parts, therefore the release and deployment of the part for going live will be based on the completion of the iteration.

The assignment is divided into three phases. The entire assignment is divided as following phases:

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

Handwritten signatures and initials are present below the table, including a large signature on the left, a signature with a checkmark in the middle, the initials 'JTB' in the center, and a circled signature on the right.

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

31. Payment Schedule


Sl.	Deliverables/Reports	Time of Submission/after date of contract signing	Payment (% of totalcontract amount)
1	Inception Report including Work plan	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(Updated)	15 Days	10%


TOR – Planning, Design, Development, Upgradation, Deployment, Support & Maintenance of Smart Krishi Market System

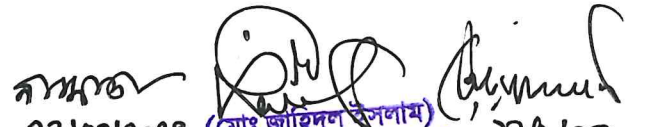
Sl.	Deliverables/Reports	Time of Submission/after date of contract signing	Payment (% of total contract amount)
	<ul style="list-style-type: none"> ✓ User Manual and Video Tutorial ✓ TOT Training Report 		
7	Performance Metrics; Support and Maintenance Service, every 3 months report submission	16 Months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

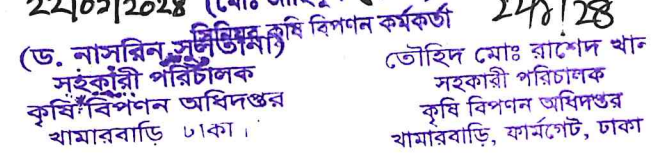
32. Conclusion

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, and 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.


 22/02/2028
 মোঃ আল আমিন সরকার
 প্রোগ্রামার
 কৃষি বিপণন অধিদপ্তর
 খামারবাড়ি, ঢাকা।


 22/02/2028
 কিশোর কুমার সাহা
 সহকারী পরিচালক
 কৃষি বিপণন অধিদপ্তর
 খামারবাড়ি, ঢাকা।


 22/02/2028 (মোঃ জাহিদুল ইসলাম)
 (ড. নাসরিন সুলতানা)
 সহকারী পরিচালক
 কৃষি বিপণন অধিদপ্তর
 খামারবাড়ি ঢাকা।


 22/02/28
 তৌহিদ মোঃ রাশেদ খান
 সহকারী পরিচালক
 কৃষি বিপণন অধিদপ্তর
 খামারবাড়ি, ফার্মগেট, ঢাকা