

Software Requirements Specification (SRS)

for

Smart Bidding Platform for the Fairness of Farmers

Version 02

Submitted to

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1.Executive Summary

The Agricultural Bidding Platform is an initiative to change the way the sales of agricultural products are carried through the introduction of an open, competitive, and fair marketplace. This platform is ideal for smallholder farmers to post their products, engage in bidding and also to get a higher price through real time auction or outright sale. Buyers can bid, track the auction, and purchase products competitively at convenient prices benefiting both parties with a more effective and balanced system.

The Smart Bidding System for farmers solves key problems of smallholder farmers, such as the price volatility, and dependence on intermediaries and barrier to entry in the market. Through providing a secure and transparent platform for real time bidding, the system eliminates the middlemen, while farmers then get higher prices for their produce, and buyers access fresh agricultural products at fair prices.

The Software Requirements Specification (SRS) identifies the functional and non-functional requirements of the Agricultural Bidding Platform. It includes key system needs including product listing, bidding systems, payment integration, user authentication and market insights. It moreover talks about monitoring strategy, risk management and change management process to make sure smooth implementation and sustainability of the system.

By addressing functionality, usability, and security, this SRS will make the platform useful to all stakeholders—farmers, the buyers, and administrators—and a good base for system development and deployment and possible enhancements in the future. The design of the platform will give farmers the power to control their products which means that they will have fair pricing and greater access to markets, which subsequently will improve their economic state.

As a guide to the development team, project managers and stakeholders, this SRS will give clear answers to the goals of this platform, features, and what needs to be done to make this vision a reality.

2. Requirements Specification

2.1 Introduction

The Agricultural Bidding Platform is an attempt to solve some of the high challenges experienced by the smallholder farmers in the agricultural market. Various farmers find it difficult to market their products at fair prices and to reliable markets, and to market them straight to buyers. It goes without saying that traditional agricultural markets are usually controlled by middlemen who use their position to mislead prices and reduce profit margins for farmers. This platform seeks to fill in the gap between the farmers and the buyers by facilitating a transparent, competitive and secure environment for listing products, bidding and a direct sale. Drawing on contemporary web technologies, the platform will allow farmers to take the reins on their sales processes, maximize their profits and target a wide range of buyers.

2.1.1 Purpose

The purpose of this Software Requirements Specification (SRS) document is to:

- Define the functional and non-functional requirements for the Agricultural Bidding Platform.
- Outline the system's features and functionalities to be developed.
- Provide a clear understanding of the platform's goals, including transparency in pricing, better market access, and increased profitability for farmers.
- Ensure all stakeholders—farmers, buyers, and administrators—are aligned on the expectations for the platform.

- Serve as a comprehensive guide for the development team to create, test, and deploy the platform.
- Establish performance, security, usability, and scalability benchmarks for the system.
- Provide a foundation for monitoring, risk management, and change management throughout the project lifecycle.

2.1.2 Definitions, Acronyms, and Abbreviations

Definitions

- **Agricultural Bidding Platform:** An online marketplace where farmers can list agricultural products, participate in bidding or direct sales, and engage with buyers in real-time auctions or fixed-price transactions.
- **Farmer:** A user of the platform who produces and sells agricultural products. They can list products, set prices, and manage inventory.
- **Buyer:** A user who purchases agricultural products. They can place bids in auctions or buy products directly at the listed price.
- **Admin:** A user with elevated privileges who manages the platform, including user roles, product listings, and transaction oversight.
- **Auction:** A process where buyers place bids on products over a specified period, with the highest bidder winning the item.
- **Reserve Price:** The minimum price set by a farmer for an auctioned product, below which the product will not be sold.
- **SSLCommerz:** A secure payment gateway used for processing online transactions between farmers and buyers.
- **MoSCoW:** A prioritization method used to classify requirements as Must have, Should have, Could have, and Won't have.

Acronyms

- **SRS:** Software Requirements Specification
- **SSL:** Secure Sockets Layer (a standard security technology for establishing an encrypted link between a server and a client).
- **API:** Application Programming Interface
- **NFR:** Non-Functional Requirements
- **FR:** Functional Requirements
- **UI:** User Interface
- **UX:** User Experience
- **DBMS:** Database Management System
- **IP:** Internet Protocol

Abbreviations

- **HTML:** HyperText Markup Language
- **CSS:** Cascading Style Sheets
- **PHP:** Hypertext Preprocessor
- **MySQL:** My Structured Query Language
- **JS:** JavaScript
- **CRUD:** Create, Read, Update, Delete
- **MVC:** Model-View-Controller (a design pattern used for developing user interfaces)
- **UI/UX:** User Interface/User Experience
- **API:** Application Programming Interface
- **SDK:** Software Development Kit
- **SLA:** Service Level Agreement
- **SMTP:** Simple Mail Transfer Protocol

2.2 Overall Description

2.2.1 Product Perspective

The Agricultural Bidding Platform is a standalone web application designed to enhance market access for smallholder farmers by allowing them to list products, manage inventory, and participate in real-time bidding. The platform ensures transparency and competitiveness while providing secure payment processing.

2.2.2 User Classes and Characteristics

- **Farmers:** Smallholder agricultural producers with limited access to formal markets.
- **Buyers:** Individual consumers and traders seeking agricultural products.
- **Admins:** Platform administrators responsible for user management and system oversight.

2.2.3 Operating Environment

- **Frontend:** HTML, CSS, Bootstrap.
- **Backend:** PHP, MySQLi.
- **Payment Gateway:** SSLCommerz.
- **Hosting:** Shared or cloud hosting with SSL support.

2.3 System Features & Requirements

2.3.1 Functional Requirements

1. User Authentication & Roles

- Users must register and log in securely.

- Role-based access control to differentiate between farmers, buyers, and admins.

2. Product Listing & Bidding

- Farmers can list products with descriptions, images, and pricing.
- Buyers can place bids or purchase products at fixed prices.

3. Inventory Management

- Farmers can update product quantities and manage stock levels.

4. Search & Filters

- Buyers can filter products by categories, price, location, and more.

5. Payment Integration

- Secure transactions via SSLCommerz payment gateway.

6. Order Management

- Track order status, view delivery details, and receive notifications.

7. Admin Dashboard

- Manage users, approve product listings, and monitor platform activity.

2.3.2 Non-Functional Requirements

1. Performance

- System should handle up to 1000 concurrent users with a response time under 3 seconds.

2. Security

- Implement SSL encryption for secure data transmission.
- Secure authentication mechanisms to protect user data.

3. Scalability

- Platform should accommodate growth in user base and product listings.

4. Usability

- User-friendly interface accessible on various devices.

5. Availability

- System uptime of 99.5% to ensure continuous access.

2.4. Monitoring Strategy

2.4.1 Real-Time Monitoring

- **Admin Dashboard:** The system will feature **real-time monitoring** via an **Admin Dashboard**, which will track user activity, auction progress, and transaction statuses.
- **Error Logs:** Tracks system errors and issues for prompt resolution.

2.4.2 Reporting

- Monthly **reports** will be generated, providing insights into platform performance, including active users, products listed, and transaction volumes.
- User **feedback** will be collected regularly to ensure that the platform continues to meet the needs of its users.

2.5 Risk Management

2.5.1 Identified Risks

1. Fraudulent Transactions

- **Mitigation:** Implement fraud detection systems and use secure payment methods like SSLCommerz.

2. System Downtime

- **Mitigation:** Use cloud hosting with failover capabilities and regular backups.

3. User Adoption

- **Mitigation:** Provide user training and support to encourage platform usage.

4. Payment Processing Issues

- **Mitigation:** Ensure reliable integration with SSLCommerz and implement dispute resolution features.

2.6 Change Management Process

2.6.1 Process Overview

The change management process will involve:

- **Logging Change Requests:** Any changes to the system requirements will be logged and assessed.
- **Impact Analysis:** The impact of the change on the system's functionality, timeline, and resources will be analyzed.
- **Approval:** Changes will be reviewed and approved by stakeholders before being implemented.
- **Implementation & Testing:** After approval, changes will be implemented and thoroughly tested to ensure system integrity.

The process will be closely monitored, and all changes will be incorporated in the project schedule and SRS updates as needed.

3. Requirements Analysis & Negotiation

3.1 Examined Against SMART Objectives

The requirements for the Agricultural Bidding Platform were analyzed and examined using the SMART framework, ensuring that the system's objectives are Specific, Measurable, Achievable, Relevant, and Time-bound.

OBJECTIVE	DESCRIPTION
SPECIFIC	The platform will allow farmers to list their products, engage in bidding, and receive secure payments. It will also provide buyers with the ability to place bids and make direct purchases.
MEASURABLE	Success will be measured by the number of active users (at least 1000 concurrent users in the first year), the number of transactions processed (target of 500 successful transactions per day), and the platform's uptime (99.5% uptime).
ACHIEVABLE	The platform will be developed using existing web technologies (HTML, CSS, Bootstrap, PHP, MySQL) and integrated with SSLCommerz for secure payment processing. The project is designed within the scope of available resources.
RELEVANT	The platform directly addresses the issues faced by smallholder farmers in accessing fair markets and prices. It meets the needs of farmers, buyers, and admins for a transparent and secure bidding process.
TIME-BOUND	The system will be fully operational within 6 months , with a phased rollout starting with core features, followed by additional functionalities such as mobile compatibility and advanced reporting.

3.2 Prioritized by MoSCoW

The MoSCoW method is used to prioritize the system requirements, ensuring that critical features are delivered first. Requirements are categorized into Must have, Should have, Could have, and Won't have.

PRIORITY	REQUIREMENTS
MUST HAVE	<ul style="list-style-type: none">- User Authentication & Roles: Secure login for farmers, buyers, and admins.- Product Listing & Bidding: Farmers can list products, and buyers can place bids.- Payment Integration: Secure transaction processing via SSLCommerz.- Order Management: Track orders and deliveries.
SHOULD HAVE	<ul style="list-style-type: none">- Inventory Management: Farmers can update stock levels and expiration dates.- Search & Filters: Buyers can filter products by price, category, and location.- Admin Dashboard: Admins can manage users, product listings, and view performance metrics.
COULD HAVE	<ul style="list-style-type: none">- Mobile App: An iOS/Android application for better accessibility.- Market Insights: Reports on market trends to help farmers set competitive prices.
WON'T HAVE	<ul style="list-style-type: none">- Blockchain Integration: Not implemented in the initial phase.- Logistics Management: Shipping and delivery management will be handled externally.

3.3 Classified into Two Categories

The requirements are classified into two categories: Functional Requirements and Non-Functional Requirements. This classification ensures that both the core functionalities and the system's quality attributes are clearly defined.

3.3.1 Functional Requirements (FR)

- **User Authentication & Roles:**
 - Secure user login and role-based access for farmers, buyers, and admins.
- **Product Listing & Bidding:**
 - Farmers can list agricultural products with descriptions, prices, and images.
 - Buyers can place bids on auctioned products or purchase directly at a fixed price.
- **Inventory Management:**
 - Farmers can update stock levels, set product expiration dates, and manage product information.
- **Search & Filters:**
 - Buyers can filter and search for products by various criteria such as price, category, and location.
- **Payment Integration:**
 - Secure payment processing through **SSLCommerz** for transactions.
- **Order Management:**
 - Buyers and farmers can track the status of orders and receive notifications upon completion or shipment.
- **Admin Dashboard:**
 - Admins can manage user roles, approve product listings, and access system performance analytics.

3.3.2 Non-Functional Requirements (NFR)

- **Performance:**

- The system should handle up to **1000 concurrent users**, with response times of **less than 3 seconds** for user interactions.
- **Security:**
 - Implement **SSL encryption** for secure data transfer.
 - Use secure authentication mechanisms to protect user accounts and transaction data.
- **Scalability:**
 - The platform should scale to support up to **100,000 users** by the end of the first year and allow for future expansion.
- **Usability:**
 - The platform should be intuitive and easy to navigate for farmers, buyers, and admins.
 - The system should be **mobile-responsive** to support users on both desktop and mobile devices.
- **Availability:**
 - The platform must have a **99.5% uptime** to ensure continuous access for users.
- **Maintainability:**
 - The system should be easy to maintain, with regular updates and bug fixes provided as part of the platform's support lifecycle.

This section of the SRS ensures that the **Agricultural Bidding Platform** is well-defined in terms of both its functional and non-functional requirements. The prioritization ensures that critical features are implemented first, while the system's quality attributes (e.g., performance, security, scalability) are also addressed to ensure a smooth user experience.

4. Requirements Elicitation

4.1 Elicitation Techniques with Details

The requirements elicitation process for the Agricultural Bidding Platform involved a combination of techniques to gather comprehensive input from stakeholders, ensuring that the system would meet the diverse needs of farmers, buyers, and admins.

4.1.1. Interviews

- **Participants:** One educated farmer who understands the challenges and opportunities in the agricultural market. This farmer is looking for better market access and fairer pricing through an online platform.
- **Purpose:** To understand the farmer's needs, pain points, and expectations regarding market access, product pricing, and the features they would want in an online agricultural marketplace.
- **Method:** A structured interview was conducted with the farmer to gather insights about their current selling practices, challenges they face with pricing, and their willingness to engage with a digital platform.

4.1.2. Surveys and Research (for Buyers)

- **Participants:** No direct interviews were conducted with buyers, but research and data analysis were used to understand their needs.
- **Purpose:** To gain insights into buyer preferences regarding product types, pricing models, and auction versus direct purchase options.
- **Method:** Data was gathered from existing market reports, research papers, and case studies on agricultural e-commerce platforms to understand buyer behavior and preferences. This included information on desired features such as product search filters, the importance of price transparency, and real-time bidding.

4.1.3. Competitive Analysis

- **Participants:** Analysis of existing agricultural platforms and e-commerce systems.
- **Purpose:** To understand the common features offered by competitors and identify gaps or opportunities for differentiation.
- **Method:** A detailed review of market-leading agricultural platforms was conducted to identify successful features and areas for improvement.

1.

4.2 Elicitation Preparation

Stakeholder Identification

- **Farmers:** One educated farmer who understands both traditional farming and digital platforms was chosen to provide insights. This farmer is actively looking for ways to increase market access and revenue through a more transparent system.
- **Buyers:** Insights were gathered indirectly through secondary research and data analysis, focusing on consumer behaviors and market trends in agricultural products.

Scope Definition

- The elicitation focused primarily on **functional requirements** related to product listing, bidding, pricing, and market access.
- Non-functional requirements such as performance, security, usability, and scalability were also considered to ensure a user-friendly experience for farmers and buyers alike.

Materials Preparation

- **Interview Scripts:** Questions were developed for the farmer interview to understand their current processes, pain points, and expectations for the digital marketplace.

- **Surveys:** A series of online surveys were designed to gather insights from buyers indirectly by analyzing available market data, including product preferences, purchasing patterns, and feature requests.
- **Competitive Analysis:** A review of existing platforms was performed to ensure the platform offers competitive advantages and meets the needs of the target users.

4.3 Conduct the Elicitation

- Introduction

- **Farmers:** The platform's objectives were explained to the farmer, highlighting how it could help them access a broader market, engage in transparent pricing, and eliminate intermediaries.
- **Buyers:** While no direct interaction occurred with buyers, secondary research provided insights into what buyers expect from agricultural platforms, such as real-time bidding, transparent pricing, and product variety.

- Body

- **Farmer Interview:** The educated farmer shared insights about their current sales process, challenges in reaching broader markets, and their hopes for an online platform that could offer them better pricing and visibility.
 - The farmer emphasized the importance of a system that allows them to set a **reserve price** to avoid undervaluation of products and the need for a platform that offers transparent **auction mechanisms**.
 - The farmer expressed the desire for **inventory management** tools that would help keep track of stock levels and product expiration dates.
- **Buyer Research:** Data from market research and competitive analysis revealed that buyers highly value **real-time bid tracking**, **search filters**, and **secure payment options**. The buyer's interest in **price transparency** and the ability to **directly purchase products** was also noted.

- **Close**

- The key takeaways from the interview were summarized and verified with the farmer to ensure all aspects of their needs and expectations were captured accurately.
- As for the buyer side, the gathered research and data were used to inform the platform's features, which will meet the expectations of buyers for transparency, bidding, and product accessibility.

- **Follow-up**

- **Farmers:** Thank-you notes were sent to the farmer who participated in the interview, and additional feedback was requested after the system prototype is delivered.
- **Buyers:** No direct follow-up was necessary since the research and data already provided the necessary buyer insights. Further buyer feedback will be collected during the beta testing phase.

4.4 Analyze Elicitation Results

- **Farmers:** The educated farmer's responses highlighted the need for a platform that provides better market access, fair pricing, and more control over product listings.
 - **Key Features:** Real-time bidding, the ability to set a reserve price, inventory management, and product descriptions with images.
- **Buyers:** The research and market data revealed that buyers value a transparent auction system, clear product information, and the ability to make secure payments.
 - **Key Features:** Advanced search filters, real-time bidding updates, and secure payment processing.

4.5 Difficulties of Requirements Elicitation

1. **Limited Direct Interaction with Buyers:** Due to the lack of direct interviews with buyers, all insights for the buyer side were derived from secondary research. This may not fully capture specific preferences or challenges those real buyers may face.
2. **Technological Constraints of Farmers:** While the farmer interviewed was educated and understood digital tools, many smallholder farmers may face challenges with technology adoption, limiting their ability to engage with the platform.
3. **Resistance to Change:** Some farmers may be reluctant to adopt new technology due to fear of complexity or distrust in digital systems. Overcoming this resistance will require clear education, user support, and incentives.

This **Requirements Elicitation** section reflects the process of gathering key insights from the farmer's side through direct interaction, while the buyer side was informed by secondary research. Despite the limitations, the process provides a strong foundation for developing a platform that meets the needs of both farmers and buyers, with clear and actionable requirements.

5. Conclusion

This Software Requirements Specification (SRS) for the Agricultural Bidding Platform sets forth the critical needs for the development of an open, safe, and expedient market for smallholder farmers and buyers. The main philosophy of the platform is to empower the farmers by offering them a direct and competitive space to list and sell their agricultural products by removing the intermediaries thus bringing the fairer pricing for their farming products.

The SRS represents the captured map of functional and non-functional requirements that will form the basis on which the system will be developed and deployed. The most

important functional requirements are user authentication, listing products, bidding, payment integration, inventory and order tracking. Non-functional requirements such as performance, security, scalability, and usability make the system secure, user friendly and scalable thus accommodating growth of the system in time.

Based on a field survey of farmers, market research, and a competitive analysis, this document determines needs and expectations by both farmers and buyers. Through the elicitation process, the features of the platform were unveiled, and that system will be in a position to serve all stakeholders within their expectations. Other challenges including poor technological and change resistance were also identified and solutions to address these kinds of challenges have also been suggested.

The sections on the Monitoring Strategy, Risk Management, and Change Management Process offer guidelines for the successful implementation of the platform and help to run it smoothly and adapt to possible changes in the future. With these strategies in place, the platform is going to achieve its targets of increased market accessibility, fair prices and more economic opportunities for farmers by the provision of a reliable competitive marketplace for buyers.

This SRS will be the basic document all along the project life cycle from design through development to testing and deployment, and will ensure that the product delivered meets the stakeholders' goals. By following the items established in this document/enumerated here, the Agricultural Bidding Platform would ensure that it delivers a strong solution which would support farmers, buyers to promote a more balanced trade of agricultural goods.