Software Requirements Specification

for

GrowTrade Net

**Version 1.0**

**Prepared by Group F**

**University of Peradeniya**

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**Revision History**

| **Name** | **Date** | **Reason For Changes** | **Version** |
| --- | --- | --- | --- |
| Group F | 10.07.2023 | Initial Version | 1.0 |

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# Document Approval

The following Software Requirements Specification has been accepted and approved by the following:

| **Date** | **Printed Name** | **Title** | **Signature** |
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# Introduction

## Purpose

The purpose of this web application to help farmers inform what to grow and facilitate

connections with wholesalers, exporters, and fertilizer sellers and to address key challenges and

capitalize opportunities in the agricultural sector. Overall, the purpose of the project is to

leverage technology to empower farmers, enhance agricultural productivity, facilitate market

connections, promote sustainability, and foster collaboration. By addressing critical needs in the

agricultural sector, the web application contributes to the overall growth and development of the

farming community while ensuring a more efficient and sustainable agricultural ecosystem.

## Product Value

The main importance of this site will provide a platform for all the farmers,customers both local and foreign, exporters, wholesale businesses and fertilizer providers will be able to cooperate and interact with each other and create relationships which will benefit each other.

technically there is no such place available online which could make that happen. Online marketplace that are available now does not encourage direct communication and does not provide guidance for the sellars and farmers. This site will take online marketing and the growth of their business to the next level.

## Intended Audience and Reading Suggestions

We mainly focus on both local and foreign customers who are interested in buying higher quality and fresh products. Also local farmers can use our site as an online marketplace to introduce their products to the world. wholesalers and exporters can also use our site to find suitable customers and build connections with the local farmers and widen their businesses.

## Project Scope

This project mainly focuses on encouraging local farmers throughout our country to widen their scope in advertising, harvesting and educating them in better management of their crops and provide better chances in finding required raw materials and fertilizers in improving the quality of their harvest.

benefits:

* This site will benefit the local farmers to widen their sales not only within the country but also in exporting and introducing our products to other countries as well.
* Lately farmers are facing a considerable amount of issues in sales, and finding better opportunities in introducing their products. With the help of this site they will be able to create new bonds and join with foreign companies and organizations to better sell their products.
* This site will provide a marketplace for all the customers in our country and outside to finally get quality and fresh products directly from the local farmers.
* This site will also provide necessary guidance for the farmers and it will help to build a community which would help each other increase the efficiency of the harvest and sales.

goals:

* Our goal is to create a user-friendly interface where customers and farmers and sellars get together and overcome their difficulties and uplift their businesses further.
* Getting proper quality fertilizers and maintaining the quality of the harvest has become a major problem due to the newly implemented laws and regulations, but this site helps the farmers to find new fertilizer suppliers and tryout,experiment new methods to increase their annual harvest.

## References

[https://www.wix.com](https://www.bing.com/aclick?ld=e8Og-0Xb1leubpXApmiI8AxDVUCUwb7MjLSMvt3FvkQoLH7qCjBZB4za7jjWwFIzFMzkE1G6KYozspdGi6moXD7dKdVoqFjU-OIUaGSj9Gxn7xw9IRYEzY5PTAbHUH3Du82Vw0UT1a9z5JC9G5kzAqhad_Jx_7iCc0VbXEyAmUMkd-Gnwv8qnwybLYpZKmjD2XTrYRjA&u=aHR0cHMlM2ElMmYlMmZ3d3cud2l4LmNvbSUyZmh0bWw1YmluZyUyZnNlby1lY29tJTNmdXRtX3NvdXJjZSUzZGJpbmclMjZ1dG1fbWVkaXVtJTNkY3BjJTI2dXRtX2NhbXBhaWduJTNkbXNfZW5fZHNhX0ZlYjIwJTVlZWNvbV9kc2ElMjZleHBlcmltZW50X2lkJTNkaHR0cHMlMjUzQSUyNTJGJTI1MkZ3d3cud2l4LmNvbSUyNTJGaHRtbDViaW5nJTI1MkZzZW8tZWNvbSU1ZWJiJTVlNzk3ODM0MzAwNjE5OTUlNWVob3clMjUyMHRvJTI1MjBidWlsZCUyNTIwYW4lMjUyMG9ubGluZSUyNTIwbWFya2V0cGxhY2UlMjZtc2Nsa2lkJTNkMjdiMzQ2MWRmMWYxMTdjNzk2MWYyMmI3ODFlZDM3ZDM&rlid=27b3461df1f117c7961f22b781ed37d3&ntb=1&ntb=1)

[Create a marketplace – The complete guide by Sharetribe](https://www.sharetribe.com/academy/guide/)

# Overall Description

## Product Perspective

This web application aims to address main challenges in the agricultural sector and provide a platform for farmers to inform their crop choices and connect with wholesalers, exporters, and fertilizer sellers. From a product perspective, the web application serves the following purposes:

* Empowering Farmers: The primary goal of the web application is to empower farmers by providing them with information and guidance on what crops to grow based on market demand and suitability. It aims to support farmers in making informed decisions that can enhance their productivity and profitability.
* Market Connections: The web application facilitates connections between farmers, wholesalers, exporters, and fertilizer sellers. It creates a marketplace where farmers can show their products and establish relationships with potential buyers, both locally and internationally. This platform enables direct communication and collaboration, mutually beneficial partnerships.
* Agricultural Productivity: By providing access to market information and connecting farmers with relevant stakeholders, the web application aims to enhance agricultural productivity. Farmers can optimize their crop choices and production techniques based on market demand, leading to improved yields and financial returns.
* Sustainability: The web application promotes sustainable practices in the agricultural sector. It can provide information and resources on sustainable farming methods, crop rotation, efficient use of fertilizers, and environmentally friendly practices.
* Collaboration and Community Building: The web application seeks to foster collaboration among farmers, wholesalers, exporters, and fertilizer sellers. It aims to create a community where participants can share knowledge, experiences, and best practices, thereby improving overall efficiency and effectiveness in the agricultural ecosystem.

## Product Functions

The web application designed to help farmers and agricultural stakeholders has several key functions aimed at achieving its goals.

* Crop Recommendations: The application provides farmers with recommendations on suitable crops to grow based on factors such as market demand, climate conditions. It analyzes data and provides farmers with valuable insights to assist them in making informed decisions about their crop choices.
* Market Platform: The web application serves as a marketplace where farmers can showcase and advertise their products. It allows them to create profiles and upload details about their crops, including quantity, quality, pricing, and availability. This function enables farmers to reach potential buyers, both local and foreign, and facilitates direct communication and transactions.
* Connection Facilitation: The web application facilitates connections between farmers, wholesalers, exporters, and fertilizer sellers. It provides a platform for these stakeholders to interact, negotiate deals, and establish business relationships. The application may include features such as chat functions, messaging systems, and contact information exchange to encourage direct communication.
* Supply and Demand Matching: The application helps match the supply of agricultural products with the demand from potential buyers. It allows buyers to search for specific crops, filter results based on their preferences, and connect with farmers who offer the desired products. Farmers can also view the demand for certain crops and adjust their production accordingly.
* Fertilizer and Resource Guidance: The web application provides guidance and information on fertilizers and other agricultural resources. It may include a directory of fertilizer suppliers, their products, and user reviews. Additionally, the application may offer guidance on the appropriate use of fertilizers, crop management techniques, and sustainable farming practices to optimize productivity and minimize environmental impact.
* Notifications and Updates: The application can send notifications and updates to users regarding market trends, new buyer inquiries, relevant news and events, or changes in crop prices. This function ensures that users stay informed and can make timely decisions based on the latest information.
* Feedback and Review System: The web application may incorporate a feedback and review system, allowing buyers to rate and provide feedback on the quality and service they receive from farmers. This function helps maintain transparency, build trust among users, and encourage continuous improvement.

## User Classes and Characteristics

Farmers:

* Farmers are the primary users of the web application. They are involved in crop cultivation and agricultural activities.
* Farmers use the application to access crop recommendations, showcase their products, connect with buyers, wholesalers, exporters, and fertilizer sellers, and exchange knowledge and resources with other farmers.
* Farmers may have varying levels of technological proficiency, so the application should be user-friendly and accessible to users with diverse digital skills. They may have limited access to resources and require support and guidance in using the application effectively.

Buyers (Local and Foreign):

* Buyers are individuals, businesses, or organizations interested in purchasing agricultural products.
* Buyers use the web application to search for specific crops, view product details, communicate with farmers, negotiate deals, and make purchases. They may also provide feedback on the quality of products and services received.
* Buyers may have different preferences and requirements, such as quantity, quality, delivery options, and pricing. They may vary in their level of familiarity with the agricultural industry and may require clear and concise information to make informed purchasing decisions.

Wholesalers and Exporters:

* Wholesalers and exporters are businesses involved in purchasing agricultural products from farmers and distributing them to larger markets or exporting them internationally.
* Wholesalers and exporters use the web application to identify potential suppliers, negotiate contracts, establish partnerships, and manage logistics related to procurement and distribution.
* Wholesalers and exporters may have specific criteria for selecting suppliers, such as product quality, reliability, and scalability. They require efficient communication channels, access to comprehensive product information, and tools to facilitate smooth transactions.

Fertilizer Sellers:

* Fertilizer sellers are businesses or individuals engaged in the production, distribution, or sale of agricultural fertilizers.
* Fertilizer sellers use the web application to connect with farmers, showcase their products, provide information on fertilizer types, pricing, and availability, and facilitate transactions related to fertilizer procurement.
* Fertilizer sellers may require a platform to promote their products, attract potential customers, and receive inquiries or orders. They need tools to manage their inventory, track deliveries, and provide support to farmers regarding fertilizer usage and application.

## Operating Environment

Web BrowsCompatible with popular web browsers such as Google Chrome, Mozilla Firefox, Microsoft Edge, and Safari.

* Devices: Designed to be responsive and compatible with various devices, including desktop computers, laptops, tablets, and smartphones. It should adapt to different screen sizes and resolutions, providing a seamless user experience across different devices.
* Operating Systems: Compatible with different operating systems, such as Windows, macOS, Linux, Android, and iOS.
* Internet Connectivity: Designed to work with different types of internet connections, including wired and wireless networks and optimized to handle varying network speeds and reliability to provide consistent performance.
* Security Considerations: The operating environment should incorporate security measures to protect user data and ensure secure transactions. This includes encryption protocols, secure login mechanisms, and protection against common web application vulnerabilities.
* Server Infrastructure: The web application requires a server infrastructure to host and deploy the application. Considerations should be given to factors such as server hardware, operating system, web server software, and database management system to ensure efficient and reliable application performance.
* Integration with Third-Party Services: Depending on the functionality of the web application, integration with third-party services may be required. This could include payment gateways, mapping services, APIs for market data, or communication platforms. Compatibility and integration with these services should be considered within the operating environment.
* Scalability: Designed to support scalability, allowing the web application to handle increased user traffic and data volume as the user base grows. This may involve load balancing, server clustering, and database scalability considerations.

## Design and Implementation Constraints

Developers of an agriculture support system website encounter specific limitations and considerations that shape their project. These factors include corporate policies, regulatory requirements, interface dependencies, technology choices, security considerations, and maintenance responsibilities.Corporate policies and regulations play a crucial role in shaping the development of an agriculture support system website. These policies dictate the data privacy and security measures that must be implemented to protect sensitive agricultural information and ensure compliance with relevant laws and regulations.Interface dependencies are essential for seamless communication between the agriculture support system website and external applications or services. These dependencies enable the exchange of data, integration of third-party tools or APIs, and the utilization of additional functionalities that enhance the website's capabilities.Technology choices in the development of an agriculture support system website are influenced by organizational standards and licensing restrictions. Developers must adhere to these guidelines when selecting programming languages, frameworks, databases, and other technical components to ensure compatibility, maintainability, and compliance.Security considerations are of utmost importance in an agriculture support system website. They involve implementing secure data transmission protocols, access control mechanisms to prevent unauthorized access to sensitive data, and vulnerability mitigation measures to protect against potential cyber threats. Robust security practices are essential to safeguard the agricultural data and maintain the trust of users.Maintenance responsibilities are crucial for the long-term viability and functionality of the agriculture support system website. If the customer's organization is responsible for maintenance, developers must adhere to design conventions, programming standards, and documentation requirements specified by the customer. This ensures that the website remains up-to-date, bug-free, and in line with industry best practices.

## User Documentation

* User Guides/Manuals
* Tutorials
* FAQs (Frequently Asked Questions)
* Queries
* Video Tutorials/Demos.
* Release Notes/Changelogs

## Assumptions and Dependencies

* Access to Internet: It is assumed that the target users, such as farmers, wholesalers,

exporters, and fertilizer sellers, have access to the internet and can use a web-based

application.

* Geographic Focus: The web application’s initial focus is assumed to be on a specific

region or country, as agricultural practices, crops, and market dynamics can vary

significantly across different locations.

* Reliable and Updated Data: The application assumes access to reliable and up-to-date

data sources, such as weather data, crop information, market prices, and agricultural

statistics. This data is essential for providing accurate recommendations and facilitating

informed decisions for farmers.

* User Input: Farmers are expected to provide relevant information about their location,

available resources, and preferences to receive tailored recommendations on what crops

to grow.

* User Adoption: It is assumed that farmers, wholesalers, exporters, and fertilizer sellers

will find value in using the web application, resulting in their active participation and

engagement.

# External Interface Requirements

## User Interfaces

* Registration and Login: The registration interface should request users to enter necessary details such as name, contact information, and farm location. The login interface should securely verify users and provide error messages for incorrect credentials.
* Dashboard: Each stakeholder (farmers, fertilizer sellers, exporters, wholesale persons) should have a user-friendly dashboard displaying relevant information and providing access to respective features. The dashboard should include notifications, messages, advertisements, and other important updates.
* Crop Recommendation: The crop recommendation interface should present the recommended crops clearly and provide additional details such as reasons for recommendation and planting guidelines.
* Advertisement Management: The advertisement management interface should allow users to create, edit, and manage their advertisements. Users should be able to specify crop/product details, pricing, and contact information.
* Messaging and Communication: The messaging interface should provide an intuitive inbox with features for composing, replying to, and organizing messages. Users should be able to attach files or images if necessary.
* Help Center Locator: The help center locator interface should integrate with mapping services to display nearby agricultural help centers on an interactive map. Users should be able to search for specific services, view contact information, and obtain directions.
* Weather Reports: The weather reports interface should display current weather conditions, forecasts, and other relevant weather data for the user's farm location. Users should be able to view weather information in a user-friendly and easily understandable format.

## Hardware Interfaces

* 3.2.1 Desktop Computers and Laptops

The web application should support popular web browsers (e.g., Google Chrome, Mozilla Firefox, Safari, Microsoft Edge) commonly used on desktop computers and laptops.

The user interface should be responsive and adapt to different screen resolutions, including support for high-resolution displays (e.g., 1080p, 4K).

Input devices such as keyboards and mice should be fully functional for user interaction with the web application.

* 3.2.2 Tablets and Smartphones

The web application should be accessible on tablets and smartphones, providing a mobile-friendly user interface.

It should support popular mobile operating systems such as Android and iOS.

The user interface should adapt to smaller screens and touch-based input, providing an intuitive and seamless experience for mobile users.

* 3.2.3 Other Hardware Components

The web application should work effectively with other common hardware components such as printers and scanners, allowing users to print documents or scan relevant paperwork if required.

It should support standard connectivity options (e.g., USB, Bluetooth) for interfacing with external devices, enabling data exchange or integration with agricultural equipment if applicable.

* 3.2.4 Performance Considerations

The web application should be designed to perform efficiently on various hardware configurations, taking into account factors such as processor speed, memory capacity, and storage capabilities.

It should be optimized to minimize resource consumption and deliver a smooth user experience, even on devices with lower processing power or limited memory.

## Software Interfaces

* 3.3.1 Google Maps API

The web application should integrate with the Google Maps API to provide mapping services and location-based functionalities.

It should utilize the API's geocoding capabilities to convert addresses into geographic coordinates (latitude and longitude) for displaying map locations accurately.

The integration should enable features such as displaying nearby agricultural help centers and locating farmers using the Google Maps API.

* 3.3.2 Weather API

The web application should integrate with a weather API to retrieve accurate and up-to-date weather information.

The API should provide access to current weather conditions, forecasts, and other relevant meteorological data based on the user's farm location or specified geographical coordinates.

The integration should allow the web application to display weather reports and provide timely information for farmers' decision-making.

* 3.3.3 Database System

The web application should interact with a specific database system (e.g., MySQL, PostgreSQL) to store, retrieve, and manage data.

The application should use the appropriate database connectors or libraries to establish connections, execute queries, and handle data transactions securely.

The database system should be designed to efficiently store user profiles, advertisements, messages, and other relevant data related to the agricultural web application.

* 3.3.4 Operating Systems

The web application should be compatible with popular operating systems, including but not limited to Windows, macOS, and Linux.

It should adhere to cross-platform development standards, enabling seamless functionality across different operating systems.

The application should take into account platform-specific considerations to ensure consistent performance and user experience on each supported operating system.

## Communications Interfaces

* Email Notifications: The system should be capable of sending email notifications to users for important updates, account-related notifications, and communication between users.
* SMS Notifications (optional): The system may include optional SMS notifications to deliver urgent or time-sensitive information to users.
* Communication Protocols: The application should utilize standard communication protocols such as HTTP and HTTPS for secure data transfer.
* Data Transfer Rates: The system should handle data transfer at reasonable speeds to ensure efficient communication between users and the application.
* Synchronization Mechanisms: Specify any synchronization mechanisms required to maintain data consistency across multiple instances of the web application or different devices.

# System Features

## Software Requirements

## Functional Requirements

* **USER REGISTRATION**
* Allow users to register by creating a user account by providing necessary information
* User roles and permissions to assign different levels of access and functionality based on their roles(e.g., Farmers, fertilizer sellers,exporters,wholesale persons, hotels)
* Enable users to log in securely using credentials (username/password, email, telephone -number)
* Provide options for password reset and account recovery.
* **GIVING COMPREHENSIVE DETAILS ABOUT FARMING**
* Crop Varieties:Farmers should have access to information about different crop varieties suitable for their region and specific conditions.This includes information on the yield potential, resistance to pests and diseases, adaptability to local climates, and tolerance to environmental factors such as drought or excessive rainfall.
* Growing Requirements:Farmers need to know the specific growing requirements of the crops they plan to cultivate.This includes information on soil type, pH levels, nutrient requirements, water requirements, temperature range, and sunlight exposure. Such details help farmers create optimal growing conditions for their crops.
* Planting and Harvesting Seasons:It is essential for farmers to know the ideal planting and harvesting seasons for the crops they intend to grow.This information ensures that crops are planted at the right time to take advantage of favorable weather conditions and harvested when they are at their peak quality and yield.
* Crop Rotation and Intercropping:Farmers should be aware of the benefits of crop rotation and intercropping.Crop rotation involves growing different crops in a specific sequence to improve soil fertility, control pests and diseases, and reduce weed pressure. Intercropping refers to growing two or more crops simultaneously on the same land. Information about suitable crop combinations and rotation schedules can help farmers maximize productivity and sustainability.
* Pest and Disease Management:Farmers need details about common pests and diseases that affect their chosen crops and effective management strategies.This includes information on preventive measures, integrated pest management techniques, natural predators, and safe and sustainable pesticide applications.
* Fertilization and Nutrient Management:Understanding the nutritional needs of crops is essential for optimal growth.Farmers should have information about the required nutrients, their deficiencies, and suitable fertilization techniques. This includes details about organic and inorganic fertilizers, their application rates, and timing.
* Post-Harvest Handling and Storage:Information on proper post-harvest handling, storage techniques, and value addition methods is vital for preserving crop quality and minimizing losses.Farmers should be aware of appropriate storage conditions, packaging methods, and handling practices to ensure their crops retain their market value.
* **ALLOW FERTILIZER SELLERS TO PUT DETAILS ABOUT THEIR PRODUCTS**
* This allows farmers to find best offers for the fertilizers around them
* Also, this allows fertilizer sellers to sell their product without any marketing
* **ALLOW WHOLESALE PERSONS, EXPORTERS, HOTELS TO PUT ADVERTISEMENTS ABOUT WHAT THEY NEED**
* This will help farmers to sell their goods without 3rd parties
* Also, this will help wholesale persons, exporters, hotels to get access to top quality products in the island
* **ALLOW CHAT BETWEEN ACCOUNTS**
* Web Application will allow chat between accounts (between farmers and wholesale persons) this will lead to better communication between seller and buyer.

# Other Nonfunctional Requirements

## Performance Requirements

* Search Speed: Users should be able to retrieve relevant information quickly, even when searching through large datasets. Consider optimizing search algorithms and utilizing indexing techniques to enhance search performance.
* Response Time: The website should have fast response times to ensure a seamless user experience. Pages should load quickly, and search results, information retrieval, and navigation should be near-instantaneous. Aim for response times within a few seconds to keep users engaged and satisfied.
* Mobile Responsiveness: The web application should exhibit optimal performance and responsiveness when accessed on mobile devices. It should adapt to different screen sizes and mobile platforms with smooth scrolling, orientations, touch interactions, fast loading pages and resolutions to provide an excellent user experience for farmers using smartphones or tablets.
* Availability: The website should be highly available, minimizing downtime and ensuring accessibility to users. Specify the required uptime percentage (e.g., 99.9%) to establish availability targets. This may involve redundant servers, load balancing, and effective error handling mechanisms.
* Image and Media Loading: Have to use techniques such as optimizing image sizes, utilizing caching techniques and lazy loading to ensure that media-rich content loads quickly without impacting overall performance.
* Scalability: The website should be designed to handle increased traffic and user demand. As the popularity of the website grows, it should be able to scale horizontally by adding more servers or utilizing cloud-based infrastructure to maintain optimal performance.
* Error Handling: Errors should be gracefully handled, with appropriate error messages and user-friendly feedback. This Minimizes any impact on performance due to error conditions.
* Concurrent Users: Specify the expected number of concurrent users the website should be able to handle without significant degradation in performance. This requirement helps in determining the necessary server capacity and optimization techniques needed to support simultaneous user interactions.
* Performance Monitoring: Implementing performance monitoring tools to track and measure various performance metrics, such as server response times, page load times, and user interactions. Continuously monitor the website's performance and use this data to identify bottlenecks, optimize critical areas, and improve overall performance.

## Safety Requirements

* Content Accuracy:Ensure that the website provides accurate and up-to-date information to users.Implement processes to regularly review and verify the content to maintain its reliability and prevent the dissemination of misleading or outdated details.
* Warning and Advisory Notices:Include prominent warning notices or advisories on the website regarding potential safety hazards, travel advisories, or other relevant information.Display clear instructions on what actions users should take in response to specific situations or emergencies.
* Emergency Contact Information:Provide readily accessible emergency contact information, such as local authorities, hospitals, embassies, and hotlines, to assist users in case of emergencies or urgent situations.
* User-Generated Content Moderation:Implement a moderation system to review and filter user-generated content, such as reviews, comments, or recommendations.Ensure that inappropriate or harmful information is not disseminated on the website, protecting the user experience and preventing potential harm.
* Backup and Disaster Recovery:Implement a backup and disaster recovery plan to minimize the risk of data loss.Ensure that backups are securely stored and can be restored in the event of a system failure or data breach.

## Security Requirements

* Data Privacy:The web application must comply with relevant data protection regulations, such as GDPR or local privacy laws.Implement measures to protect users' personal information, including secure storage, encrypted transmission, and anonymization where applicable.Provide users with clear information about data collection, processing, and retention practices, and obtain their consent where necessary.
* Secure Authentication:Implement a secure user authentication mechanism to ensure that only authorized individuals can access privileged information and perform specific actions on the website.Utilize industry-standard practices such as password hashing, session management, and multi-factor authentication to protect user accounts.
* Access Control and Authorization:Implement a secure user authentication mechanism to control access to sensitive information and administrative functionalities. Utilize strong password policies, encryption, and secure session management techniques to protect user accounts and prevent unauthorized access.
* Secure Data Transmission:Utilize encryption protocols, such as SSL/TLS, to secure data transmission between users and the website.Ensure that sensitive information is protected from unauthorized interception or tampering during transit.
* Regular Security Audits:Conduct regular security audits and penetration testing to identify vulnerabilities and weaknesses in the website's security infrastructure.Address identified issues promptly and implement security best practices throughout the development and maintenance process.
* Protection against XSS and SQL Injection Attacks:Apply input validation and sanitization techniques to prevent common web application vulnerabilities, such as cross-site scripting (XSS) and SQL injection attacks.Regularly update security patches and ensure that the website's software components are kept up to date.

## Software Quality Attributes

* Usability:The website should be designed to be user-friendly and intuitive, ensuring easy navigation and access to information for farmers.Conduct user testing and gather feedback to continuously improve usability and enhance the user experience.Aim for a high satisfaction rate in user surveys or usability testing sessions.
* Reliability:The website should be reliable, providing consistent and accurate information to farmers.Minimize system errors, crashes, or downtime that may disrupt the user experience.Aim for a high uptime percentage to ensure farmers can access the website consistently.
* Performance Efficiency:Ensure the website operates efficiently, utilizing system resources optimally.Monitor and optimize server response times, database queries, and page loading speed to provide a smooth and responsive experience.Set specific targets for performance metrics, such as page load time under a certain threshold.
* Maintainability:Use techniques such as clean code, modular architecture, and well-documented APIs to facilitate future development and maintenance tasks.Employ version control systems and adhere to coding standards to ensure code maintainability.
* Portability:Ensure the website is compatible with different web browsers commonly used by farmers, ensuring a consistent user experience across platforms.Design and develop the website to be responsive and adaptable to different devices, such as smartphones and tablets, commonly used by farmers.
* Security:Implement robust security measures to protect user data, prevent unauthorized access, and ensure secure transactions.Conduct regular security assessments and vulnerability scans to identify and address potential security risks.Stay updated with security best practices and ensure compliance with relevant security standards and regulations.
* Testability:Implement automated testing frameworks and provide comprehensive test cases to ensure that new features or changes do not introduce regressions.Conduct thorough testing, including functional testing, performance testing, and security testing, to ensure the stability and reliability of the website.
* Robustness:Design the website to be robust and resilient, handling unexpected inputs or scenarios gracefully.Implement proper error handling mechanisms and provide informative error messages to guide users in resolving issues.

## Business Rules

* Pricing Guidelines:Adhere to specific pricing guidelines or regulations set by relevant authorities or agricultural organizations.Implement pricing models or mechanisms that align with industry standards and ensure fair pricing for agricultural products or services.
* Certifications and Quality Standards:Comply with certifications and quality standards applicable to the agricultural sector, such as organic certifications or food safety regulations.Ensure that agricultural products or services meet the required quality criteria and adhere to relevant standards.
* Approval Processes:Implement approval processes for specific actions or transactions, such as the approval of bulk orders or the verification of certifications.Define the workflow and criteria for obtaining approvals, ensuring compliance with internal policies or external regulations.
* Order Fulfillment Requirements:Adhere to specific order fulfillment requirements, such as minimum order quantities, delivery timelines, or packaging specifications.Ensure that orders are processed and fulfilled according to the defined requirements and guidelines.
* Collaboration and Networking:Facilitate collaboration and networking among farmers, wholesalers, exporters, and other stakeholders in the agricultural sector.Provide features or functionalities that enable users to connect, share information, and engage in collaborative activities.
* Regional or Seasonal Considerations:Incorporate regional or seasonal considerations into the web application, such as crop recommendations specific to different geographical regions or seasonal variations in market demand.Provide localized information and guidance to farmers based on their specific regions or seasons.
* Product Traceability:Enable product traceability by implementing mechanisms to track and record information about the origin, production methods, and distribution of agricultural products.Provide users with the ability to trace the journey of a product from farm to market, ensuring transparency and accountability.
* Sustainable Farming Practices:Promote and encourage sustainable farming practices by providing information, resources, and support for environmentally friendly and socially responsible agricultural methods.Incorporate features that educate farmers about sustainable practices and enable them to track and measure their sustainability efforts.
* Market Connections and Opportunities:Facilitate market connections by providing a platform for farmers to connect with wholesalers, exporters, and other potential buyers.Identify and capitalize on market opportunities by providing market intelligence, trends, and insights to help farmers make informed decisions.

# Other Requirements

# Error Handling:

* Specify how the system should handle and display error messages or notifications to users in case of invalid inputs, system errors, or failed operations.
* Define error logging and tracking mechanisms to capture and report system errors for analysis and troubleshooting.

**Notifications and Alerts:**

* Specify the need for push notifications or email alerts to inform users about important updates, new messages, or relevant information.
* Define the conditions and triggers for sending notifications, such as when a crop recommendation is available or when a user receives a new message.

**Search Functionality:**

* Define the search capabilities of the web application, allowing users to search for specific products, farmers, exporters, or wholesale persons based on various criteria (e.g., name, location, product type).
* Specify the need for advanced search features, such as filtering by price range, location proximity, or specific crop requirements.

**Privacy and Data Protection:**

* Define the privacy policy and data handling practices of the web application, ensuring compliance with relevant data protection regulations.
* Specify the need for obtaining user consent for data processing and clearly communicate how user data will be used, stored, and shared within the system.

**Reporting and Analytics:**

* Specify the reporting and analytics requirements, including the ability to generate reports on user activity, advertisements, product sales, or system usage.
* Define key performance indicators (KPIs) and metrics to measure the effectiveness and performance of the web application.

**Integration with Payment Gateways:**

* Specify the integration requirements for accepting online payments, including support for different payment gateways, transaction processing, and order management.
* Define the need for secure and encrypted payment transactions, ensuring the protection of user payment information.

**Mobile Responsiveness:**

* Specify the requirement for the web application to be responsive and optimized for various mobile devices, ensuring a seamless user experience across different screen sizes and resolutions.

**User Feedback and Ratings:**

* Define the ability for users to provide feedback, ratings, or reviews for products, advertisements, or other users within the system.
* Specify the need for moderation and content management features to ensure the appropriateness and integrity of user-generated content.

**Offline Access:**

* Specify the need for offline functionality, allowing users to access certain features or data even when they have limited or no internet connectivity.
* Define the synchronization mechanisms to update data between the local device and the server once internet connectivity is restored.

**Database Requirements:**

* **Data Storage:** The web application should utilize a relational database management system (DBMS) to store and manage data efficiently. Consider using tables for users, products, advertisements, messages, and other relevant entities.
* **Data Integrity:** Implement appropriate constraints and validations in the database schema to ensure data integrity, such as primary keys, foreign key relationships, and unique constraints.
* **Scalability:** Design the database to handle increasing data volumes and user activity, considering factors such as indexing, query optimization, and efficient data retrieval.

**Internationalization Requirements:**

* **Language Support:** Enable the web application to support multiple languages, allowing users to select their preferred language for the interface and content.
* **Localization:** Implement localization capabilities to adapt the application's interface, content, and date/time formats to meet the cultural and linguistic conventions of different target markets.
* **Currency Conversion:** If the application involves financial transactions, provide support for currency conversion based on the user's location or preference.

**Legal Requirements:**

* **Data Protection and Privacy:** Ensure compliance with relevant data protection and privacy regulations, such as GDPR (General Data Protection Regulation) or CCPA (California Consumer Privacy Act). Implement appropriate measures to protect user data, including encryption, secure data storage, and user consent management.
* **Intellectual Property:** Adhere to intellectual property laws and ensure that the web application does not infringe upon any copyrights or trademarks.
* **Terms of Service and Privacy Policy:** Create comprehensive terms of service and privacy policy documentation that outlines the rights, responsibilities, and data handling practices of the application. Make sure that users agree to these terms during registration or use of the application.

**Reuse Objectives:**

* **Code Reusability:** Aim to develop reusable code components, libraries, or modules that can be easily integrated into different parts of the application, promoting efficient development and reducing redundancy.
* **Modular Design:** Adopt a modular architecture that allows for the independent development and deployment of individual components, making it easier to update, maintain, and reuse specific functionalities.

**Appendix A: Glossary**

* **Agricultural Help Centers:** Physical locations or facilities that provide assistance, resources, and support to farmers in various aspects of agriculture, such as crop management, pest control, and agricultural techniques.
* **API:** Abbreviation for Application Programming Interface, which defines the methods and protocols through which different software components or systems can interact and communicate with each other.
* **Crop Recommendation:** A feature of the web application that suggests suitable crops to farmers based on factors like soil type, climate, and previous crop history.
* **DBMS:** Abbreviation for Database Management System, which is software used to manage and organize databases, including storing, retrieving, and manipulating data.
* **Exporters:** Stakeholders involved in the agricultural industry who specialize in exporting agricultural products to other countries or markets.
* **Fertilizer Sellers:** Businesses or individuals engaged in the sale and distribution of agricultural fertilizers used to enhance plant growth and crop yields.
* **Inbox:** An internal messaging system within the web application that allows users to send, receive, and manage messages with other stakeholders.
* **User Interface (UI):** The visual and interactive components of the web application that allow users to interact with the system, including screens, forms, buttons, and navigation elements.
* **User Stories:** Brief, narrative descriptions of a specific functionality or feature from the perspective of an end user, capturing the intended actions and desired outcomes.
* **Web Application:** A software application accessed through a web browser or web-enabled device that provides specific features, services, and functionality over the internet.

**Appendix B: Analysis Models**

**UML diagram:**

**QR CODE:**

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**Link:**

[**https://drive.google.com/drive/folders/1vchWFx0SH7AjeYYb4SHN0TvrYY80Ghro?usp=drive\_link**](https://drive.google.com/drive/folders/1vchWFx0SH7AjeYYb4SHN0TvrYY80Ghro?usp=drive_link)

**Appendix C: To Be Determined List**

**TBD: Social Media Integration**

* Requirements for integrating with social media platforms, such as Facebook, Twitter, or LinkedIn, for authentication, sharing, or posting updates.

**TBD: Advanced Search Functionality**

* Additional features and criteria to enhance the search functionality, such as advanced filters, sorting options, or predictive search suggestions.

**TBD: Offline Access and Synchronization**

* Detailed specifications for providing offline access to certain features or data and implementing synchronization mechanisms once the internet connection is restored.

**TBD: Reporting and Analytics**

* Specific metrics, reports, or data visualization requirements to measure and analyze user activity, product sales, or system performance.

**TBD: Mobile Application Development**

* Determining the need for developing native mobile applications for iOS and Android platforms to complement the web application.

**TBD: Automated Email Notifications**

* Defining the specific triggers, content, and frequency of automated email notifications, such as account verification, password reset, or subscription updates.

**TBD: Data Backup and Recovery**

* Detailed requirements for regular data backups, recovery procedures, and disaster recovery strategies to ensure data integrity and system reliability.

**TBD: Performance Testing and Optimization**

* Defining performance testing scenarios, load testing requirements, and optimization strategies to ensure the web application can handle expected user traffic and deliver optimal performance.