**Document 1- Business case document template**

**Why is this project initiated?**

The **Urban Crop** project was initiated to address the growing need for **sustainable, efficient, and transparent urban farming practices**. As urban farming becomes more popular, farmers face **operational inefficiencies** due to reliance on manual or outdated methods for tracking crops, managing inventory, and handling sales. These inefficiencies lead to **wastage, financial losses, and a lack of transparency** in the supply chain.

**What are the current problems?**

Current Problems is growing as cities seek local and sustainable food production, but farmers and stakeholders face several critical challenges that hinder efficiency, profitability, and transparency.

* **Lack of a Streamlined Crop Tracking System**
  + Farmers rely on manual or outdated methods (paper logs, spreadsheets) to track crops.
  + No centralized system to monitor crop growth, harvesting schedules, or expected yields.
  + Difficulties in forecasting supply, leading to mismatches in demand and production.
* **Inefficient Inventory Management**
  + Farmers and suppliers struggle to track stock levels accurately, leading to:
    - Overproduction → Wastage of crops
    - Underproduction → Shortages in the market
* No real-time inventory updates, making sales and procurement planning difficult.
* **Unstructured Procurement & Sales Process**
  + Buyers and vendors lack a centralized record of transactions, making it difficult to track purchases and sales.
  + No proper documentation of where crops come from and how they reach the market.
  + Limited visibility into pricing trends, affecting fair trade and negotiations.
* **Manual Invoice Generation & Financial Errors**
  + Farmers and vendors create manual invoices, leading to
    - Calculation mistakes
    - Delayed payments
    - Increased administrative work
* No automated billing or digital payment tracking, reducing financial transparency.
* **Lack of Real-Time Data & Insights**
  + Farmers and businesses lack access to live market trends, making it difficult to adjust production.
  + No demand forecasting tools, leading to poor decision-making.
  + Stakeholders struggle to analyse historical sales and crop performance for better planning.
* **Limited Supply Chain Transparency**
  + Farmers, suppliers, and buyers do not have clear visibility into the supply chain.
  + No way to track and verify if crops are sourced ethically and sustainably.
  + Trust issues due to lack of real-time access to procurement and pricing data.
* **High Food Wastage & Sustainability Concerns**
  + Without proper tracking, a large portion of harvested crops go to waste before reaching the market.
  + Farmers struggle to optimize resource use, leading to inefficiencies in water, fertilizers, and energy consumption.
  + The absence of data-driven decision-making prevents the adoption of sustainable farming practices.

**With this project how many problems could be solved?**

The Urban Crop project directly addresses and resolves at least seven major problems in urban farming. Here’s how:

* **Lack of a Streamlined Crop Tracking System**
  + Solution: A digital crop tracking system to monitor the entire lifecycle from planting to harvesting
  + Impact: Farmers can track growth stages, predict harvest times, and forecast supply efficiently.
  + **Inefficient Inventory Management** 
    - Solution: A real-time inventory management system that updates stock levels dynamically.
    - Impact:
* Reduces overproduction (wastage) and underproduction (shortages).
* Ensures efficient stock handling for better market planning.
* **Unstructured Procurement & Sales Process**
  + Solution: A centralized platform for procurement and sales tracking.
  + Impact:
    - Proper documentation of transactions, ensuring accountability.
    - Helps vendors plan purchases based on real-time crop availability.
* **Manual Invoice Generation & Financial Errors**
  + Solution: Automated invoice and billing system integrated into the platform.
  + Impact:
    - Eliminates manual errors in invoices.
    - Reduces administrative workload for farmers and vendors.
    - Ensures transparent financial tracking and faster payments.
* **Lack of Real-Time Data & Insights**
  + Solution: Data analytics and reporting tools for market trends and demand forecasting.
  + Impact:
    - Farmers can adjust production based on demand trends.
    - Helps businesses make data-driven decisions for pricing and procurement.
* **Limited Supply Chain Transparency**
  + Solution: A real-time tracking system that records crop movements from farm to market.
  + Impact:
    - Improves traceability and accountability in the food supply chain.
    - Builds trust between farmers, suppliers, and buyers.
* **High Food Wastage & Sustainability Concerns**
  + Solution: Smart inventory management and efficient crop utilization tracking.
  + Impact:
    - Reduces wastage by optimizing supply and demand.
    - Supports sustainable urban farming practices through better resource management.

**Final Summary: Problems Solved**

* 7 out of 7 major urban farming problems addressed
* Farmers, suppliers, and vendors benefit from efficiency, transparency, and automation
* Sustainable urban farming becomes more viable and profitable

**What are the resources required?**

To successfully develop and implement the Urban Crop system, the following resources are required:

* **Technological Resources**
  + **Software Development**:
    - Web & Mobile App Development (for farmers, suppliers, and vendors)
    - Database Management System (for crop records, inventory, and sales tracking)
    - Cloud Hosting Services (AWS, Google Cloud, or Azure)
* **Technology Stack**
  + - Frontend: React.js, Flutter (for mobile), or Vue.js
    - Backend: Node.js, Python (Django or Flask), or Java (Spring Boot)
    - Database: PostgreSQL, MySQL, Firebase (for real-time updates)
    - APIs & Integration: Payment gateways, notification services, GPS tracking
* **Security & Compliance**
  + - Data encryption & user authentication (to protect sensitive information)
    - Backup & Recovery Systems (to prevent data loss)
* **Human Resources**
  + **Development Team**
    - Project Manager – Oversees planning, execution, and delivery.
    - Software Developers – Build and maintain the system.
    - UI/UX Designers – Ensure a user-friendly interface.
    - QA Testers – Identify and fix bugs before launch.
* **Operations & Support:**
  + - Agriculture Experts – Ensure the system meets farmers’ real-world needs.
    - Supply Chain Specialists – Optimize procurement and sales processes.
    - Customer Support Team – Assist users with technical and operational queries.
* **Marketing & Business Development**
  + - Sales & Outreach Team – Engage farmers, suppliers, and market vendors.
    - Training Team – Educate farmers on how to use the system.
* **Financial Resources** 
  + **Development Budget**
    - App & Web Development Costs (initial and ongoing maintenance)
    - Cloud Hosting & Server Costs (monthly or annual plans)
    - Security & Compliance investments
* **Marketing & Outreach**
  + - Advertising & Promotions (social media, workshops, and events)
    - Partnership Building (collaborations with farmer associations and markets)
* **Training & Support**:
  + - Farmer On boarding Programs
    - Customer Support Infrastructure
* **Physical Resources**
  + **Workspaces & Equipment**
    - Office Space (for development and operations teams)
    - Laptops, Internet, & Servers (for development and hosting)
* **Logistics & Field Equipment**
  + - IoT Sensors (optional) – To monitor crop growth and environmental conditions
    - Point-of-Sale (POS) Systems – For direct farmer-market transactions
* **Strategic Partnerships & Government Support**
  + **Collaborations with**
    - Local Governments & Agriculture Departments (for policy support & funding)
    - Farmer Cooperatives & Urban Farming Groups (for system adoption)
    - Retail Chains & Markets (to connect farmers directly with buyers)
    - Financial Institutions (for loans, micro-financing, and digital payments)

**How much organizational change is required to adopt this technology?**

The adoption of the Urban Crop digital platform will require moderate to significant organizational change, depending on the current processes used by farmers, suppliers, and market vendors. Below is an analysis of the changes needed:

* **Digital Transformation in Farming Operations** 
  + **Shift from Manual to Digital Record-Keeping**:
    - Farmers need to transition from notebooks and spreadsheets to an app-based tracking system.
    - Training will be required to familiarize users with the digital workflow (planting, harvesting, inventory updates).
* **Use of Data & Analytics for Decision-Making**:
  + - Farmers and suppliers will need to understand how to use real-time insights for planning.
    - Market vendors will check digital inventory instead of relying on verbal or paper-based orders.

Change Level: Moderate (Requires training and mindset shift)

* **Changes in Supply Chain & Procurement** 
  + **Automation of Crop Procurement & Sales**:
    - Suppliers and buyers will need to place and track orders digitally.
    - Eliminates informal procurement methods (phone calls, paper records).
* **Transparent Pricing & Market Visibility**:
  + - Vendors and farmers will have real-time price updates instead of negotiating based on estimates.
    - Reduces overpricing, under-pricing, and supply chain inefficiencies.

Change Level: Significant (Requires process reengineering and policy updates)

* **Financial & Invoice Management**
  + **Shift from Manual to Automated Invoicing**:
    - Farmers and vendors will now receive auto-generated invoices, reducing paperwork.
    - Requires trust in the system's accuracy and reliability.
* **Integration with Digital Payments**:
  + - Farmers may need to transition to online or mobile payment systems instead of cash transactions.
    - Reduces fraud and increases transparency.

Change Level: Significant (Requires policy adjustments and financial literacy programs)

* **Training & Workforce Adaptation**
  + **Education on Digital Tools**:
    - Farmers, suppliers, and vendors must be trained to use the mobile app, dashboards, and digital inventory tools.
    - Requires step-by-step on boarding programs to ensure smooth adoption.
* **Customer Support for Adoption Challenges**:
  + - Dedicated support teams to assist users with troubleshooting and on boarding.
    - Requires ongoing engagement to drive user confidence in the system.

Change Level: Moderate to Significant (Training programs needed for different user levels)

* **Policy & Organizational Workflow Adjustments**
  + **Standardized Digital Documentation**:
    - Organizations managing urban farming projects must shift to structured digital records.
    - Government or regulatory bodies may need to establish digital compliance policies.
* **Integration with Existing Agriculture Policies**:
  + - Partnerships with local governments and cooperatives will be essential.
    - Potential need for regulatory adjustments to accommodate digital workflows.

Change Level: Moderate (Depends on regulatory environment)

**Time frame to recover ROI?**

Time Frame to Recover ROI for the Urban Crop Project

The return on investment (ROI) for the Urban Crop project depends on several factors, including development costs, adoption rates, operational savings, and revenue generation. Below is an estimated ROI recovery timeline based on industry trends and project scope.

**Key Factors Affecting ROI Recovery:**

1. **Initial Investment Costs**
   1. Technology Development: Web & mobile app, database, cloud hosting.
   2. Training & On boarding: Educating farmers, suppliers, and vendors.
   3. Marketing & Adoption: Outreach programs to increase platform usage.
   4. Operational Costs: Customer support, maintenance, and upgrades.
2. **Revenue Streams** 
   1. Subscription Fees: Monthly/annual plans for farmers & vendors.
   2. Transaction Fees: Small commission on crop sales.
   3. Government & NGO Grants: Support for sustainable farming initiatives.
   4. Data & Analytics Services: Selling insights to agribusinesses.
3. **Cost Savings for Users**
   1. Reduced Crop Wastage: Better inventory management leads to 10-30% less loss.
   2. Lower Administrative Costs: Automated invoicing and procurement tracking.
   3. Faster Market Access: More efficient sales channels for farmers.
4. **Adoption & Scalability**
   1. Gradual Expansion: Pilot launch in one city → nationwide rollout.
   2. Network Effect: More farmers & vendors on board = Faster revenue growth.
   3. Integration with Government & Private Sector: Support for long-term sustainability.

**Estimated ROI Recovery Timeline**

|  |  |  |  |
| --- | --- | --- | --- |
| **Phase** | **Time Frame** | **Key Milestones** | **Expected ROI Impact** |
| Phase 1: Development & Pilot Launch | 0 - 6 months | Platform development, on boarding first 100 farmers & vendors | Initial investment stage, no direct returns yet |
| Phase 2: Early Adoption & Market Expansion | 6 - 18 months | 1,000+ active users, improved operational efficiency | Cost savings start reducing losses |
| Phase 3: Revenue Growth & Scaling | 18 - 36 months | 5,000+ users, partnerships with suppliers & retailers | Positive cash flow, ROI breakeven |
| Phase 4: Full ROI Recovery & Profitability | 3 - 5 years | 10,000+ users, nationwide adoption | Full return on investment, sustained profitability |

**Conclusion: ROI Recovery Estimate**

* Breakeven Point: 18 - 36 months (1.5 - 3 years)
* Full ROI Recovery & Profits: 3 - 5 years
* Faster ROI Possible If:
  + Strong adoption rates & user growth
  + Government or NGO funding support
  + Strategic partnerships with agri-businesses

**How to identify Stakeholders?**

A **RASCI matrix** (Responsible, Accountable, Supportive, Consulted, Informed) helps clarify roles and responsibilities of stakeholders in the ATS project. Below is the step-by-step process to identify stakeholders and define their RASCI roles.

**1. Identify Key Stakeholders**

Stakeholders can be classified into Primary, Secondary, and External stakeholders.

|  |  |  |
| --- | --- | --- |
| **Stakeholder Group** | **Roles Involved** | **Why They Matter?** |
| Primary Stakeholders (Directly Impacted) | - Farmers (Urban & Peri-Urban) | - Use the platform for crop tracking & sales. - Need efficient procurement & inventory management. |
| Secondary Stakeholders (Influence the Project) | - Government & Agriculture Ministries | - Regulate urban farming policies. - Provide funding & resources. - Offer digital tools & tech support. |
| External Stakeholders (Indirectly Affected) | - End Consumers (Urban Population) | - Demand transparency & sustainable farming. - Can fund/scale the project. - May collaborate or compete. |

### **Key:**

* **R (Responsible)** – Does the work and ensures execution.
* **A (Accountable)** – The final decision-maker who owns the task.
* **S (Supportive)** – Provides resources, assistance, and expertise.
* **C (Consulted)** – Provides input before the task is completed.
* **I (Informed)** – Needs updates on progress but not actively involved.

**2: Define Stakeholder Responsibilities Using RASCI**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Name** | **Position** | **Responsible (R)** | **Accountable (A)** | **Supporting**  **(S)** | **Consulted**  **(C)** | **Informed**  **(I)** |
| Urban Crop | CEO |  |  |  | Yes | Yes |
| Mr Rohit Sarnaik | Business Analyst | Yes |  |  |  |  |
| Farmers | Stakeholder |  |  |  | Yes | Yes |
| Vendors | Stakeholder |  |  |  | Yes | Yes |
| Mr Karthik | Financial Head |  |  | Yes | Yes | Yes |
| Government & Agriculture Ministries | Stakeholder |  |  | Yes |  |  |
| Mr Henry Smith | Project Manager |  | Yes |  |  |  |
| Mr John Doe | Delivery Head |  | Yes |  |  |  |

**Document 2: BA Strategy**

Here's a structured **Business Analyst (BA) Approach Strategy** for completing a project, including elicitation techniques, stakeholder analysis (RACI/ILS), required documentation, approval processes, communication channels, change request handling, progress updates, and UAT sign-off.

### ****Business Analyst (BA) Approach Strategy****

* **Project Initiation & Planning**

### **Steps:**

* Understand the business objectives, scope, and high-level requirements.
* Identify stakeholders and conduct stakeholder analysis (RACI & ILS).
* Define communication channels and project governance.

### ****Key Deliverables:****

* **Business Case Document** – Justifies the project investment.
* **Stakeholder Analysis (RACI/ILS)** – Defines stakeholder roles.
* **Project Kick-off** – Outlines objectives, scope, and approach.
* **Stakeholder Analysis & RACI/ILS Framework**

### ****Stakeholder Analysis:****

* **Identify Key Stakeholders:** Business Owners, IT Team, Users, Farmers, Vendors.
* **Categorize Stakeholders:**
  + **RACI Matrix:** Defines who is Responsible, Accountable, Consulted, and Informed.
  + **ILS (Interest, Level of Influence, Support required):** Prioritizes stakeholders based on their impact and involvement.

### **RACI Matrix**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Name** | **Position** | **Responsible (R)** | **Accountable (A)** | **Supporting**  **(S)** | **Consulted**  **(C)** | **Informed**  **(I)** |
| Urban Crop | CEO |  |  |  | Yes | Yes |
| Urban Crop | CFO |  |  |  | Yes | Yes |
| Mr Rohit Sarnaik | Business Analyst | Yes |  |  |  |  |
| Farmers | Stakeholder |  |  |  | Yes | Yes |
| Vendors | Stakeholder |  |  |  | Yes | Yes |
| Mr Karthik | Financial Head |  |  | Yes | Yes | Yes |
| Government & Agriculture Ministries | Stakeholder |  |  | Yes |  |  |
| Mr Henry Smith | Project Manager |  | Yes |  |  |  |
| Mr Mr John Doe | Delivery Head |  | Yes |  |  |  |

## **Requirements Elicitation & Analysis**

### ****Elicitation Techniques**:**

* **Workshops** – Collaborative discussions with stakeholders.
* **Interviews** – One-on-one discussions for in-depth insights.
* **Surveys & Questionnaires** – Gather feedback from a larger audience.
* **Document Analysis** – Review existing processes and policies.
* **Prototyping** – Create wireframes/mock-ups to validate requirements.

**Key Deliverables:**

* **Business Requirements Document (BRD)** – Captures high-level business needs.
* **Functional Requirements Specification (FRS)** – Details system functionalities.
* **Process Flow Diagrams** – Visual representation of workflows.
* **Use Case Document** – Defines system interactions.
* **Approval & Sign-Off Process**

### ****1. Scope of Approvals****

The approval process applies to:

* **Project Milestones:** Initiation, Design, Development, Testing, Deployment
* **Budget & Resources:** Funding, Vendor Contracts, Staffing
* **System Requirements:** Functional, Technical, Compliance needs
* **User Acceptance Testing (UAT):** Final validation before go-live
* **Go-Live Readiness:** Final approval before implementation
* **Post-Implementation Sign-Off:** Closing and transition to operations

### ****2. Step-by-Step Approval Workflow****

#### **A. Request for Approval**

* Owner submits approval request with supporting documents
* Key stakeholders review and provide feedback

#### **B. Review & Feedback**

* Reviewers assess feasibility, risks, and compliance
* Consulted parties provide insights if necessary

#### **C. Decision & Sign-Off**

* Approvers formally approve (email, document, workflow system)
* If rejected, feedback is provided with required changes

#### **D. Communication & Documentation**

* Approved items are documented
* Stakeholders are informed about the decision

### ****3. Approval Tools & Documentation****

* **Tools:** Project Management tool (JIRA, Devops), E-signature (DocuSign)
* **Documents Required:** Business Case, Budget Proposal, Functional Requirements, UAT Reports

### ****4. Escalation Process****

If approval is delayed beyond **X days**, the issue escalates to:

* **First Level:** Direct Manager / PMO
* **Second Level:** Steering Committee
* **Final Level:** Executive Sponsor

### ****Sign-Off Documents:****

* **BRD/FRS Approval Form**
* **Change Request Form**
* **Client Acceptance Form for UAT**

### ****5. Communication Strategy & Implementation****

### **Communication Channels:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Channel** | **Purpose** | **Frequency** | **Audience** |
| **Emails** | Formal documentation and approvals | As needed | All Stakeholders |
| **Meetings (Virtual/In-Person)** | Requirement gathering, issue resolution, and decision-making | Weekly/Bi-weekly | Core Team |
| **JIRA/Confluence/SharePoint** | Requirement tracking and collaboration | Continuous | IT, Development, BA, QA |
| **Project Status Reports** | Progress updates | Weekly | Client, Leadership |
| **Slack/MS Teams** | Quick updates and collaboration | Daily | Internal Teams |

### ****6. Change Request Management****

### ****Change Request Process Flow****

### ****Step 1: Submit Change Request****

* Any stakeholder (client, business users, development team, etc.) can raise a **Change Request (CR)**.
* The requester fills out a **Change Request Form (CRF)**, including:
  + Description of change
  + Business justification
  + Impact on scope, timeline, cost, and resources

**Deliverable:** Change Request Form (CRF)

### ****Step 2: Initial Assessment & Logging****

* The Business Analyst (BA) reviews the CR and logs it in the **Change Request Tracker** (JIRA, Excel, or a shared repository).
* The BA conducts a **preliminary impact analysis** to assess feasibility.

**Deliverable:** Updated Change Request Tracker

### ****Step 3: Impact Analysis****

* The BA, in collaboration with the Project Manager, IT, and Business Teams, evaluates the impact on:  
  🔸 Scope (Does this affect core functionality?)  
  🔸 Timeline (Does this delay project delivery?)  
  🔸 Budget (Are extra costs involved?)  
  🔸 Resources (Are additional developers/testers needed?)

**Deliverable:** **Impact Analysis Document** outlining risks, dependencies, and feasibility.

### ****Step 4: Approval Process****

* The CR is presented to the **Change Control Board (CCB)** or relevant decision-makers.
* Approval is required from stakeholders based on impact:
* **Minor Changes** (UI tweaks, small process updates) → Approved by BA/PM.  
  **Major Changes** (New features, integrations) → Approved by Client/Sponsor.

**Deliverable:** **CR Approval Email/Form** with decision status.

### ****Step 5: Implementation & Testing****

* If approved, the **Development Team** incorporates the change into the system.
* The **QA Team** performs regression testing to ensure no negative impact.

**Deliverable:** **Updated Functional Requirements Document (FRD)** and **Test Cases**.

### ****Step 6: Client Review & Sign-Off****

* The client reviews the implemented change in **User Acceptance Testing (UAT)**.
* Once validated, the **Client signs off on the change.**

**Deliverable:** **Change Request Completion & Sign-Off Form**.

## **2. Sample Change Request Form (CRF)**

|  |  |
| --- | --- |
| **Change Request ID:** | **CR-2025-001** |
| **Project Name:** | Urban Crop |
| **Requested By:** | Vaishnava Sharma |
| **Date Submitted:** | 02-Feb-2025 |
| **Description of Change:** | Modify the candidate filtering algorithm to include years of experience as a mandatory filter. |
| **Business Justification:** | Improves candidate shortlisting and speeds up hiring. |
| **Impact on:** | ☐ Scope ☐ Timeline ☐ Budget ☐ Resources (Check all that apply) |
| **Impact Analysis Summary:** | Estimated 2-week delay, minor UI changes needed. |
| **Approval Status:** | ☐ Approved ☐ Rejected ☐ Needs More Info |
| **Approver Name & Signature:** | Mr Henry Smith |
| **Implementation Date:** | 10-Feb-2025 |
| **Completion & Sign-Off Date:** | 15-Feb-2025 |

## **Project Progress Updates & Reporting**

## **Tracking & Reporting Progress:**

* **Weekly Status Reports** – Shared with stakeholders.
* **Project Dashboard (JIRA/Trello)** – Tracks tasks, milestones, and blockers.
* **Risk Register** – Identifies potential risks and mitigations.

## **Sample Status Report Template:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Task** | **Status** | **Owner** | **Comments** |
| Requirements Gathering | Completed | BA | Approved by Client |
| System Integration | In Progress | IT Team | Expected Completion: Next Week |
| UAT Testing | Pending | QA Team | Scheduled for Next Sprint |

## **User Acceptance Testing (UAT) & Sign-Off**

## **1. UAT Planning**

### ****Steps:**** ****Define UAT Scope:****

### Identify what will be tested (features, workflows, integrations).

### **Identify UAT Participants:** Business users, key stakeholders, end users. **Prepare UAT Test Plan:** Define test scenarios, acceptance criteria, and timeline. **Set Up UAT Environment:** Ensure a test environment with real-world data.

### ****Key Deliverables:****

**UAT Test Plan** – Outlines scope, objectives, participants, and timeline.  
**UAT Test Scenarios & Cases** – Documents test cases with expected outcomes.

## **2. UAT Execution**

### **Steps**

**Kickoff UAT:** Conduct a kickoff meeting with stakeholders.  
**Execute Test Cases:** Users test each scenario and log results.  
 **Log Issues/Defects:** Report bugs in a defect tracker (JIRA, Excel).  
 **Defect Resolution & Retesting:** IT team fixes issues, and testers validate again.  
 **Obtain Feedback:** Gather user feedback and ensure all concerns are addressed.

### ****Key Deliverables:****

### **UAT Test Execution Report** – Records test case execution status. **Defect Log (JIRA/Excel)** – Tracks issues, fixes, and retests.

## **3. UAT Sign-Off Process**

### ****Steps to Obtain Client Approval:****

**Review UAT Results:** Ensure all critical issues are resolved.  
**Client Review & Confirmation:** Conduct a final review with stakeholders.  
**Obtain Formal Sign-Off:**

* Share the **UAT Completion Report** and **Client Acceptance Form**.
* Get official approval via digital signature/email confirmation.

### ****Key Deliverables:****

**Client Acceptance Form** – Confirms successful UAT and system readiness for deployment.  
**Final UAT Report** – Summarizes test results and final approvals.

## **UAT Sign-Off Template:-**

### ****User Acceptance Testing (UAT) Sign-Off Form****

**Project Name:** Urban Crop  
**System Name:** Urban Crop  
**UAT Start Date:** 05-Jan-2025  
**UAT End Date:** 25-Jan-2025

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Test Case ID** | **Scenario** | **Tested By** | **Status (Pass/Fail)** | **Comments** |
| TC001 | Login Functionality | Vikash Pandey | Pass | - |
| TC002 | Create User Id functionality | Sai Krishna | Pass | - |
| TC003 | Crop Tracking Stages | Sheetal Teja | Fail | Issue with file size limit |

* **Defects Resolved:** Yes ☐ No ☐
* **System Ready for Deployment:** Yes ☐ No ☐

**Client Representative:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Signature)  
**Date:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

## **Lessons Learned & Project Closure**

### ****Final Steps:****

* Conduct a **Lessons Learned Workshop** with stakeholders.
* Document key findings and improvement areas.
* Archive all project documents in a **Project Repository**.

### ****Final Deliverables:****

* **Lessons Learned Document**
* **Project Closure Report**
* **Final Signed-Off BRD, FRS, and UAT Acceptance Form**

## **Conclusion**

Following this **structured BA approach** ensures **smooth project execution**, clear stakeholder engagement, effective change management, and successful **client acceptance and sign-off**.

### ****Key Deliverables and Artifacts****

1. Stakeholder Analysis (RACI/ILS)
2. Business Requirements Document (BRD)
3. Functional Requirements Document (FRD)
4. Use Cases/User Stories
5. Process Flows
6. Traceability Matrix
7. UAT Test Cases
8. Client Acceptance Form
9. Change Request Forms
10. Project Status Reports

### Summary of Key Steps

1. Understand the project scope and stakeholders.
2. Elicit and document requirements using appropriate techniques.
3. Validate and obtain sign-off on requirements.
4. Establish communication channels and update stakeholders regularly.
5. Handle change requests through a structured process.
6. Facilitate UAT and obtain client acceptance.
7. Close the project with final sign-off and lessons learned.

By following this structured approach, a Business Analyst can ensure that the project is delivered on time, within scope, and meets the stakeholders' expectations.

**Document 3- Functional Specifications**

|  |  |
| --- | --- |
| Project name | Urban Crop |
| Customer name | Urban Crop |
| Project Version | V1.01 |
| Project Sponsor | Urban Crop |
| Project Manager | Mr Henry Smith |
| Project Initiation date | 01/01/2025 |

**Functional Requirement specifications**

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | Requirement Name | Requirement Description | Priority |
| FR-001 | User Authentication & Role Management | The system must support secure login with role-based access (e.g., farmers, vendors, admin). | 10 |
| FR-002 | Crop Lifecycle Management | Farmers should be able to record, monitor, and update crop status from planting to harvesting. | 10 |
| FR-003 | Inventory Management | The system should allow real-time tracking of available stock, reducing wastage and shortages. | 9 |
| FR-004 | Procurement Management | Automate the procurement process from farmers to market vendors, ensuring proper documentation. | 9 |
| FR-005 | Sales & Order Tracking | Track sales orders and provide a clear record of transactions between farmers and buyers. | 9 |
| FR-006 | Automated Invoice Generation | Generate invoices for each transaction to minimize manual errors and administrative workload. | 8 |
| FR-007 | Payment Integration | Enable digital payment options such as mobile wallets, UPI, and bank transfers. | 8 |
| FR-008 | Real-time Notifications | Send alerts/reminders for key farming activities (e.g., irrigation, harvesting, low stock alerts). | 8 |
| FR-009 | Data Analytics & Reporting | Generate reports on crop production, sales trends, and inventory insights for better decision-making. | 7 |
| FR-010 | Multi-Language Support | Allow users to switch languages to ensure ease of use for non-English speaking farmers. | 7 |
| FR-011 | Supplier & Buyer Management | Provide a directory of suppliers and buyers, facilitating direct communication and transactions. | 7 |
| FR-012 | AI-Based Crop Suggestions | Use AI recommendations to suggest optimal planting schedules based on weather and demand. | 6 |
| FR-013 | Offline Data Entry | Allow users to input data offline, syncing automatically once an internet connection is available. | 6 |
| FR-014 | Government Compliance Reports | Generate standardized reports required for government food safety and agricultural compliance. | 6 |
| FR-015 | Farm Expense Tracking | Allow farmers to log expenses related to seeds, fertilizers, labor, and maintenance. | 5 |
| FR-016 | Integration with Marketplaces | Enable farmers to list and sell produce on third-party e-commerce platforms. | 5 |
| FR-017 | Customer Support Chat | Provide a chat-based helpdesk to assist users with system-related queries. | 4 |
| FR-018 | Sustainability Metrics | Track and report eco-friendly farming practices such as water and energy usage. | 4 |
| FR-019 | Customization for Farmers | Allow farmers to customize reports, alerts, and dashboard views based on their needs. | 3 |
| FR-020 | Social Media & Marketing Integration | Allow farmers to share product listings directly on social media for better market reach. | 3 |

**Non Functional Requirement Specification**

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | Requirement Name | Requirement Description | Priority |
| NFR-001 | System Availability | The platform should be available 99.9% of the time to ensure continuous access. | 10 |
| NFR-002 | Scalability | The system should support an increasing number of users and data without performance degradation. | 9 |
| NFR-003 | Performance Efficiency | The system should process user requests (e.g., order placement, inventory updates) within 2 seconds. | 9 |
| NFR-004 | Security | Implement authentication, role-based access control, and data encryption to prevent unauthorized access. | 10 |
| NFR-005 | Data Integrity | Ensure no loss or corruption of data by implementing regular backups and validation mechanisms. | 9 |
| NFR-006 | Usability | The system should have a user-friendly interface, making it easy for farmers and vendors to navigate. | 8 |
| NFR-007 | Mobile Responsiveness | The web platform must be fully optimized for mobile devices and different screen sizes. | 8 |
| NFR-008 | Offline Functionality | Farmers should be able to enter data offline, which syncs when an internet connection is restored. | 7 |
| NFR-009 | Compliance with Regulations | Ensure compliance with agricultural, food safety, and financial transaction regulations. | 7 |
| NFR-010 | Multi-Language Support | The system should support multiple languages to accommodate diverse users. | 6 |
| NFR-011 | Logging & Audit Trail | Maintain logs of all transactions and system activities for transparency and accountability. | 9 |
| NFR-012 | Disaster Recovery | Implement automated backups and a disaster recovery plan to restore the system in case of failure. | 9 |
| NFR-013 | Third-Party API Integration | Enable integration with weather APIs, payment gateways, and government databases. | 6 |
| NFR-014 | Response Time | System should respond to user actions within 2-3 seconds under normal load. | 8 |
| NFR-015 | Maintainability | The system should be easy to update and maintain with modular code architecture. | 7 |
| NFR-016 | Customer Support & Helpdesk | Provide an online help center, chatbot, and human support for issue resolution. | 5 |
| NFR-017 | Eco-Friendly Hosting | The system should be hosted on energy-efficient and carbon-neutral servers where possible. | 4 |
| NFR-018 | Customization Options | Allow customization of UI themes, report formats, and notifications based on user preferences. | 5 |
| NFR-019 | Integration with Marketplaces | Enable integration with e-commerce platforms for direct farmer-to-market sales. | 4 |
| NFR-020 | AI-Based Recommendations | Use AI to suggest best crops to plant, pricing strategies, and inventory management tips. | 3 |

**Document 4- Requirement Traceability Matrix**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID** | **Requirement Name** | **Requirement Description** | **Design** | **D1 (Dev Phase 1)** | **T1 (Test Phase 1)** | **D2 (Dev Phase 2)** | **T2 (Test Phase 2)** | **UAT** |
| FR-001 | User Authentication & Role Management | The system must support secure login with role-based access (e.g., farmers, vendors, admin). | Completed | Implemented | Passed | Ongoing | Pending | Pending |
| FR-002 | Crop Lifecycle Management | Farmers should be able to record, monitor, and update crop status from planting to harvesting. | Completed | Partially Implemented | In Progress | Ongoing | Pending | Pending |
| FR-003 | Inventory Management | The system should allow real-time tracking of available stock, reducing wastage and shortages. | Completed | Implemented | Passed | Ongoing | Pending | Pending |
| FR-004 | Procurement Management | Automate the procurement process from farmers to market vendors, ensuring proper documentation. | Completed | Implemented | Passed | Planned | Pending | Pending |
| FR-005 | Sales & Order Tracking | Track sales orders and provide a clear record of transactions between farmers and buyers. | Completed | Not Started | In Progress | Planned | Pending | Pending |
| FR-006 | Automated Invoice Generation | Generate invoices for each transaction to minimize manual errors and administrative workload. | Completed | Partially Implemented | In Progress | Planned | Pending | Pending |
| FR-007 | Payment Integration | Enable digital payment options such as mobile wallets, UPI, and bank transfers. | Completed | Implemented | Passed | Planned | Pending | Pending |
| FR-008 | Real-time Notifications | Send alerts/reminders for key farming activities (e.g., irrigation, harvesting, low stock alerts). | Completed | Implemented | Passed | N/A | Pending | Pending |
| FR-009 | Data Analytics & Reporting | Generate reports on crop production, sales trends, and inventory insights for better decision-making. | Completed | Implemented | Passed | N/A | Pending | Pending |
| FR-010 | Multi-Language Support | Allow users to switch languages to ensure ease of use for non-English speaking farmers. | Design Document Section 3.1 | Implemented | Test Case TC-001 | N/A | Pending | Pending |
| FR-011 | Supplier & Buyer Management | Provide a directory of suppliers and buyers, facilitating direct communication and transactions. | Design Document Section 3.2 | Implemented | Test Case TC-002 | N/A | Pending | Pending |
| FR-012 | AI-Based Crop Suggestions | Use AI recommendations to suggest optimal planting schedules based on weather and demand. | Design Document Section 4.1 | Not Started | Test Case TC-003 | Completed | Pending | Pending |
| FR-013 | Offline Data Entry | Allow users to input data offline, syncing automatically once an internet connection is available. | Design Document Section 4.2 | Implemented | N/A | Planned | Pending | Pending |
| FR-014 | Government Compliance Reports | Generate standardized reports required for government food safety and agricultural compliance. | Design Document Section 5.1 | Not Started | Test Case TC-006 | N/A | Pending | Pending |
| FR-015 | Farm Expense Tracking | Allow farmers to log expenses related to seeds, fertilizers, labor, and maintenance. | Design Document Section 6.1 | Not Started | N/A | Planned | Pending | Pending |

**Document 5- BRD Template**

### Key:

* **Req ID**: Unique identifier for the requirement.
* **Requirement Name**: Short name for the requirement.
* **Requirement Description**: Detailed description of the requirement.
* **Design**: Reference to the design document or section where the requirement is addressed.
* **D1, D2**: Development phases (e.g., Phase 1 and Phase 2).
* **T1, T2**: Testing phases (e.g., Unit Testing, Integration Testing).
* **UAT**: User Acceptance Testing status or test case reference.

### Notes:

1. **N/A**: Not applicable (e.g., if a requirement is not part of a specific phase).
2. **Partially Implemented**: Indicates that the requirement is partially completed in the current phase.
3. **Planned**: Indicates that the requirement is planned for a future phase.
4. **Test Case References**: Test cases (e.g., TC-001) are linked to specific requirements for traceability.

This RTM can be expanded or modified based on the specific requirements and phases of your project. Let me know if you need further customization!

**Business Requirement Document**

<Application Tracking System>

<Project ID>

<V1.0.1>

<Rohit Sarnaik>

Contents

1. Document Revisions
2. Approvals
3. RASCI Chart for This Document

Codes Used in RASCI Chart

RASCI Chart

1. Introduction
   1. Business Goals
   2. Business Objectives
   3. Business Rules
   4. Background
   5. Project Objective
   6. Project Scope

4.6.1. In Scope Functionality

4.6.2. Out Scope Functionality

1. Assumptions
2. Constraints
3. Risks Technological Risks

Political Risks

Business Risks

Requirements Risks

Other Risks

1. Business Process Overview
   1. Legacy System (AS-IS)
   2. Proposed Recommendations (TO-BE)
2. Business Requirements
3. Appendices
   1. List of Acronyms
   2. Glossary of Terms
   3. Related Documents

**1. Document Revisions**

|  |  |  |
| --- | --- | --- |
| **Date** | **Version Number** | **Document Changes** |
| 01/01/2023 | V1.0 | Initial draft of the project documentation. |
| 10/5/2023 | V1.1 | Added system architecture diagrams and API specifications. |
| 10/10/2023 | V1.2 | Updated user interface mockups and revised the glossary of terms. |
| 05/10/2023 | V1.3 | Incorporated feedback from stakeholders and updated the test plan. |
| 20/10/2023 | V1.4 | Finalized the document after review and approval. |
| 01/11/2023 | V1.5 | Added new requirements for AI-based resume parsing functionality. |

**2. Approvals**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Role** | **Name** | **Title** | **Signature** | **Date** |
| Project Sponsor | Sai Teja | Sai Teja |  | 2-Jan-25 |
| Business Owner | Vikash Pandey | Vikash Pandey |  | 4-Jan-25 |
| Project Manager | Nitesh Singh | Nitesh Singh |  | 6-Jan-25 |
| System Architect | Sachin Gutte | Sachin Gutte |  | 8-Jan-25 |
| Development | Ritesh Sharma | Ritesh Sharma |  | 10-Jan-25 |
| Lead | Nikita Meena | Nikita Meena |  | 12-Jan-25 |
| User Experience | Rahul Kr | Rahul Kr |  | 14-Jan-25 |
| Lead | Poonam Singh | Poonam Singh |  | 18-Jan-25 |

**3. RACI Chart for This Document**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Name** | **Position** | **Responsible (R)** | **Accountable (A)** | **Supporting**  **(S)** | **Consulted**  **(C)** | **Informed**  **(I)** |
| Urban Crop | CEO |  |  |  | Yes | Yes |
| Urban Crop | CFO |  |  |  | Yes | Yes |
| Mr Rohit Sarnaik | Business Analyst | Yes |  |  |  |  |
| Farmers | Stakeholder |  |  |  | Yes | Yes |
| Vendors | Stakeholder |  |  |  | Yes | Yes |
| Mr Karthik | Financial Head |  |  | Yes | Yes | Yes |
| Government & Agriculture Ministries | Stakeholder |  |  | Yes |  |  |
| Mr Henry Smith | Project Manager |  | Yes |  |  |  |
| Mr Mr John Doe | Delivery Head |  | Yes |  |  |  |

**4. Introduction**

As cities continue to grow, the need for sustainable urban farming has become increasingly important. Urban Crop is a smart digital platform designed to modernize the crop management, procurement, and sales process for urban and peri-urban farmers. This project aims to streamline operations, reduce inefficiencies, and enhance transparency in the agricultural supply chain.

Currently, many farmers rely on manual or outdated methods to track their crops, leading to issues such as poor inventory management, procurement inefficiencies, financial errors, and lack of real-time insights into crop availability. These challenges result in wastage, financial losses, and missed market opportunities for both farmers and vendors.

**4.1 Business Goals**

1. **Crop Tracking & Management**: Provide farmers with a digital platform to record, monitor, and manage their planted crops from sowing to harvesting.

2. **Inventory Management**: Maintain an accurate real-time inventory of all crops procured from farmers, ensuring efficient stock management.

3. **Procurement & Sales Tracking**: Automate the process of tracking crops as they move from farms to markets, ensuring proper documentation.

4. **Invoice & Financial Management**: Generate automated invoices for all transactions, reducing manual errors and improving financial transparency.

5. **Data-Driven Decision Making**: Offer insights and analytics on crop production, demand trends, and sales performance to help farmers and businesses optimize their operations.

6. **Supply Chain Transparency**: Improve traceability by providing stakeholders with real-time access to crop availability, pricing, and procurement history.

7. **Sustainability & Efficiency**: Reduce wastage, improve resource utilization, and support sustainable urban farming practices through better tracking and management.

**4.1 Business Objectives**

The Urban Crop project is designed to modernize urban farming by introducing a smart digital platform that enhances efficiency, transparency, and profitability for farmers, suppliers, and market vendors. The following business objectives outline the key outcomes that this project aims to achieve:

**1. Improve Crop Tracking and Management**

* Provide farmers with a digital system to monitor crop lifecycles from planting to harvesting.
* Reduce reliance on manual record-keeping and outdated tracking methods.

**2. Optimize Inventory Management**

* Ensure real-time inventory updates to prevent shortages and minimize wastage.
* Automate stock management, allowing farmers and vendors to make informed sales decisions.

**3. Streamline Procurement and Sales Processes**

* Digitize procurement operations, ensuring seamless transactions between farmers and market vendors.
* Maintain a well-documented supply chain record to improve accountability.

**4. Enhance Financial Transparency and Efficiency**

* Automate invoice generation to reduce errors and administrative burden.
* Provide a secure financial tracking system for all stakeholders.

**5. Increase Supply Chain Visibility and Trust**

* Offer real-time updates on crop availability, pricing, and market trends.
* Improve traceability of products from farms to markets.

**6. Enable Data-Driven Decision Making**

* Utilize analytics and reporting tools to help farmers and vendors make better business decisions.
* Forecast market demand and pricing trends for improved planning.

**7. Support Sustainability and Reduce Waste**

* Promote efficient resource utilization through automated inventory tracking.
* Reduce post-harvest losses by aligning supply with demand more effectively.

**8. Improve Market Access for Farmers**

* Connect farmers directly with market vendors, eliminating unnecessary intermediaries.
* Provide farmers with better market opportunities and fair pricing.

**9. Ensure Scalability and User-Friendly Adoption**

* Design a simple and intuitive platform to encourage adoption by farmers with minimal technical skills.
* Develop a scalable solution that can grow with increased demand and users.

**10. Generate Revenue and Achieve Profitability**

* Establish a sustainable business model through subscription fees, transaction-based charges, or partnerships.
* Ensure the project reaches ROI within a reasonable timeframe through increased adoption and efficiency gains.

**4.3. Business Rules**

The Urban Crop project must adhere to organization policies, procedures, and regulatory compliance to ensure smooth operations, transparency, and scalability. Below is a structured list of business rules categorized into policies, procedures, and rules & regulations.

**1. Organization Policies**

These policies define the governing principles for operating and managing the Urban Crop platform.

**1.1 Data Management Policy**

* All crop tracking, inventory, procurement, and financial transactions must be recorded digitally.
* Data must be backed up daily to prevent loss and ensure reliability.
* Farmers and vendors own their data but must comply with platform regulations.

**1.2 User Access & Role-Based Permissions Policy**

* Farmers, suppliers, and vendors must register before accessing the platform.
* Access levels must be role-based (e.g., farmers can update crop data, but only vendors can confirm purchases).
* Admin users must have higher privileges for approving changes and monitoring system health.

**1.3 Financial Transaction & Payment Policy**

* All transactions (procurement, sales, and invoicing) must be recorded digitally in the system.
* Automated invoices should be generated immediately upon transaction completion.
* Refunds, disputes, or transaction errors must be resolved within 7 business days.

**1.4 Sustainability & Environmental Policy**

* Farmers must follow best agricultural practices to ensure eco-friendly urban farming.
* The platform must track and minimize food wastage through better forecasting.

**2. Procedures**

These procedures outline the step-by-step processes to ensure the platform functions effectively.

**2.1 Crop Registration & Monitoring Procedure**

* Farmers must register their crops on the platform before planting.
* Updates on crop growth stages, estimated yield, and harvest dates must be provided regularly.

**2.2 Inventory Management Procedure**

* All harvested crops must be entered into inventory immediately upon procurement.
* Automated alerts should be sent for low stock or oversupply conditions.

**2.3 Procurement & Sales Workflow**

* Buyers must place orders digitally, and farmers/vendors must confirm transactions in the system.
* Once an order is confirmed, the system updates inventory levels automatically.

**2.4 Invoicing & Payment Reconciliation Procedure**

* The platform must generate an invoice upon successful sale.
* Payments must be reconciled and matched with invoices before order fulfilment.

**2.5 Compliance & Audit Process**

* Transactions, procurement records, and sales logs must be audited monthly for accuracy.
* Users must comply with government food safety laws and traceability requirements.

**3. Rules & Regulations**

These legal and operational rules ensure regulatory compliance and industry standards.

**3.1 Data Privacy & Security Rules**

* The platform must comply with GDPR (General Data Protection Regulation) and local data privacy laws.
* User data must be encrypted and securely stored.
* Farmers' and vendors' personal and business information cannot be shared without consent.

**3.2 Product Quality & Safety Rules**

* All crops listed on the platform must meet food safety standards.
* Any contaminated or low-quality produce must be reported and removed immediately.

**3.3 Dispute Resolution & Conflict Management Rules**

* Any disputes regarding pricing, inventory, or procurement must be reported within 48 hours.
* The platform must have a dispute resolution mechanism to resolve conflicts between farmers, suppliers, and vendors.

**3.4 System Downtime & Maintenance Rules**

* Any planned maintenance must be scheduled outside peak transaction hours.
* Users must be notified at least 24 hours in advance of any system downtime.

**3.5 Legal & Compliance Regulations**

* The platform must adhere to local government agricultural laws, taxation policies, and food distribution regulations.
* Transactions must comply with e-commerce and digital payment guidelines to prevent fraud.

**4.4. Background1. Introduction**

Urban farming is becoming a vital solution to address the challenges of food security, sustainability, and local food production in growing cities. As urban populations rise, there is an increasing demand for efficient and structured agricultural practices within city environments. However, many urban and peri-urban farmers still rely on manual record-keeping and outdated methods, leading to inefficiencies in crop management, sales, and procurement.

Recognizing these challenges, the Urban Crop Project was initiated to develop a smart digital platform that enables farmers, suppliers, and market vendors to efficiently track crops, manage inventory, and improve the procurement process.

**2. Business Issues & Problems Identified**

Several critical business issues and operational inefficiencies were identified in the current urban farming ecosystem, including:

* **Lack of Digital Crop Tracking & Management**:
  + Farmers do not have a structured way to track crops from planting to harvest, leading to inefficiencies and yield mismanagement.
* **Inventory Management Challenges**:
  + Many urban farmers struggle with overproduction or shortages due to lack of real-time inventory tracking.
  + Poor stock management leads to food wastage and financial losses.
* **Inefficient Procurement & Sales Process**:
  + The movement of crops from farms to markets is often unstructured, leading to delays and lack of transparency.
  + Buyers have limited visibility into available crops, making procurement unpredictable.
* **Manual Invoicing & Financial Errors**:
  + Many farmers manually generate invoices, increasing errors, payment delays, and administrative burden.
  + There is no centralized system to track payments, outstanding dues, and financial records.
* **Limited Data for Decision-Making**:
  + Farmers, suppliers, and vendors lack real-time insights on market demand and crop trends.
  + Without data-driven forecasting, farmers may plant crops that do not align with market needs, resulting in losses.
* **Supply Chain Transparency Issues**:
  + The lack of a digital system makes it difficult to track produce movement across the supply chain.
  + Buyers and regulators do not have visibility into the origins and quality of produce.

**3. Expected Benefits of Implementing the Project**

The Urban Crop project aims to address these challenges by introducing a centralized digital platform that will streamline crop management, inventory tracking, procurement, and financial operations. The key benefits include:

* **Automated Crop Tracking & Management**: Farmers will have access to a structured digital system to monitor planting, growth, harvesting, and sales, improving efficiency.
* **Real-Time Inventory Management**: The platform will provide real-time stock updates, helping farmers and suppliers prevent overproduction and shortages.
* **Improved Market Access & Sales**: Buyers will have better visibility into available crops, allowing for smoother procurement processes and reduced supply chain disruptions.
* **Automated Invoicing & Financial Transparency**: Digital invoices will reduce manual errors, accelerate payment processing, and increase financial accuracy for farmers and suppliers.
* **Data-Driven Decision-Making**: The system will generate market insights, demand forecasts, and crop performance analytics, helping farmers make better planting and sales decisions.
* **Enhanced Supply Chain Transparency**: The digital tracking system will ensure full traceability of crops from farm to market, increasing trust and compliance with food safety regulations.
* **Sustainability & Waste Reduction**: With better inventory management and demand forecasting, farmers can reduce wastage and contribute to sustainable urban agriculture.

**4. Conclusion**

The Urban Crop project was proposed as a response to the growing need for efficient, technology-driven urban farming solutions. By digitizing and optimizing the entire crop lifecycle, this project will empower urban farmers, streamline supply chain operations, and enhance food sustainability in cities.

**4.5. Project Objective**

**1. Overall Goal of the Project**

The Urban Crop project aims to develop a smart digital platform that streamlines crop tracking, inventory management, procurement, invoicing, and supply chain transparency for urban farmers, suppliers, and market vendors. This system will improve efficiency, reduce losses, enhance financial accuracy, and provide data-driven insights to optimize urban farming operations.

**2. High-Level Product Descriptions**

The Urban Crop platform will offer the following core functionalities:

* **Crop Tracking & Management**:
  + Enable farmers to digitally record and monitor the entire crop lifecycle (planting, growth, harvesting, and sales).
  + Provide alerts and notifications for key farming activities.
* **Inventory Management System**:
  + Maintain an accurate, real-time inventory of all crops procured from farmers.
  + Prevent overproduction, wastage, or shortages through automated stock updates.
* **Procurement & Sales Automation**:
  + Digitize the process of tracking crops from farms to market vendors, ensuring proper documentation.
  + Enable market buyers to view available crops and purchase efficiently.
* **Automated Invoicing & Financial Tracking**:
  + Generate error-free digital invoices for all procurement and sales transactions.
  + Provide a secure and transparent financial tracking system for farmers, suppliers, and vendors.
* **Supply Chain Transparency & Traceability**:
  + Ensure full traceability of produce from farm to market, improving compliance with food safety standards.
  + Allow stakeholders to track crop movement and pricing history.
* **Data Analytics & Reporting**:
  + Generate insights on crop production, demand trends, and market forecasts.
  + Help farmers make informed planting and sales decisions based on real-time data.
* **Sustainability & Waste Reduction:**
  + Optimize resource utilization and reduce food waste through intelligent stock management.
  + Support sustainable urban farming practices with data-driven strategies.

**3. Alignment with Business Objectives**

|  |  |
| --- | --- |
| **Business Objective** | **Alignment with Urban Crop Platform** |
| Increase Efficiency | Automates crop tracking, inventory updates, and invoicing to minimize manual effort and errors. |
| Improve Market Access | Provides real-time visibility of available crops for buyers and vendors. |
| Enhance Financial Accuracy | Reduces manual invoicing errors and ensures transparent financial tracking. |
| Ensure Transparency | Tracks crop movement, pricing history, and procurement records for full traceability. |
| Enable Data-Driven Decision-Making | Offers real-time insights for better planning and forecasting. |
| Support Sustainability | Reduces food wastage and encourages resource optimization. |

**4. Interaction with Other Systems**

The Urban Crop platform will interact with various external systems to ensure seamless functionality and data integration, including:

* **ERP & Accounting Systems**: Integration with existing enterprise resource planning (ERP) and accounting software for financial tracking and reporting.
* **Market & E-commerce Platforms**: Synchronization with online marketplaces or agricultural platforms to allow direct crop sales.
* **Government & Compliance Systems**: Compatibility with local agricultural and food safety databases to ensure regulatory compliance.
* **Weather & Farming Advisory APIs**: Integration with weather forecasting APIs to provide climate insights for farmers.
* **Mobile Payment & Banking Systems**: Support for digital payments and financial transactions to enable secure and easy payments for farmers and buyers.

**4.6. Project Scope**Project Scope – Urban Crop

**1. Scope Overview**

The Urban Crop project will develop a digital platform that enables urban farmers, suppliers, and market vendors to efficiently manage their crop inventory, procurement, sales, invoicing, and supply chain transparency. The system will provide real-time tracking, automated processes, and data-driven insights to optimize urban farming operations.

**2. Features & Functionalities to be developed**

|  |  |
| --- | --- |
| **Feature** | **Description** |
| Digital Crop Tracking System | Allows farmers to record and monitor their crops from planting to harvesting. Includes alerts and notifications for key farming activities. |
| Inventory Management System | Maintains real-time inventory of procured crops, preventing shortages and wastage. |
| Automated Procurement & Sales Tracking | Digitizes procurement, allowing farmers, suppliers, and vendors to manage orders, transactions, and stock movement. |
| Invoice & Financial Management | Generates automated invoices, reducing manual errors and ensuring transparent financial tracking. |
| Supply Chain Transparency | Tracks crop movement from farms to markets, ensuring traceability and accountability. |
| Data Analytics & Reporting | Provides insights into crop production, demand trends, and market forecasts for better decision-making. |
| Mobile & Web Accessibility | A responsive web and mobile application for farmers, suppliers, and vendors to access and update data anywhere. |
| User Roles & Permissions | Role-based access for farmers, suppliers, vendors, and market administrators to control data access. |
| Integration with External Systems | Connects with accounting, payment, weather forecast, and compliance systems for seamless operations. |
| User-Friendly Interface | Intuitive UI/UX design to ensure ease of use, even for farmers with minimal technical knowledge. |

**3. Deliverables**

The project will deliver the following components:

* Web & Mobile Application: A platform for managing crops, inventory, sales, and finances.
* Automated Reporting System: Real-time dashboards for analytics and insights.
* Role-Based Access Control: Security implementation for different user types.
* Integration with Payment & Compliance Systems: Ensuring financial transparency and regulatory compliance.

**4.6.1. In Scope Functionality**In-Scope Functionalities – Urban Crop

The Urban Crop project will include the following functionalities:

**1. Crop Tracking & Management**

* Farmers can record and monitor crops from sowing to harvesting.
* Provides alerts and notifications for key farming activities.
* Tracks crop growth stages with updates on progress.

**2. Inventory Management**

* Maintains real-time stock levels for all procured crops.
* Automatic stock updates when crops are harvested or sold.
* Tracks wastage and spoilage to optimize storage efficiency.

**3. Procurement & Sales Tracking**

* Digitizes procurement processes from farmers to suppliers and vendors.
* Tracks sales transactions in real time.
* Provides order history and transaction records for all stakeholders.

**4. Automated Invoicing & Financial Management**

* Generates automated invoices for crop procurement and sales.
* Tracks payments and outstanding balances for financial transparency.
* Allows integration with external accounting systems for bookkeeping.

**5. Supply Chain Transparency & Traceability**

* Tracks crop movement from farm to market with timestamps.
* Provides real-time updates on available produce for vendors.
* Ensures accountability and compliance in the procurement process.

**6. Data Analytics & Reports**

* Provides insights into crop production trends and demand forecasts.
* Generates performance reports on sales, stock levels, and procurement.
* Helps farmers and vendors make data-driven decisions.

**7. User Role Management & Access Control**

* Supports role-based access for farmers, suppliers, vendors, and administrators.
* Allows customizable permissions to protect sensitive data.

**8. Mobile & Web Application**

* Provides a responsive, user-friendly interface for desktop and mobile use.
* Enables offline data entry with auto-sync when connected.

**9. Integration with External Systems**

* Connects with payment gateways for financial transactions.
* Integrates with weather APIs for crop planning recommendations.
* Allows export of reports to external accounting systems.

**10. Notifications & Alerts**

* Sends automated alerts for crop readiness, stock shortages, and order updates.
* Provides reminders for payments, procurement schedules, and system updates.

**4.6.2. Out Scope Functionality**Out of Scope Functionalities – Urban Crop

The following functionalities are not included in the current project scope:

**1. Advanced AI-Based Crop Monitoring**

* No AI-driven disease detection or automated crop health analysis.
* No use of drones or IoT sensors for precision farming.

**2. Automated Logistics & Delivery Management**

* No integration with third-party logistics for automated delivery tracking.
* Farmers/vendors must manage transportation independently.

**3. Government Compliance & Regulatory Reporting**

* No automated government compliance reporting or integration with regulatory bodies.
* Farmers/vendors must handle legal and tax compliance manually.

**4. Farm Equipment & Resource Management**

* No tracking of farm equipment usage or resource allocation (e.g., fertilizers, water usage).
* The system focuses only on crop tracking and sales management.

**5. Multi-Currency & International Trade Support**

* No support for multiple currencies or cross-border transactions.
* Designed for local/regional markets only.

**6. Market Price Prediction & Demand Forecasting**

* No AI-driven market price forecasting for crops.
* Users need to analyze market trends manually.

**7. Automated Customer Order Management**

* No B2C (Business-to-Consumer) e-commerce functionality for direct customer orders.
* Focuses on B2B (Business-to-Business) sales between farmers and vendors.

**8. Block chain-Based Supply Chain Management**

* No block chain implementation for crop traceability and security.
* Traditional database systems will be used for record-keeping.

**9. Employee Payroll & HR Management**

* No HR system integration for managing farm workers' salaries and schedules.
* Farmers must handle payroll externally.

**10. Climate & Weather-Based Smart Farming Recommendations**

* No AI-driven weather predictions or smart farming suggestions.
* Farmers need to rely on external weather forecasts.

**5. Assumptions**

The following assumptions have been made in defining the requirements and scope of the Urban Crop project:

**1. User Adoption & Technical Readiness**

* Farmers, suppliers, and vendors have access to smartphones or computers to use the platform.
* Users are willing to adopt digital tools and transition from manual processes.

**2. Internet & Infrastructure Availability**

* Users have access to stable internet connectivity for real-time data updates.
* The system will be cloud-based and requires an internet connection to function.

**3. Crop Data Management**

* Farmers will enter accurate data about their crops, including planting, harvesting, and sales.
* The platform does not verify crop quality; it relies on user-entered information.

**4. Market & Business Operations**

* The system is designed for urban and peri-urban farming and local markets.
* Farmers and vendors already have existing supply chain relationships; the system enhances transparency but does not establish new partnerships.

**5. Legal & Compliance Considerations**

* Users are responsible for ensuring compliance with local regulations, including food safety, taxation, and invoicing requirements.
* The platform does not provide automated tax filing or legal compliance checks.

**6. System Security & Access Control**

* Users are responsible for securing their login credentials and preventing unauthorized access.
* The system will have basic role-based access control (e.g., farmer, vendor, admin).

**7. Data Integration & Compatibility**

* The platform will not integrate with existing farm management tools unless specified in future phases.
* The system assumes uniform data formats and does not account for major inconsistencies in crop tracking data.

**8. Financial Transactions & Payment Processing**

* The platform does not process financial transactions (e.g., direct payments between farmers and vendors).
* Users must handle payments externally and update records manually.

**9. Scalability & Performance**

* The system is designed for small to medium-scale urban farming operations, not industrial-scale agriculture.
* Performance expectations are based on a limited number of concurrent users in the initial phase.

**10. Training & Support**

* Farmers and vendors will receive basic training on using the system.
* It is assumed that users will require minimal technical support after on boarding.

**6. Constraints**

The Urban Crop project is subject to the following constraints that may impact its development, deployment, and operations:

**1. Budget Constraints**

* The project must be developed within a predefined budget, limiting the scope of features in the initial release.
* Limited funding for advanced AI/ML-based analytics, which may be considered in future phases.

**2. Time Constraints**

* The system must be developed and deployed within the agreed project timeline (e.g., 6-12 months).
* Feature rollouts must follow a phased approach to ensure timely implementation.

**3. Technical Constraints**

* The platform must be cloud-based with a mobile-responsive web application, limiting the use of heavy desktop applications.
* Limited integration with existing third-party farm management software in the initial release.
* The system must support multiple users simultaneously, but performance optimizations may be required for scaling.

**4. User Adoption & Training**

* The system must be easy to use for farmers and vendors with minimal technical knowledge.
* Limited availability of training and support staff for on boarding new users.

**5. Internet & Connectivity Constraints**

* The system requires an internet connection, which may be a challenge in rural/peri-urban areas.
* Offline functionality is not included in the first phase but may be considered later.

**6. Security & Compliance Constraints**

* The system must comply with data privacy regulations (e.g., GDPR if applicable).
* No sensitive financial transactions will be processed within the system (only invoice generation).

**7. Hardware & Device Limitations**

* The platform must be compatible with basic smartphones and low-end devices since not all farmers may have high-end smartphones or computers.
* The UI/UX must be simple and lightweight to work efficiently on older devices.

**8. Language & Localization Constraints**

* The system will only support one or two languages in the initial release due to resource constraints.
* Local dialects may not be fully supported in text-based instructions.

**9. Data Entry & Accuracy Constraints**

* The system relies on manual data entry from farmers, which may lead to inaccuracies.
* No automated crop quality checks will be included in the first release.

**10. Legal & Regulatory Constraints**

* The system must align with local agricultural policies regarding crop tracking and sales.
* Tax compliance and invoicing rules may vary by region, requiring future updates.

**7. Risks**

The **Urban Crop** project involves several risks that could affect its success. Below is a structured risk analysis, outlining each risk category, its likelihood, potential impact, and mitigation strategy.

**Technological Risks**

|  |  |  |  |
| --- | --- | --- | --- |
| **Risk** | **Likelihood** | **Impact** | **Mitigation Strategy** |
| System Performance Issues | Medium | High | Optimize system performance through load testing and cloud scalability. |
| Security Vulnerabilities | High | High | Implement strong encryption, access controls, and regular security audits. |
| Integration Challenges | Medium | Medium | Ensure API compatibility and test integrations before deployment. |
| Data Loss or Corruption | Low | High | Regular backups and disaster recovery planning. |
| Limited Offline Functionality | Medium | Medium | Consider adding offline support in later phases. |

**Skills Risks**

|  |  |  |  |
| --- | --- | --- | --- |
| **Risk** | **Likelihood** | **Impact** | **Mitigation Strategy** |
| Lack of Skilled Developers | Medium | High | Hire experienced developers and provide training. |
| Limited Knowledge of Farming Practices | High | Medium | Collaborate with agricultural experts and conduct research. |
| User Training & Adoption Challenges | High | Medium | Develop simple UI and provide training sessions for users. |

**Political Risks**

|  |  |  |  |
| --- | --- | --- | --- |
| **Risk** | **Likelihood** | **Impact** | **Mitigation Strategy** |
| Changes in Government Policies | Medium | High | Monitor policy changes and adapt the system accordingly. |
| Regulatory Compliance Issues | High | High | Work with legal experts to ensure compliance with agricultural laws. |
| Funding Challenges | Medium | High | Seek alternative funding sources (grants, investors, partnerships). |

**Business Risks**

|  |  |  |  |
| --- | --- | --- | --- |
| **Risk** | **Likelihood** | **Impact** | **Mitigation Strategy** |
| Project Cancellation | Low | High | Maintain stakeholder engagement and demonstrate project value. |
| Low User Adoption | High | High | Implement marketing strategies and user incentives. |
| Competitive Market Pressure | Medium | Medium | Continuously update features and improve user experience. |

**Requirements Risks**

|  |  |  |  |
| --- | --- | --- | --- |
| **Risk** | **Likelihood** | **Impact** | **Mitigation Strategy** |
| Incorrect Requirements Definition | Medium | High | Conduct stakeholder reviews and iterative development cycles. |
| Feature Creep | High | High | Define clear project scope and prioritize essential features. |
| Misalignment with Business Needs | Medium | High | Regular feedback loops with business stakeholders. |

**Other Risks**

|  |  |  |  |
| --- | --- | --- | --- |
| **Risk** | **Likelihood** | **Impact** | **Mitigation Strategy** |
| Internet Connectivity Issues | High | Medium | Optimize the platform for low-bandwidth environments. |
| Resistance to Digital Adoption | Medium | High | Run awareness campaigns and provide hands-on training. |
| System Downtime | Low | High | Use reliable cloud hosting with failover mechanisms. |

**8. Business Process Overview**

The Urban Crop project streamlines urban farming by digitizing crop tracking, inventory management, sales, and invoicing. Below is the high-level business process flow from plantation to market sales across different phases.

**1. Plantation & Crop Management Phase**

* Farmers log into the system via web or mobile.
* Enter details about new crops, including type, planting date, and expected harvest time.
* The system sends alerts for watering, fertilization, and harvesting schedules.
* Farmers can track growth progress through periodic updates and images.

Key Output: Crop records are maintained with accurate tracking.

**2. Inventory Management Phase**

* Farmers update harvested crops in the system.
* The system updates stock levels dynamically.
* Notifications are sent to suppliers & buyers about crop availability.
* Expiry dates are tracked to prevent wastage.

Key Output: Real-time stock levels ensure optimized inventory.

**3. Procurement & Sales Tracking Phase**

* Vendors and suppliers view available crops via the platform.
* Orders are placed, and the system reserves stock accordingly.
* The platform matches supply with demand, reducing shortages or overstocking.
* Farmers can track order status and expected pickup/delivery times.

Key Output: Smooth procurement process ensures an efficient supply chain.

**4. Invoicing & Payment Management Phase**

* Upon order confirmation, the system auto-generates invoices.
* Payment tracking options are available for cash, digital payments, or credit transactions.
* Farmers & vendors can download reports for financial management.

Key Output: Automated invoicing minimizes errors and speeds up transactions.

**5. Supply Chain & Market Transparency Phase**

* Buyers & stakeholders receive real-time updates on stock levels & pricing.
* Supply chain tracking ensures visibility from farm to market.
* Reports and analytics help optimize future crop production.

Key Output: Greater market efficiency, reduced waste, and better pricing decisions.

**End-to-End Workflow Summary:**

1. Farmers Plant & Manage Crops →
2. System Tracks Inventory in Real-Time →
3. Buyers Place Orders & Farmers Process Sales →
4. Invoices Are Auto-Generated & Payments Are Tracked →
5. Stakeholders Gain Transparency & Market Insights

This digitized process improves efficiency, minimizes waste, and enhances profitability for urban farmers & vendors.

**8.1. Legacy System (AS-IS)**Before implementing the Urban Crop digital platform, urban farmers and vendors relied on manual or outdated methods to manage their farming operations. This led to inefficiencies in crop tracking, inventory management, sales processing, and invoicing. Below is a brief explanation of the current (legacy) system and a process flow diagram showing how tasks were handled before automation?

**Legacy System Process Explanation**

1. **Crop Tracking & Management (Manual Logs)**

* Farmers maintain handwritten logs or basic spreadsheets to record planting and harvesting schedules.
* No automated alerts or tracking, leading to missed harvesting windows and crop losses.

1. **Inventory Management (Paper-Based Records)**

* Inventory is recorded manually in notebooks or Excel sheets.
* No real-time tracking, causing overstocking, shortages, or wastage.
* Vendors rely on word of mouth or phone calls to check stock availability.

1. **Procurement & Sales (Unstructured Process)**

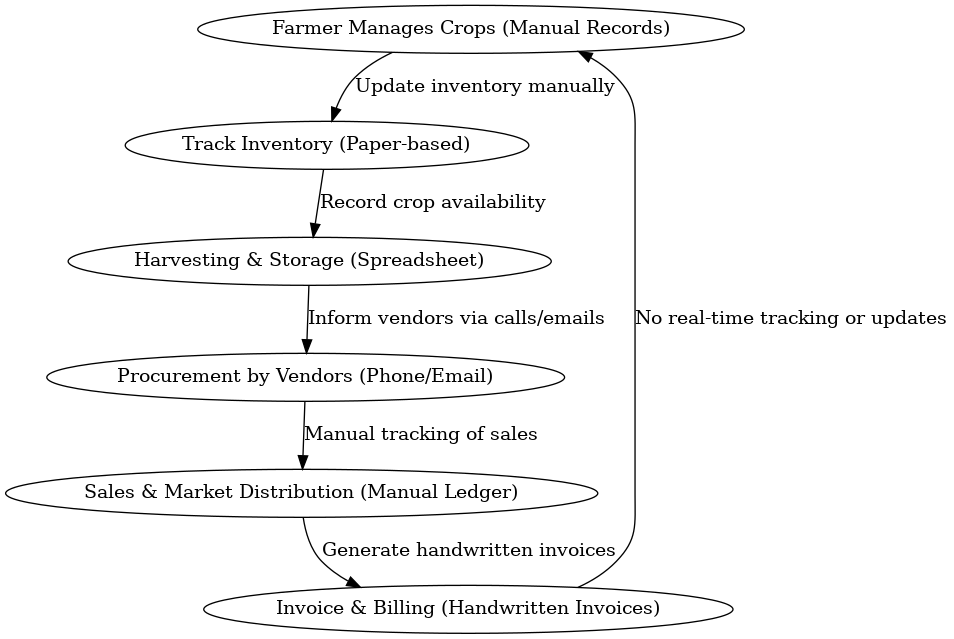
* Buyers visit farms physically or negotiate orders via phone calls and messages.
* No centralized database to view available stock and pricing.
* Orders are often mismanaged due to lack of documentation.

1. **Invoicing & Payments (Manual & Error-Prone)**

* Farmers generate invoices manually using paper or Excel templates.
* Payments are handled in cash or bank transfers with no digital tracking.
* Errors in calculations and lack of transparency lead to disputes and delayed payments.

1. **Lack of Transparency & Reporting**

* Stakeholders (farmers, suppliers, vendors) lack access to real-time reports.
* Decision-making is based on guesswork rather than data analytics.



**8.2. Proposed Recommendations (TO-BE)**

The Urban Crop system is designed to modernize urban farming operations by digitizing and automating the entire lifecycle of crop tracking, inventory management, procurement, and sales. The proposed system will address the inefficiencies of the legacy system by integrating smart technology, real-time tracking, and data-driven decision-making to improve transparency, reduce waste, and enhance profitability.

How the Proposed System Addresses the Challenges in the Legacy System

* 1. **Crop Tracking & Management**
* Legacy System Issue: Farmers rely on manual logs or spreadsheets to track planted crops, leading to errors and difficulty in monitoring crop lifecycles.
* Proposed Solution: A centralized digital platform that allows farmers to log, monitor, and manage crop details in real-time, including sowing, growth stages, and harvest dates.
  1. **Inventory Management**
* Legacy System Issue: Inaccurate stock records result in overstocking, shortages, and increased wastage.
* Proposed Solution: Automated inventory tracking with real-time updates on available crops, ensuring optimized stock levels and minimizing waste.
  1. **Procurement & Sales Tracking**
* Legacy System Issue: Farmers and vendors use manual records for transactions, making it difficult to track sales history.
* Proposed Solution: Digitized procurement and sales tracking, ensuring every transaction is documented, improving accountability, and simplifying order fulfilment.
  1. **Invoice & Financial Management**
* Legacy System Issue: Invoices are created manually, leading to errors, delays, and lack of financial transparency.
* Proposed Solution: Automated invoice generation for each sale or procurement transaction, ensuring accuracy and reducing administrative workload.
  1. **Supply Chain Transparency**
* Legacy System Issue: Lack of real-time data on crop availability and pricing creates inefficiencies in the supply chain.
* Proposed Solution: Real-time data access for stakeholders, enabling informed decision-making on crop procurement, pricing, and distribution.

1. **Data-Driven Decision Making**

* Legacy System Issue: No structured method for analyzing crop trends, demand patterns, or sales performance.
* Proposed Solution: Analytics and reporting tools to provide insights into production trends, market demand, and financial performance, enabling better forecasting and business strategies.

1. **User-Friendly & Scalable System**

* Legacy System Issue: Farmers and vendors rely on basic or outdated digital tools that are not user-friendly.
* Proposed Solution: A mobile-friendly and scalable platform with an intuitive interface that supports future expansions and growing user needs.

1. **Sustainability & Efficiency**

* Legacy System Issue: Lack of organized data results in excessive wastage and inefficient farming practices.
* Proposed Solution: Data-driven optimization of farming practices, ensuring reduced wastage, better resource utilization, and more sustainable urban farming operations.

**Implementation Approach**

Phase 1: System Design & Development

Phase 2: Pilot Testing with Selected Farmers & Vendors

Phase 3: Full-Scale Deployment & User Training

Phase 4: Continuous Monitoring, Feedback, & System Enhancements

**9. Business Requirements**

**1. Functional Business Requirements**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Req ID** | **Requirement Name** | **Requirement Description** | **Priority (10-1)** | **Reference/Use Case** |
| R-001 | User Management | The system should allow farmers, suppliers, and vendors to create and manage their accounts. | 10 | User Registration & Authentication |
| FR-002 | Crop Tracking | Farmers should be able to record and monitor crop lifecycles from plantation to harvest. | 10 | Crop Lifecycle Tracking |
| FR-003 | Inventory Management | The system should maintain real-time stock levels and update dynamically. | 9 | Stock Management & Inventory Updates |
| FR-004 | Procurement & Sales Tracking | Automate procurement and sales transactions, tracking crops from farms to markets. | 10 | Order & Sales Processing |
| FR-005 | Automated Invoicing | Generate invoices automatically for procurement and sales transactions. | 9 | Invoice Generation & Financial Tracking |
| FR-006 | Price Management | Enable vendors to set dynamic pricing based on demand and market trends. | 8 | Pricing Module |
| FR-007 | Data Analytics & Reporting | Provide insights on crop production, demand forecasting, and sales trends. | 8 | Business Intelligence Dashboard |
| R-008 | Real-Time Notifications | Notify users about crop status, order updates, and system alerts. | 7 | Notification & Alerts |
| FR-009 | Integration with Payment Gateways | Allow digital payments and track financial transactions securely. | 7 | Payment Processing |
| FR-010 | Multi-Device Accessibility | The platform should be accessible via web and mobile applications. | 9 | Mobile & Web Compatibility |

**2. Non-Functional Business Requirements**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Req ID** | **Requirement Name** | **Requirement Description** | **Priority (10-1)** | **Reference/Use Case** |
| NFR-001 | System Scalability | The system should support a growing number of users and data without performance issues. | 10 | Infrastructure Scalability |
| NFR-002 | Data Security | Implement encryption and authentication mechanisms to protect user and financial data. | 10 | Security & Compliance |
| NFR-003 | System Availability | Ensure 99.9% uptime to support farmers and vendors with uninterrupted access. | 9 | Service Level Agreement (SLA) |
| NFR-004 | User Experience (UX) Optimization | Ensure the interface is intuitive and accessible to non-technical users. | 9 | UI/UX Design Standards |
| NFR-005 | Response Time | The system should respond to user actions within 3 seconds for optimal performance. | 8 | Performance Metrics |
| NFR-006 | Backup & Recovery | Implement automatic data backups and disaster recovery mechanisms. | 9 | Data Redundancy & Backup Strategy |
| NFR-007 | Regulatory Compliance | Ensure compliance with agricultural laws and data protection regulations. | 8 | Legal & Compliance |
| NFR-008 | Cross-Browser Compatibility | The system should work across major browsers like Chrome, Firefox, Safari, and Edge. | 7 | Browser Compatibility Testing |
| NFR-009 | Localization & Multi-Language Support | The platform should support multiple languages based on user demographics. | 7 | Language Settings |
| NFR-010 | Integration with IoT Sensors | Enable real-time crop monitoring via IoT-based tracking solutions. | 7 | IoT Integration |

**3. Requirements Traceability Matrix**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID** | **Requirement Name** | **Requirement Description** | **Design** | **D1 (Dev Phase 1)** | **T1 (Test Phase 1)** | **D2 (Dev Phase 2)** | **T2 (Test Phase 2)** | **UAT** |
| FR-001 | User Authentication & Role Management | The system must support secure login with role-based access (e.g., farmers, vendors, admin). | Completed | Implemented | Passed | Ongoing | Pending | Pending |
| FR-002 | Crop Lifecycle Management | Farmers should be able to record, monitor, and update crop status from planting to harvesting. | Completed | Partially Implemented | In Progress | Ongoing | Pending | Pending |
| FR-003 | Inventory Management | The system should allow real-time tracking of available stock, reducing wastage and shortages. | Completed | Implemented | Passed | Ongoing | Pending | Pending |
| FR-004 | Procurement Management | Automate the procurement process from farmers to market vendors, ensuring proper documentation. | Completed | Implemented | Passed | Planned | Pending | Pending |
| FR-005 | Sales & Order Tracking | Track sales orders and provide a clear record of transactions between farmers and buyers. | Completed | Not Started | In Progress | Planned | Pending | Pending |
| FR-006 | Automated Invoice Generation | Generate invoices for each transaction to minimize manual errors and administrative workload. | Completed | Partially Implemented | In Progress | Planned | Pending | Pending |
| FR-007 | Payment Integration | Enable digital payment options such as mobile wallets, UPI, and bank transfers. | Completed | Implemented | Passed | Planned | Pending | Pending |
| FR-008 | Real-time Notifications | Send alerts/reminders for key farming activities (e.g., irrigation, harvesting, low stock alerts). | Completed | Implemented | Passed | N/A | Pending | Pending |
| FR-009 | Data Analytics & Reporting | Generate reports on crop production, sales trends, and inventory insights for better decision-making. | Completed | Implemented | Passed | N/A | Pending | Pending |
| FR-010 | Multi-Language Support | Allow users to switch languages to ensure ease of use for non-English speaking farmers. | Design Document Section 3.1 | Implemented | Test Case TC-001 | N/A | Pending | Pending |
| FR-011 | Supplier & Buyer Management | Provide a directory of suppliers and buyers, facilitating direct communication and transactions. | Design Document Section 3.2 | Implemented | Test Case TC-002 | N/A | Pending | Pending |
| FR-012 | AI-Based Crop Suggestions | Use AI recommendations to suggest optimal planting schedules based on weather and demand. | Design Document Section 4.1 | Not Started | Test Case TC-003 | Completed | Pending | Pending |
| FR-013 | Offline Data Entry | Allow users to input data offline, syncing automatically once an internet connection is available. | Design Document Section 4.2 | Implemented | N/A | Planned | Pending | Pending |
| FR-014 | Government Compliance Reports | Generate standardized reports required for government food safety and agricultural compliance. | Design Document Section 5.1 | Not Started | Test Case TC-006 | N/A | Pending | Pending |
| FR-015 | Farm Expense Tracking | Allow farmers to log expenses related to seeds, fertilizers, labor, and maintenance. | Design Document Section 6.1 | Not Started | N/A | Planned | Pending | Pending |

**4. Use Case Documentation**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Description** | **Priority** | **Functional Area** | **Source** | **Use Case Link** | **Dependencies** | **Status** |
| REQ-001 | Users must be able to log in using email and password. | High | User Management | Stakeholder A | Use Case 1 | None | Approved |
| REQ-002 | System must support role-based access control (Admin, User, and Guest). | High | User Management | Stakeholder B | Use Case 2 | REQ-001 | Draft |
| REQ-003 | Data must be encrypted at rest and in transit. | High | Security | Compliance Team | Use Case 3 | None | Approved |
| REQ-004 | System must generate daily sales reports in PDF format. | Medium | Reporting | Stakeholder C | Use Case 4 | REQ-005 | Draft |
| REQ-005 | System must integrate with Salesforce for customer data synchronization. | High | Integration | Stakeholder D | Use Case 5 | None | Approved |
| REQ-006 | System must handle up to 10,000 concurrent users without performance degradation. | High | Performance | Stakeholder E | Use Case 6 | None | Approved |

### ****5. Key Reference Materials****

* **Use Case Documentation**: Links to detailed use case descriptions.
* **Stakeholder Interviews**: Notes or recordings of stakeholder discussions.
* **Technical Specifications**: Architecture diagrams, API documentation, etc.
* **Compliance Documents**: Regulatory or security standards (e.g., GDPR, HIPAA).
* **Test Plans**: Links to test cases and validation procedures.

### ****6. Tools for Managing Requirements****

To streamline this process, consider using tools like:

* **Jira**: For requirement tracking and task management.
* **Confluence**: For documentation and linking requirements to use cases.
* **Excel/Google Sheets**: For traceability matrices and requirement tables.
* **Requirement Management Tools**: Such as IBM DOORS or Jama Software.

**10. Appendices**

**10.1. List of Acronyms**

|  |  |  |
| --- | --- | --- |
| **Acronym** | **Full Form** | **Description** |
| BRD | Business Requirements Document | A document that outlines the business needs and requirements for the project. |
| FR | Functional Requirement | A requirement that defines a specific feature or function of the system. |
| NFR | Non-Functional Requirement | A requirement that defines the quality attributes of the system, such as performance and security. |
| ROI | Return on Investment | A measure of the profitability of the project over time. |
| UI/UX | User Interface/User Experience | The design and usability aspects of the system. |
| IoT | Internet of Things | The use of smart devices and sensors for real-time crop monitoring. |
| SLA | Service Level Agreement | An agreement defining the expected system performance and uptime. |
| API | Application Programming Interface | A set of protocols for integrating the system with other applications. |
| DBMS | Database Management System | The system used for storing and managing data efficiently. |
| ERP | Enterprise Resource Planning | A system that integrates business processes, including procurement and inventory. |
| SSL | Secure Sockets Layer | A security technology for encrypted communication over the internet. |
| GDPR | General Data Protection Regulation | A regulation for data protection and privacy compliance. |
| ML | Machine Learning | A subset of AI used for predictive analytics and automated decision-making. |
| AI | Artificial Intelligence | The use of intelligent algorithms for automation and insights. |
| CSV | Comma-Separated Values | A file format used for exporting and importing data. |
| XML | Extensible Mark-up Language | A format used for data exchange between systems. |
| JSON | JavaScript Object Notation | A lightweight data format for API communication. |
| HTTPS | Hypertext Transfer Protocol Secure | A secure version of HTTP for safe web communication. |
| KPI | Key Performance Indicator | Metrics used to evaluate the project's success and efficiency. |
| MIS | Management Information System | A system used to analyse and report business operations. |

**10.2. Glossary of Terms**

|  |  |
| --- | --- |
| **Term** | **Definition** |
| Urban Farming | The practice of cultivating, processing, and distributing food in or around urban areas. |
| Crop Lifecycle Management | The process of tracking crops from plantation to harvesting and sales. |
| Inventory Management | A system to keep track of stored crops, ensuring supply meets demand without wastage. |
| Procurement | The process of sourcing and purchasing crops from farmers to be sold in markets. |
| Supply Chain Transparency | Ensuring all stakeholders have visibility into the movement of crops from farm to market. |
| Invoice Automation | The automatic generation of invoices to streamline financial transactions. |
| Data Analytics | The process of analysing collected data to improve decision-making. |
| Real-Time Tracking | A feature that allows monitoring of crop availability and sales in real time. |
| Sustainability | Farming practices that minimize environmental impact and maximize efficiency. |
| Stakeholders | Individuals or organizations involved in the project, such as farmers, suppliers, and market vendors. |
| Traceability | The ability to track the origin and movement of crops throughout the supply chain. |
| Forecasting | Predicting future demand and crop production based on historical data. |
| Digital Platform | A web or mobile-based system that facilitates farm management and crop sales. |
| Automated Reports | System-generated insights and reports to help farmers and suppliers make informed decisions. |
| Market Planning | Strategies for optimizing crop sales based on demand and supply trends. |
| Harvesting Schedule | A timetable for collecting mature crops to ensure optimal freshness and supply. |
| Compliance Regulations | Legal and industry standards that farmers and suppliers must adhere to. |
| User Authentication | Security measures such as login credentials to protect access to the platform. |
| Cloud Storage | A secure online repository for storing system data, invoices, and reports. |

10.3. Related Documents

* **Functional Requirements Specification (FRS)** - Detailed description of the functionalities the system will provide. Includes use cases, user interactions, and system behaviour.
* **System Requirements Specification (SRS)** - Technical details about the system architecture, hardware/software requirements. Describes integration points with other systems.
* **Use Case Documentation** - Provides detailed scenarios of how users will interact with the system. Includes actors, preconditions, and expected outcomes.
* **Process Flow Diagrams** - Visual representations of the existing (AS-IS) and proposed (TO-BE) processes. Helps illustrate how information and tasks flow through the system.
* **Data Flow Diagram (DFD)** - Illustrates how data is input, processed, stored, and output within the system. Helps define the structure of data movement across different modules.
* **System Architecture Document** - Provides a high-level view of the system’s infrastructure. Details backend, frontend, database, and cloud storage components.
* **Integration Plan** - Outlines how the system will integrate with third-party services, APIs, or existing solutions. Includes data exchange protocols and security considerations.
* **Test Plan & Test Cases** - Defines the testing strategy for ensuring system quality. Lists test scenarios and expected outcomes.
* **Deployment Plan** - Steps required to deploy the system into production. Includes rollout strategies, backup plans, and contingency measures.
* **Training & User Manuals** - Guides for farmers, suppliers, and stakeholders to use the platform. Includes step-by-step instructions, screenshots, and troubleshooting tips.
* **Compliance & Regulatory Documentation** - Legal guidelines, data privacy policies, and industry regulations relevant to urban farming.
* **Project Charter**: Outlines the scope, objectives, and stakeholders of the project.
* **System Requirements Specification (SRS)**: Details the functional and non-functional requirements.
* **API Documentation**: Describes the endpoints, parameters, and usage of API.