

Mobile Agricultural Marketplace – System Design

Project Overview

Title: Design and Development of a Mobile-Based Marketplace for Enhancing Direct Agricultural Trade Between Farmers and Clients

Objective: Build a mobile-first platform connecting farmers and clients, replacing traditional orders with a WhatsApp chat feature.

Scope: Mobile marketplace, role-based access control, modular backend design, WhatsApp chat for communication.

Phase One – Core System Design

1. Users & Roles

Role	Responsibilities
Farmer	Add/edit/delete own products, manage stock
Client	Browse products, contact farmers via WhatsApp
Admin	Moderate products/users (optional)

User Data Model (Table: users) - `id`, `name`, `email`, `password_hash`, `role` (`farmer`, `client`, `admin`), `created_at`

Role-Based Permissions - Farmers → CRUD their products only

- Clients → browse products and initiate chat

- Admin → manage all products/users

2. Core Backend Modules (Locked)

Auth Module - Responsibilities: Register/Login, hash passwords, issue tokens, role-based access

- Endpoints: `/api/register`, `/api/login`, `/api/logout`

Product Module - Responsibilities: CRUD products, browse/search products, moderation

- Endpoints: `/api/products`, `/api/products/{id}` (GET, POST, PUT, DELETE)

Communication Module (WhatsApp Chat) - Replaces Orders Module

- Clients contact farmers via WhatsApp link

- Endpoint: `/api/products/{id}/chat` → returns WhatsApp link

Permissions Enforcement - All actions checked against user roles in backend

- Farmers cannot edit others' products
- Clients cannot delete products
- Admin can override everything

Phase Two – Database Implementation

Database Tables

1. users

```
CREATE TABLE users (  
  id INT AUTO_INCREMENT PRIMARY KEY,  
  name VARCHAR(100) NOT NULL,  
  email VARCHAR(100) NOT NULL UNIQUE,  
  password_hash VARCHAR(255) NOT NULL,  
  role ENUM('farmer', 'client', 'admin') NOT NULL,  
  created_at DATETIME DEFAULT CURRENT_TIMESTAMP  
);
```

2. products

```
CREATE TABLE products (  
  id INT AUTO_INCREMENT PRIMARY KEY,  
  farmer_id INT NOT NULL,  
  name VARCHAR(100) NOT NULL,  
  category VARCHAR(50),  
  description TEXT,  
  price DECIMAL(10,2) NOT NULL,  
  quantity INT DEFAULT 0,  
  image_url VARCHAR(255),  
  created_at DATETIME DEFAULT CURRENT_TIMESTAMP,  
  updated_at DATETIME DEFAULT CURRENT_TIMESTAMP ON UPDATE  
  CURRENT_TIMESTAMP,  
  FOREIGN KEY (farmer_id) REFERENCES users(id) ON DELETE CASCADE  
);
```

3. Optional Analytics (WhatsApp Chat Clicks)

4. Fields: `id`, `product_id`, `client_id`, `clicked_at`

Notes - Relationships: `products.farmer_id → users.id`

- No Orders/Payments table needed

Phase Three – Backend Logic & API Contracts

Auth Module: register/login/logout with role-based access

Product Module: CRUD & browse/search

Communication Module: WhatsApp chat feature instead of orders

Permissions: enforce user roles at backend

Design Principles

- Modular monolith: each module in its own folder/package
 - Database-first approach → informs backend & frontend
 - System design guides mobile UI/UX
 - All endpoints secure and role-aware
 - No payment gateway — WhatsApp chat replaces direct ordering
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Suggested Free AI Tools for Project Planning

Tool	Use Case	Notes
Notion AI	Task/project planning, documentation, kanban boards	Free plan; AI can summarize & generate docs
ClickUp AI	Project management, sprint planning, task breakdown	Free version includes AI suggestions
Trello + Butler AI	Kanban boards + AI automation	Generate checklists & automated workflows
GitHub Copilot Chat	Plan and scaffold backend/frontend code logic	Free with GitHub Student Pack
ChatGPT (Free / Plus)	Brainstorm system designs, document plans, generate API contracts	Can create flowcharts, step-by-step plans
Obsidian + AI plugins	Knowledge base + project notes	Local-first, great for locked system design docs
Miro AI (Free Tier)	Whiteboard, flowcharts, diagrams	Great for UI/UX planning visually

Document Complete – Locked Blueprint

This document captures all phases, modules, database design, API contracts, permissions, and project planning AI suggestions.