

# 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.

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## 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
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### 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
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## 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

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## 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

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## 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

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### Document Complete - Locked Blueprint

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