Smart Agriculture ERP System

1. Login Page – System Description

1.1 Purpose of the Login Page

The Login Page serves as the primary access point to the Smart Agriculture ERP System. It allows registered users to securely enter the system and access features relevant to their role. The system is designed to support three main user groups: farmers, agriculture instructors, and agriculture department officers, all through a single unified login interface.

1.2 User Access

All user categories access the system using the same login page. The system identifies the user's role after successful authentication and redirects the user to the appropriate dashboard automatically. No role selection is required at the login stage.

1.3 Login Credentials

Users are required to enter the following credentials:

• Username: Users can choose their own unique username during the account creation process.

• Password: Users must create a moderate-strength password that meets basic system requirements.

1.4 Login Process Flow

1. The user navigates to the login page.

2. The user enters their username and password.

3. The system validates the entered credentials.

4. If the credentials are correct, the system identifies the user's role and redirects the user to the relevant dashboard.

5. If the credentials are incorrect, the system displays an appropriate error message and prompts the user to try again.

1.5 New User Registration Link

The login page includes an option for new users to create an account. Users who do not already have login credentials can proceed to the registration process from this page.

2. User Detail Collection (Post-Login Registration)

2.1 Purpose

After creating login credentials, users are required to complete a separate form to provide personal and role-specific details. This ensures that the system maintains accurate records and delivers role-appropriate services.

2.2 Data Collection Approach

• Login credentials are created first.

• On first login, users are redirected to a user details form.

• The form collects relevant information based on the user's role (e.g., farmer details, instructor affiliation, department designation).

2.3 Completion Requirement

Users must complete the required personal information form before gaining full access to the system functionalities.

There should be two dashboards (admin (VertexcoreAI), farmer.

Farmer Dashboard

The dashboard should contain the following major sections -> Crop Management, Inventory Management, Finance and Labour Management, Environment Management (Automation), Data analysis and business insights

Crop Management

The dashboard includes a crop selection section with the following categories: Greenhouse, Poly Tunnel, Net / Shading house, Outdoor farming, Paddy fields, Other Crops, and Dairy farming.

Within each category (e.g., Greenhouse), the farmer can add specific instances such as Greenhouse A, Greenhouse B, etc. After selecting a specific instance like Greenhouse A, the farmer can enter details including the greenhouse square feet, crop type (e.g., bell pepper, cucumber, capsicum, hot Chilli, strawberry, etc.), crop starting date, and the number of plants inside the greenhouse. For other cultivation types like outdoor farming, the farmer can add the land area using perches and acres. Once all crops are added, the dashboard displays the selected crop types, such as Greenhouse A, Greenhouse B, Paddy field, Poly tunnel A, etc.

Upon clicking and entering a specific crop instance like Greenhouse A, the farmer can perform crop management.

In the crop management section, there are subsections as follows:

Fertilizer Management: The farmer selects the fertilizer to use for the crop, such as Calcium Nitrate, Albert Solution, K44, and Magnesium Sulphate. After selection, the farmer enters the amount added to the plants daily.

Pesticides Management: The farmer adds pesticides for the crop, such as Chess, Abamectine, Imida, Mosphilan, etc. Pesticides come as powders or liquids, so when entering the pesticide, the farmer specifies the amount in grams, ml, or liters. When spraying pesticides, the farmer enters the amount used for the crop. The farmer can also add the next date for spraying pesticides, and the system notifies one day before that date.

Fungicides Management: Follows the same pattern as pesticides. Some fungicides include: Topsin, Dacoli, Homai, Captan, Mancozeb.

Water Management: The farmer enters the water amount put for a plant. Using this, the system calculates the total amount of water used for all crops.

Harvest Management: The farmer enters the crop amount plucked, selecting the day first. If there is a discard amount, it should be mentioned, and the farmer can add a reason if desired. Market price, marketplace, and selling price should be added. There can be different buyers, so the farmer can add different market prices, marketplaces, and selling prices.

Next section ->**Notes**: The farmer can add any information as desired and save it for reference.

In the next section - Analysis ->Analysis should show here like Total harvest up to now, total cost for this crop cycle up to now, total cost for fertilizer, pesticides, and fungicides up to now. Total cost prediction for fertilizer, pesticides and fungicides. Total water usage for the crop. Like this we should add more analysis for business insights.

Inventory Management

Here we should implement when we have resources that are scarce (Kshayawana sampath), like poly tunnels, greenhouses, vehicles, farmers are able to add them and make a rate like (10% for annually). This should affect the monthly profit calculations of crop cycles.

Then there should be another part for adding expenses like grow bags, hanging ropes, spray machines, buckets, mulch sheets, and other things. Here, there is no need to add the scarce rate.

Then there should be a Fertilizer, Pesticides and Fungicides management part.

Here we add a fertilizer for an example K44 – 1kg, Rs 1000.00 per kilogram, 2026.01.05 like that. In the crop management section we think we used 200gram for the crop of Greenhouse A, Then we used another 100gram for the crop of greenhouse B. Total should be deducted from the Inventory.

Like this same procedure should affect to the pesticides, and fungicides too.

Finance and Labour Management

Here, we should link the finance details that come from the crop management section and the inventory management section. And should add another expenses as well, like transport costs, water bill, electricity bill, taxes, and others.

Farmer should be able to create labour profiles for his labours. Then he can update the working days, working hours, daily payments or monthly payments according to the labour. While creating the profile, it will be better to add a profile picture as well.

Here farmer should be able to see all the financial analytics here.

Environment Management (Automation)

Here in this section, valuable environmental conditions for farming should be gathered using temp & humidity sensors, soil moisture sensors, light intensity sensors, and co2 sensors.

After analysing the data, irrigation, ventilation fans, dehumidifiers, and misters can be controlled by using the control unit.

Along with sensors, we should get the weather forecast using an accurate weather API for more accurate decision-making for automating the above irrigation and everything.

Data analysis and business insights

Here, we should include all the analytics we can get by processing gathered data. AI can be used for predictions as well.