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Faculty of Engineering & Information Technology
Department of Computer Engineering

GRADUATION PROJECT I
BLOOM

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Disclaimer

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Abstract

Bloom is a smart agriculture platform designed to help farmers manage their crops and access agricultural services in a simple and organized way. The project combines several important features in one system, including crop management, expert communication, AI-based assistance, and an online marketplace. Bloom is available as both a web application and a mobile application, which allows users to access the system anytime and from different devices.

Through Bloom, farmers can create crop cases, upload images, receive guidance, and communicate with agricultural experts using a real-time messaging system. The platform also provides a marketplace where users can buy, sell, or rent agricultural products and tools. In addition, Bloom includes AI-supported features that help generate tasks and recommendations based on crop information and environmental conditions.

The main goal of this project is to reduce the need for farmers to rely on multiple separate platforms and instead provide one integrated solution that supports daily farming activities. Bloom aims to improve access to reliable information, enhance communication between farmers and experts, and support better decision-making in agriculture using modern web and mobile technologies.

Chapter 1

Introduction

1.1 General Background

Agriculture plays a vital role in supporting communities and ensuring food security, especially in regions that depend heavily on farming for their daily income. Farmers often face challenges related to crop health, access to reliable information, communication with experts, and obtaining agricultural products and tools. In many cases, these services are scattered across different platforms, which makes farming management more difficult and time-consuming.

With the rapid development of web and mobile technologies, digital platforms have become an effective solution for supporting farmers in managing their agricultural activities. Smart agriculture systems can help farmers organize crop information, receive guidance, communicate with experts, and access agricultural services in a more efficient way. This creates an opportunity to improve decision-making, reduce losses, and support sustainable farming practices.

1.2 Project Objectives

The Bloom project aims to provide an integrated smart agriculture platform that helps farmers manage their crops and access essential agricultural services through a single system. The objectives of the project are divided according to user roles as follows:

For Regular Users (Farmers and General Users)

- **Secure Authentication System:** Includes registration, login, logout.
- **Crop Case Management:**
 - Users can create crop cases by adding crop details, descriptions, tasks, and images. This feature allows farmers to document crop conditions, follow plant health issues, and organize crop-related information in one place.
- **Expert Consultation and Messaging:**

- Bloom allows users to communicate directly with agricultural experts through a real-time messaging system. This enables farmers to ask questions, and receive professional advice in a structured and reliable way.

- **AI-Based Support and Guidance:**

- Help users with basic and daily crop care tasks and recommendations.
- Identifying plant diseases and providing advice to help treat them.
- Automatically displays the plant's life cycle as soon as the plant is added to your crops, and continuously tracks and confirms its progression from one stage to the next.
- When the user requests to add a plant, the AI verifies the environmental conditions entered by the user and assesses their suitability for that plant, then provides tailored advice based on the evaluation.
- A dedicated chat for freely talking with the AI and asking questions about plants.

- **Marketplace Access:**

- Users can buy, sell, or rent agricultural products, tools, and equipment through the integrated marketplace. This helps farmers access needed resources without relying on external platforms.
- Check your orders (what you ordered from others + what others ordered from you).
- Check your rentals (what you rented + what others rented from you).
- Pay online or pay cash on delivery.
- Track your orders all the way — from packing → shipping → delivered right to your door.
- Users can report products listed in the marketplace. This reporting feature helps maintain platform safety and allows administrators to review and take appropriate actions when needed.
- Each product includes a dedicated questions section where users can ask questions and post inquiries related to the product. The product owner can respond directly to these questions, which helps improve clarity, trust, and decision-making before purchasing or renting items.

- **Community Interaction:**

- Bloom includes a community section where users can interact with other farmers and users, share their thoughts, images, locations, polls, and experiences, interact with posts by sharing, commenting and liking within a controlled environment.
- Users can report inappropriate or misleading posts in the community. This reporting feature helps maintain platform safety and allows administrators to review and take appropriate actions when needed.

- **Real-time Messaging System:**

- Chat with your friends for free.
- Chat with experts for a fee.

For Administrators

The administrator in the Bloom platform is responsible for managing, monitoring, and maintaining the system to ensure safety, reliability, and smooth operation. The admin panel provides several tools that support effective control over users, content, and marketplace activities.

- **User Management:**

- The admin can view and manage all user accounts on the platform. This includes monitoring user activity, reviewing account status, and taking actions such as warning, suspending, or banning users when necessary.

- **Expert Verification Management:**

- The admin is responsible for reviewing farmer requests to become verified experts. This process ensures that expert accounts are trustworthy and qualified before being approved.

- **Marketplace Management:**

- The admin oversees marketplace activities, including monitoring listed products, reviewing reported products, and ensuring that marketplace content follows platform rules. The admin can take actions such as removing inappropriate products or responding to reports.

- **Handling Reports and Complaints:**

- Bloom allows users to report posts in the community and products in the marketplace. The admin reviews these reports, evaluates their validity, and takes suitable actions to maintain platform safety and trust.

- **Product Questions Monitoring:**

- The admin can monitor the questions and answers related to marketplace products to ensure respectful communication and prevent misuse or misleading information.

1.3 Project Significance

Bloom represents an important digital solution for supporting farmers by integrating multiple agricultural services into a single platform. Instead of relying on separate systems for crop management, expert consultation, and agricultural marketplaces, Bloom provides a centralized environment that simplifies daily farming activities.

The significance of the Bloom project can be summarized as follows:

- **Integrated Agricultural Services:** Bloom combines crop case management, expert communication, AI-supported assistance, community interaction, and marketplace services in one system, reducing the need for farmers to use multiple platforms.
- **Improved Access to Expert Knowledge:** By enabling direct communication with verified agricultural experts, Bloom helps farmers receive reliable guidance and make better decisions related to crop health and management.
- **Support for Better Decision-Making:** The platform organizes crop information and provides AI-based recommendations that assist farmers in planning and responding to agricultural challenges more effectively.
- **Increased Accessibility:** The availability of Bloom as both a web application and a mobile application allows farmers to access the system anytime and from different working environments.

Overall, Bloom contributes to improving agricultural productivity, communication, and organization through the use of modern digital technologies.

1.4 Organization of the Report

This report is organized into six chapters as follows:

- **Chapter One** introduces the Bloom project, including the general background, project objectives, project significance, and the organization of the report.
- **Chapter Two** presents the theoretical background and reviews related work relevant to smart agriculture systems.
- **Chapter Three** describes the system methodology, including the tools, technologies, architecture, and the implementation of the main features for both users and administrators.
- **Chapter Four** presents the results and analysis of the Bloom system.
- **Chapter Five** discusses the project's goal achievement, actual contribution, strengths, and limitations.
- **Chapter Six** concludes the report and presents future work and possible improvements to the system.

Chapter 2

Theoretical Background and Related Work

2.1 Theoretical Background

Agriculture is one of the main sectors that directly affects food availability and community stability. Farmers face many daily challenges related to crop health, weather conditions, access to expert advice, and availability of agricultural tools and resources. In many cases, farmers rely on personal experience or delayed consultations, which can lead to incorrect decisions and crop losses.

With the development of web and mobile technologies, digital platforms have become useful tools for supporting farmers. Smart agriculture systems help organize crop information, provide guidance, and improve communication between farmers and experts. These systems make agricultural management easier and more efficient, especially for farmers who depend on mobile phones in their daily work.

Artificial intelligence is also being used in agriculture to support decision-making. AI-based features can help farmers with basic recommendations, task planning, and crop-related guidance based on available data. Although these technologies are still developing, they play an important role in improving modern agricultural systems.

In addition, digital agricultural platforms support interaction between farmers by allowing them to share experiences, ask questions, and learn from others. Combining crop support, expert communication, and community interaction in one system helps reduce complexity and improves accessibility.

2.2 Related Work

Several digital platforms and mobile applications have been developed to support farmers and improve agricultural practices. Many existing systems focus on a single aspect, such as crop monitoring, farm management, or providing educational content. Other platforms focus mainly on expert consultation, allowing farmers to communicate with specialists for advice.

In recent years, AI-based agricultural systems have gained attention, especially for plant disease detection and crop monitoring using images. These systems allow users to upload crop images and receive basic analysis or suggestions. However, most of these systems work independently and do not provide full integration with other agricultural services.

Some agricultural platforms also offer online marketplaces where farmers can buy and sell agricultural products and tools. However, these marketplaces are often separate from crop management and expert guidance features. This forces farmers to use multiple platforms, which increases complexity and reduces efficiency.

2.3 Relevance to the BLOOM Application

The Bloom platform was developed to overcome the limitations found in existing agricultural systems. Instead of offering separate features, Bloom combines crop case management, expert communication, AI-based assistance, community interaction, and marketplace services in one platform.

Bloom simplifies the user experience by organizing agricultural activities in a single system. Farmers can document crop problems, communicate with experts, ask questions, and access agricultural products without switching between different platforms. This integration improves efficiency and supports better decision-making.

By using modern web and mobile technologies, Bloom provides flexible access for users in different environments. The platform is designed to allow future improvements, such as enhanced AI features and additional agricultural services.

Chapter 3

Methodology

3.1 TOOLS, TECHNOLOGIES, ARCHITECTURE, AND PROGRAMMING LANGUAGE

3.1.1 Tools

The development of Bloom relied on several tools to support implementation and testing:

- **Visual Studio Code:** Used as the main development environment for both frontend (React/React Native) and backend (Node.js) code editing and debugging.
- **Android Studio Emulator:** Employed to test the mobile app during development on a simulated Android device.
- **Supabase:** The main database used to store structured data such as users, products, crops, logs, and system settings.
- **Postman:** Used for testing RESTful API endpoints between the frontend and backend, ensuring proper request handling, authentication, and response formats.
- **GitHub:** used for version control and collaboration, allowing the development team to manage updates, track changes, and maintain a reliable backup of the project source code throughout the development process.
- **Firebase Cloud Messaging:** Integrated to send real-time notifications to users, such as alerts for product expiry.

3.1.2 Architecture Diagram

The architecture of the **Bloom** platform is designed in a structured and layered manner that ensures clarity, maintainability, and scalability. The interaction begins at the client side, where users access the system through a user-friendly interface provided by the **web application built with React** and the **mobile application**. These interfaces allow farmers to manage crop cases, browse marketplace items, and communicate with experts, while experts, sellers, and admins access role-specific features based on their permissions.

When a user triggers an action (such as submitting a crop case, opening a conversation, or placing an order), the request is handled in the client application and then passed to the communication layer, which is responsible for sending requests to the backend through **RESTful API calls**. These API requests are processed by the **Node.js backend**, which manages the system logic including authentication, role-based authorization, validation, and routing to the correct service modules.

On the backend side, the system is organized into modular components that handle the core functionalities of Bloom, such as user management, crop posts/cases, marketplace operations, and messaging workflows. The backend communicates with the database layer to store and retrieve platform data, including user accounts, crop case information, chat conversations, and transaction records. In addition, Bloom integrates **WebSocket communication** to support real-time messaging, enabling instant message delivery and improving the responsiveness of the chat experience between users and experts.

Finally, Bloom supports optional AI-related functionality for plant health analysis by enabling the integration of an AI service that can process uploaded images and return disease classification or health indicators. This layered architecture allows Bloom to evolve over time, making it easier to add new modules, improve performance, and extend the system across both web and mobile platforms.

3.1.3 Programming Languages & Frameworks

The **Bloom** platform was developed using a full-stack architecture that supports both web and mobile environments. The web application frontend was built using **JavaScript** with the **React** framework to provide a responsive and interactive user experience. The mobile application was developed using **React Native**, allowing farmers and users to access Bloom features through smartphones while maintaining a consistent design and functionality across devices.

On the backend side, the system was implemented using **JavaScript** with **Node.js**, which provides RESTful API endpoints to handle authentication, role-based access control, crop cases, marketplace operations, and messaging functionalities. For real-time communication, **WebSocket technology** was integrated to enable instant message delivery and improve chat responsiveness between users.

For database management and backend services, Bloom uses **Supabase**, which provides a scalable relational database environment and supports secure data storage and retrieval for platform entities such as users, crop-related posts, conversations, and marketplace transactions. In addition, Bloom includes an AI component developed using **Python**, which supports plant health analysis and enables future enhancements for disease detection and classification based on uploaded images.

3.2 FEATURES IMPLEMENTATION

The primary goal of the **Bloom** platform is to support farmers in managing crop health, accessing agricultural services, and making better farming decisions in a simple and organized way. Since mobile phones are one of the most accessible tools for farmers in daily work, Bloom was developed as both a **mobile application** and a **web application**, allowing users to use the system anytime and from different devices. Through Bloom, farmers can submit crop cases, upload images, receive guidance, and access a marketplace where they can buy and sell agricultural products and tools.

Bloom also helps build a connected agricultural community by providing an integrated environment that combines crop support, communication, and marketplace services in one platform. This reduces the need for farmers to depend on scattered information

sources and makes it easier to find expert advice and suitable products in a faster and more reliable way.

In Bloom, there are two main roles:

- **Farmer:** the regular user of the system, and this role includes the ability to create crop cases, browse and purchase products, and also sell products through the marketplace. In addition, the farmer can submit a verification request to become an **Expert**, allowing verified users to provide professional consultation and support to other farmers through the platform.
- **Administrator:** responsible for managing the system, reviewing expert verification requests, monitoring users and reported content, and ensuring that Bloom operates safely and effectively.

3.2.1 WEBSITE

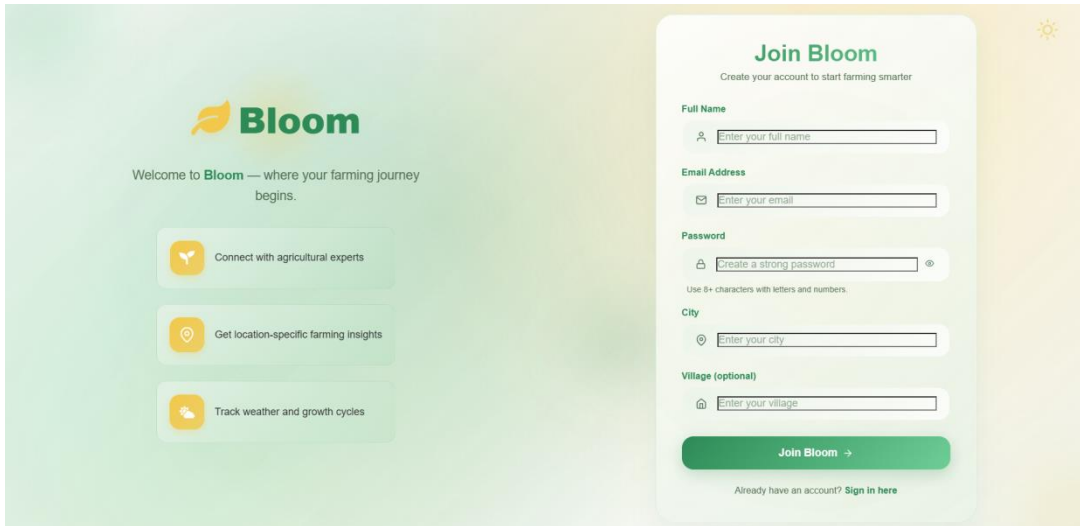
Bloom also provides a web application so farmers and admins can use the same services from a browser. The web version supports the same core modules: authentication, crop management, AI support, community, chat with expert payment workflow, marketplace (buy/sell/rent), profile verification, and admin dashboard management. This matches the Bloom goal of being available across device

- **Authentication Screens**

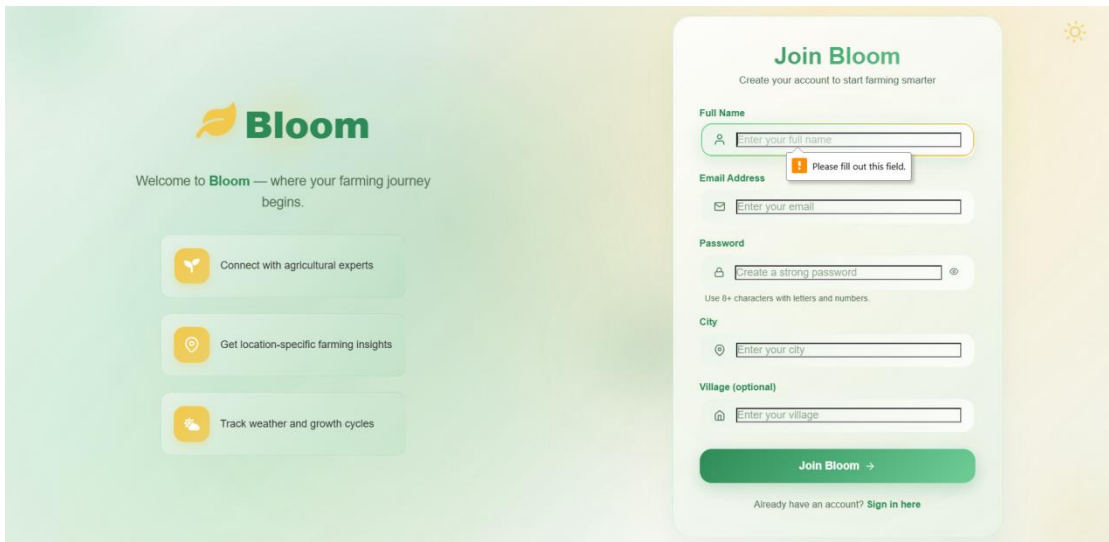
Our authentication screens provide two essential functions: user registration for new accounts and secure login for existing users.

- **Sginup Screens**

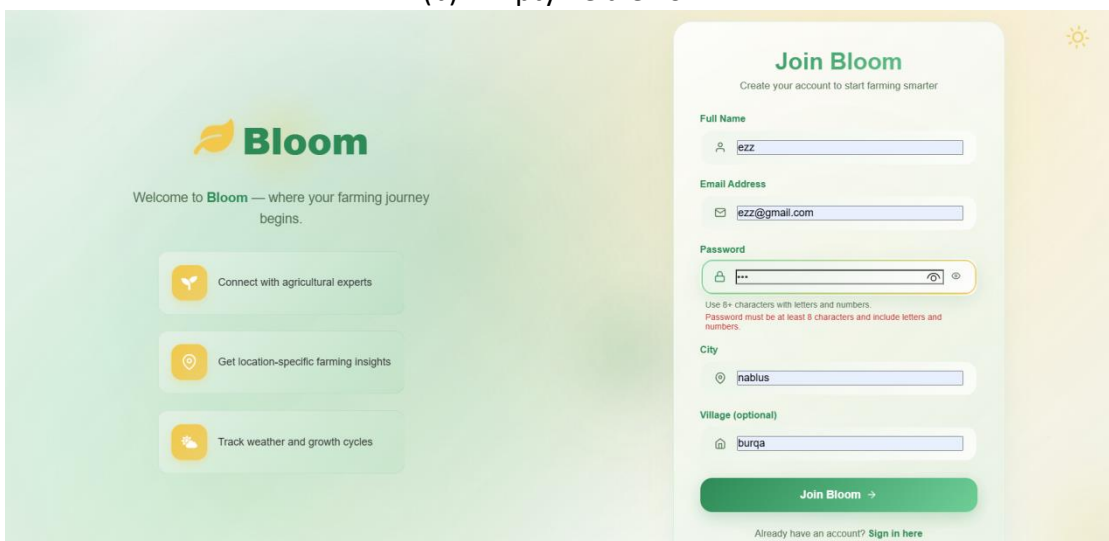
During account creation, users are required to provide essential information including their full name, email address, password, village, and city. The system performs real-time validation to ensure that all data is correctly entered and that both the email and phone number are unique and not previously used. One of the core strengths of this system is its ability to assess the strength of the entered password, ensuring it meets the application's security requirements. Additionally, the form prevents the submission of empty fields, ensuring complete and accurate data collection.



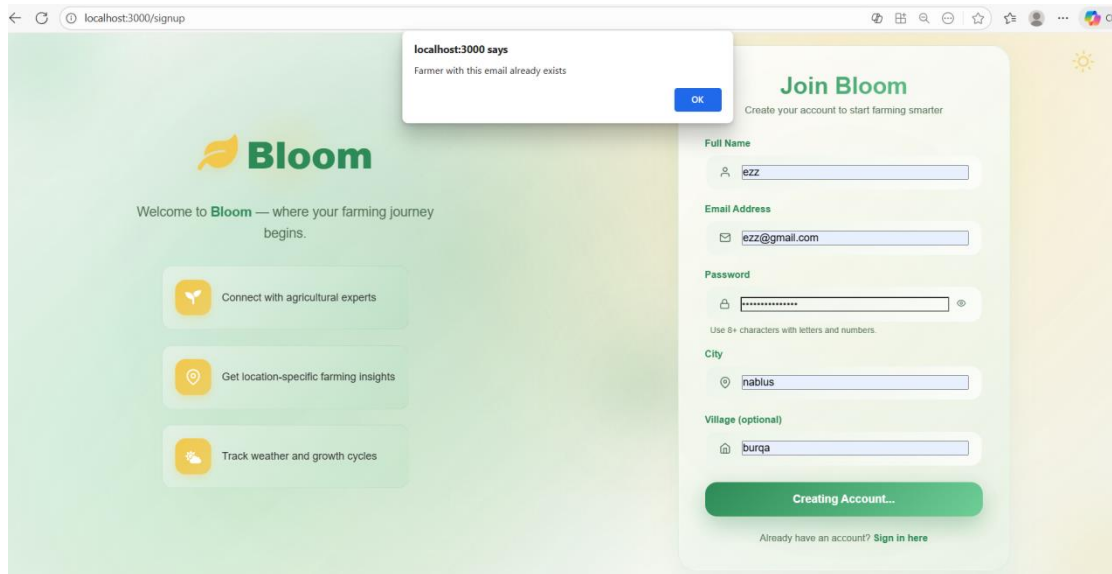
(a). Signup screen



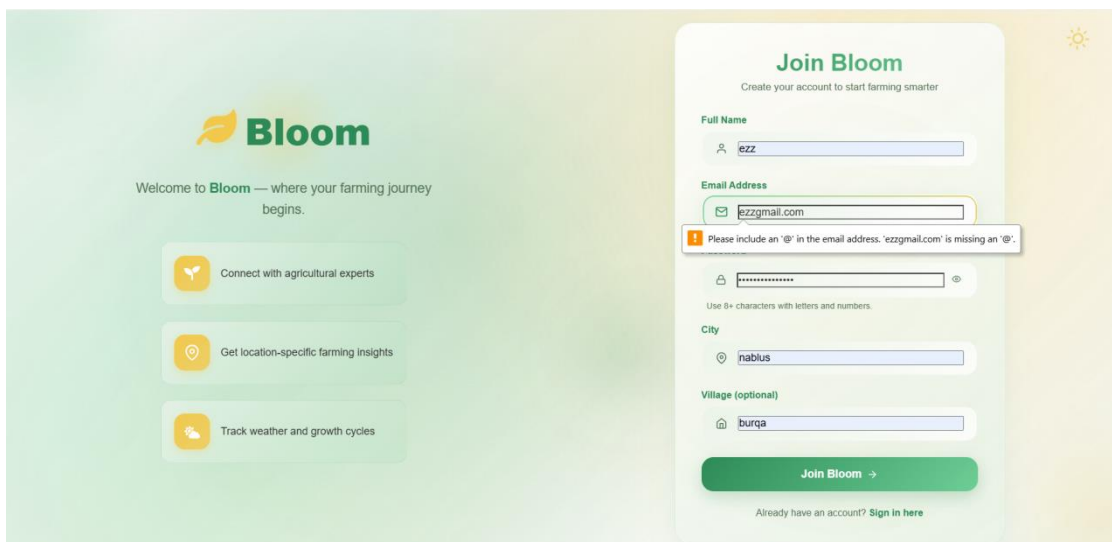
(b). Empty field error



(c). Password strength check



(d). Email duplication check

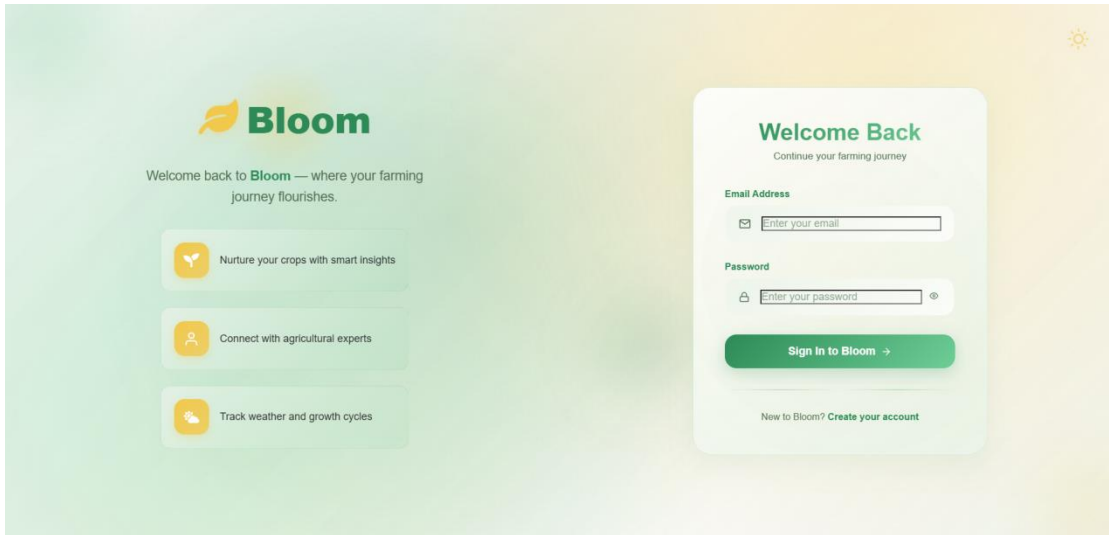


(e). Email format validation

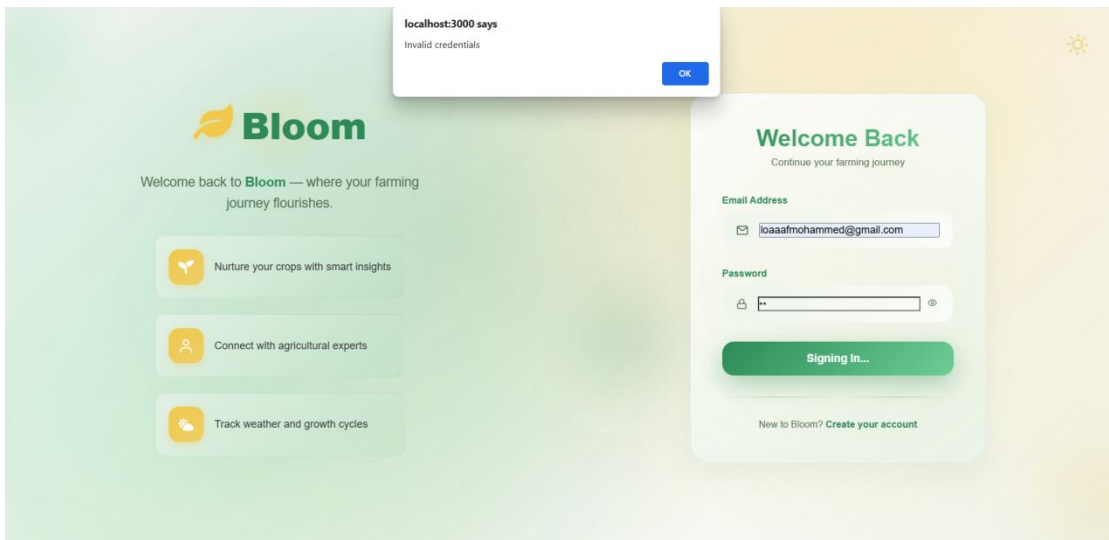
Figure 3.1: Signup Screens on the web interface

– **Sginin Screens**

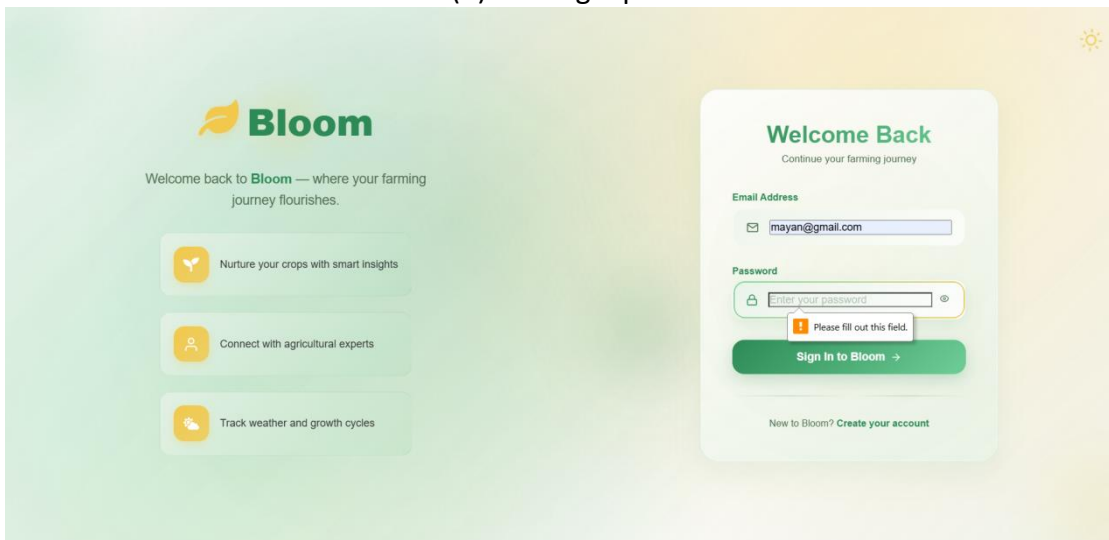
The sgin-In Screen allows registered users to access their accounts by entering their email and password. The interface is simple and user-friendly, guiding users through the login process. If the entered credentials are in-correct such as a wrong email or password—the system displays an error message informing the user of the issue and prevents access until valid information is provided. This helps maintain security and ensures only authorized users can log in.



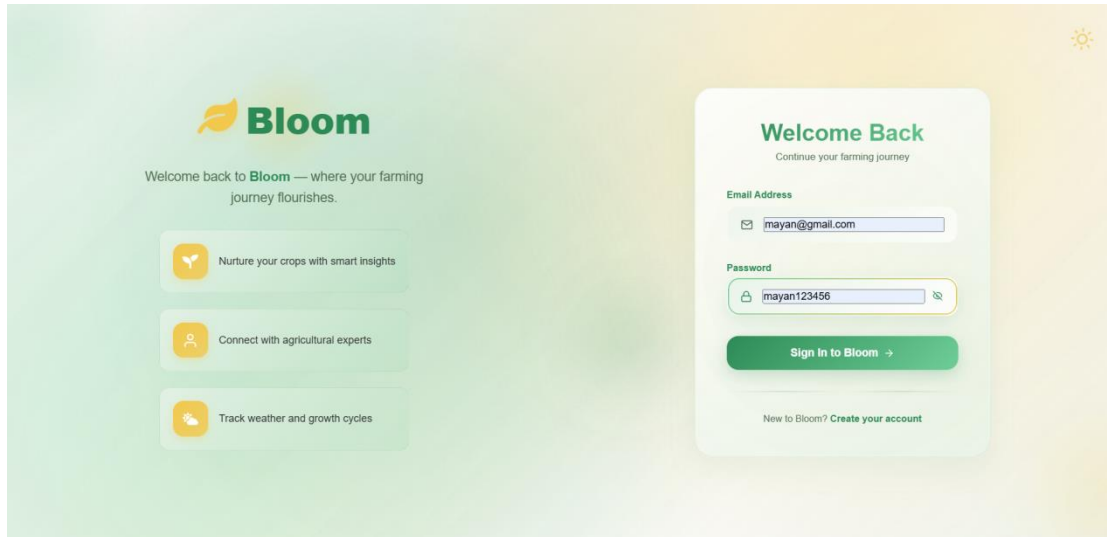
(a). Sginin page



(b). Wrong input



(c). Empty field validation



(d). Password visibility

Figure 3.2: Signin Screens on the web interface

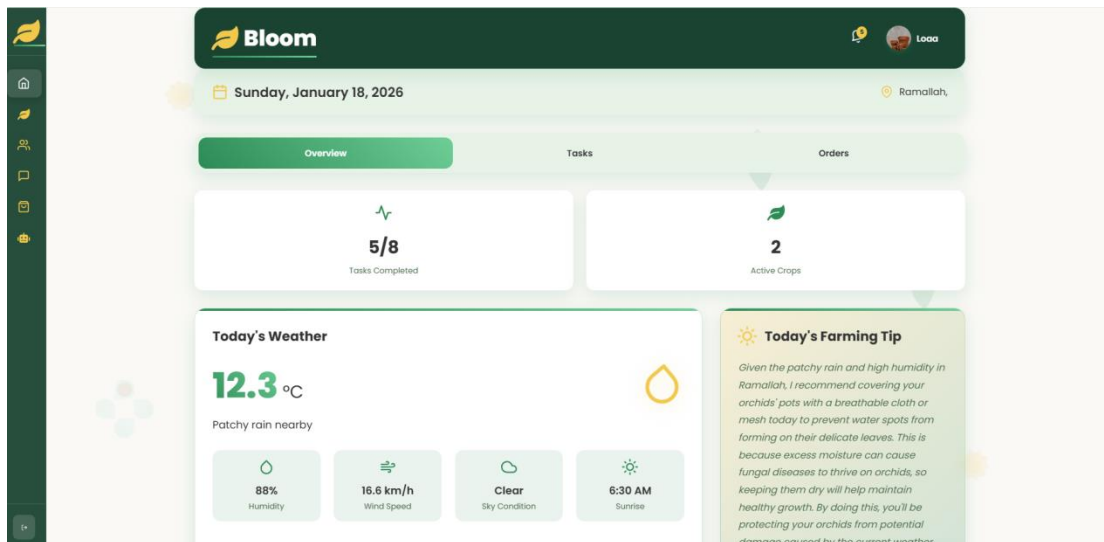
3.2.1.1 Use “BLOOM” Website as a USER (Farmer/ Expert)

• User Home Page

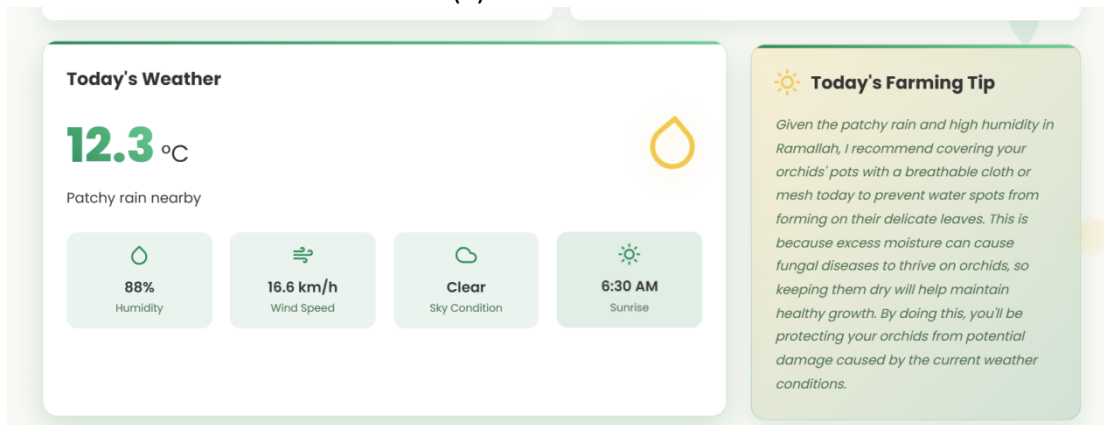
On the **Home page** of the Bloom platform, the user can view key daily information in a clear and organized way. The page displays the user’s **current location**, the **date**, and the **current weather status**. In addition, the system provides an **AI-generated tip** based on the weather conditions and the user’s available crops, helping the farmer make better decisions for daily farm activities.

The Home page is divided into **three main tabs**. The first tab, **Overview**, presents a quick summary of the user’s activity, including the total number of tasks assigned and the number of crops currently managed in the system. The second tab, **Tasks**, displays the list of daily farming tasks. These tasks can be automatically generated by the AI based on the user’s location, weather information, current crops, and the tasks completed in previous days. The AI generates today’s tasks by analyzing the provided inputs and creating a suitable plan for daily farming actions. The user can also manually add their own tasks to the system at any time. The third tab, **Orders**, allows the user to track marketplace activity by viewing the orders they have placed as a buyer, as well as the orders made by other users for the products they are selling.

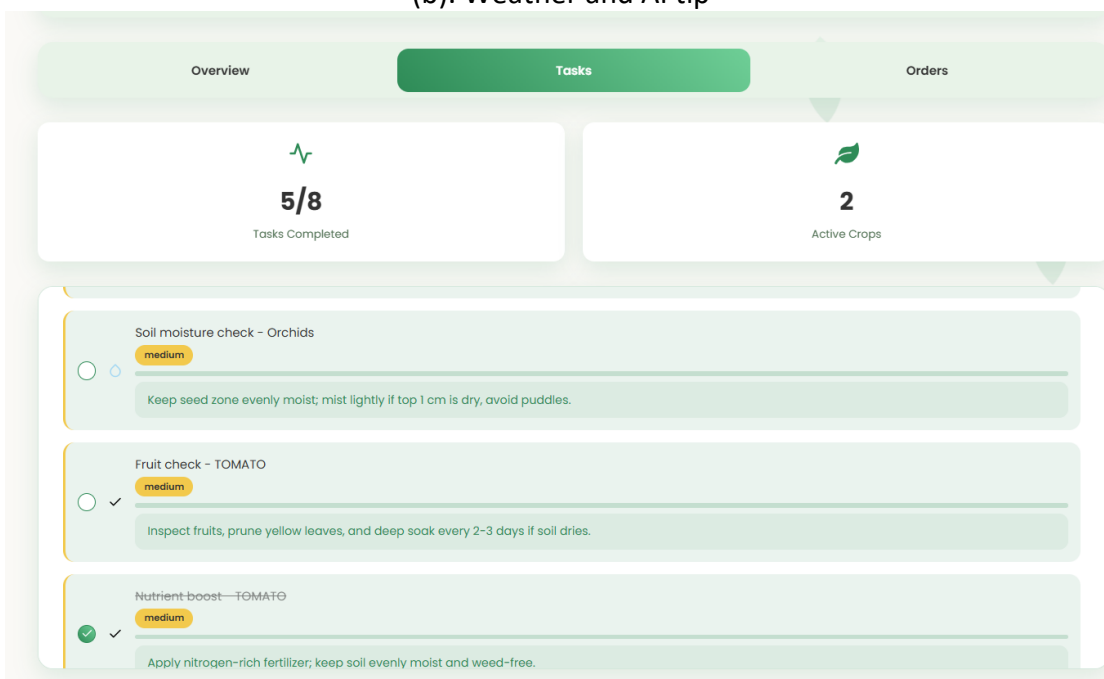
This for farmer and expert.



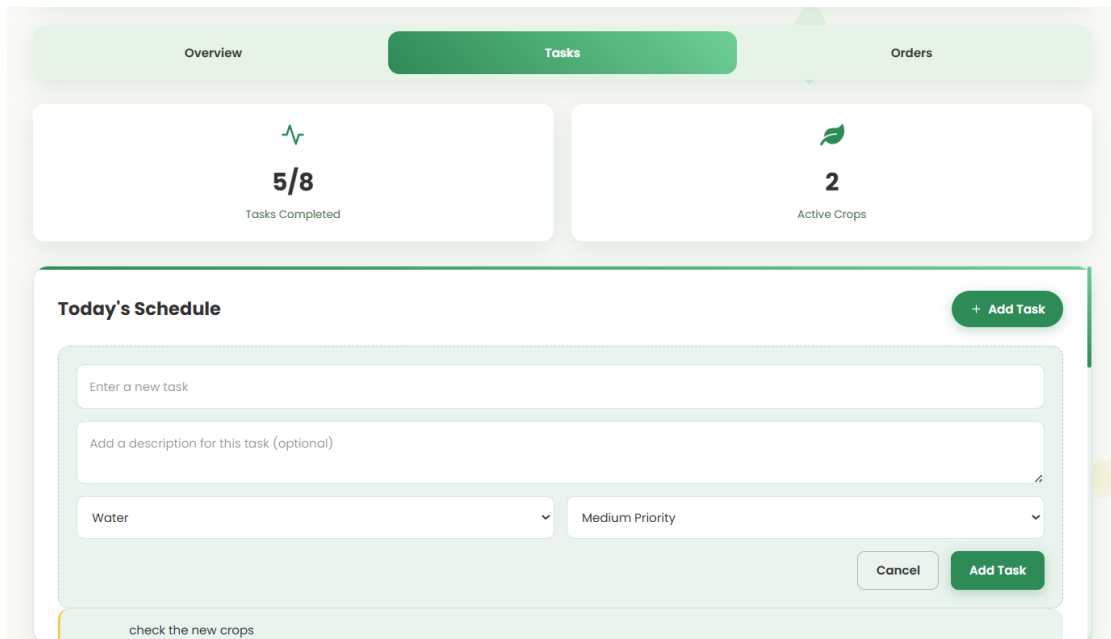
(a). home screen



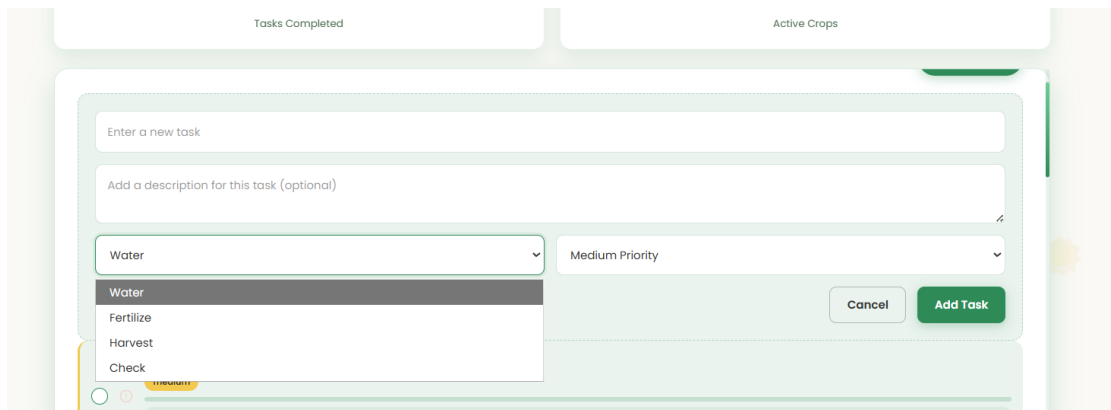
(b). Weather and AI tip



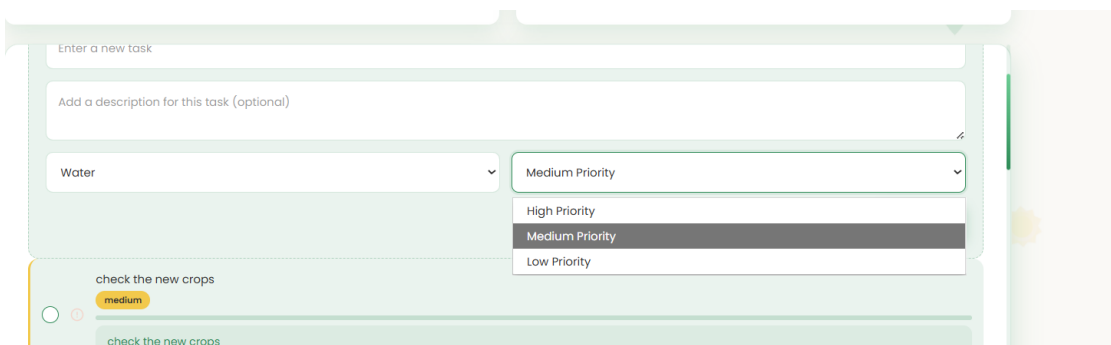
(c). task tap



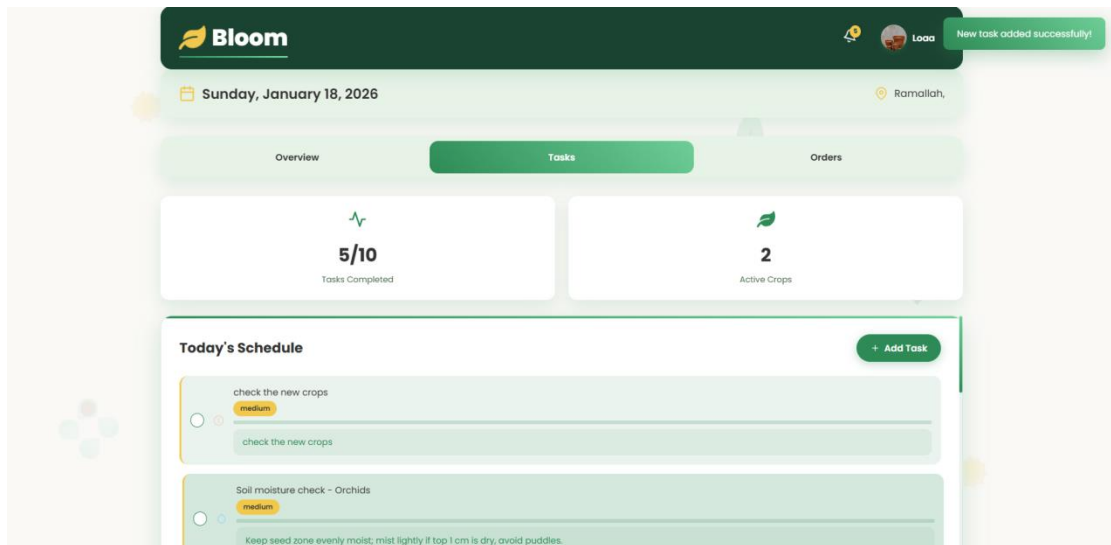
(d). add new task manually



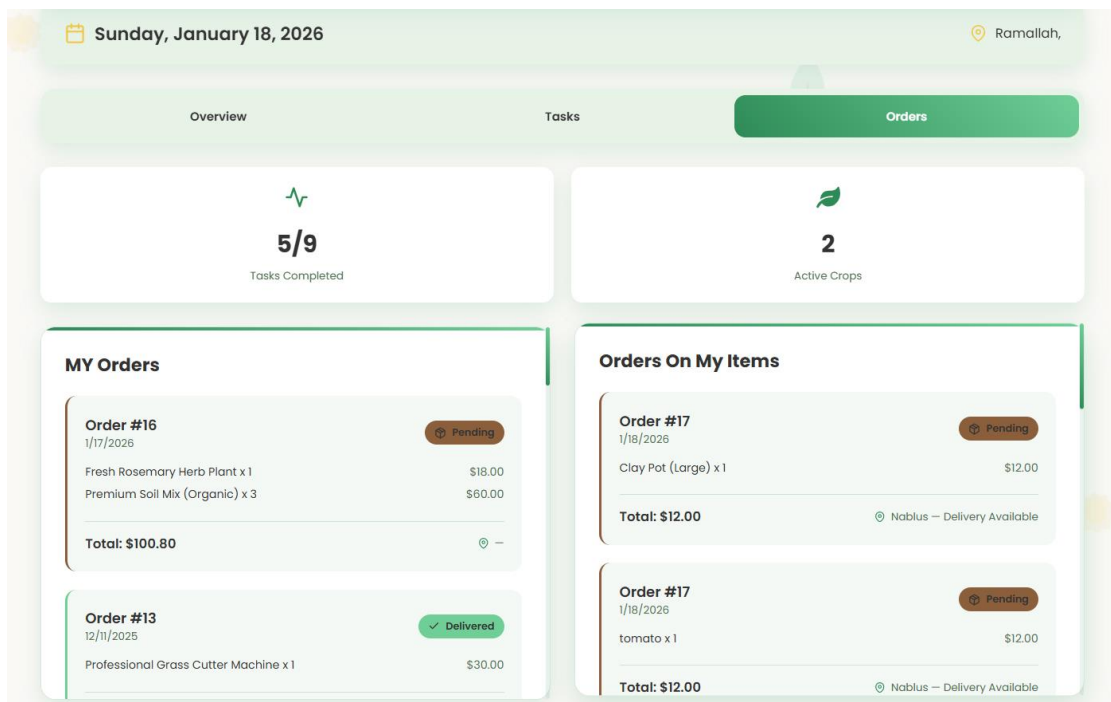
(e). task type



(f). task priority



(g). new task manually



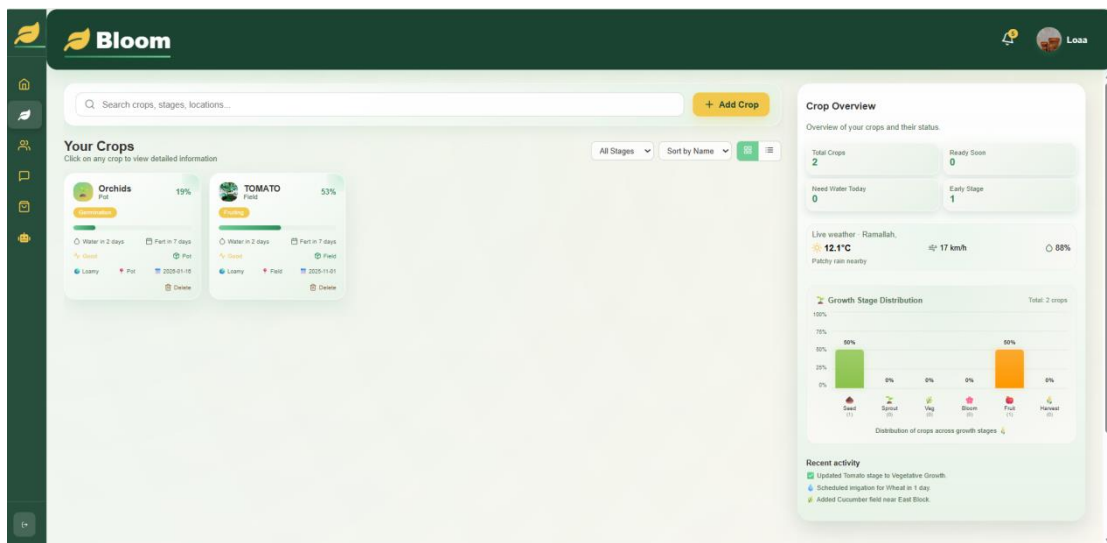
(h). orders tap.

Figure 3.3: Home Screens on the web interface

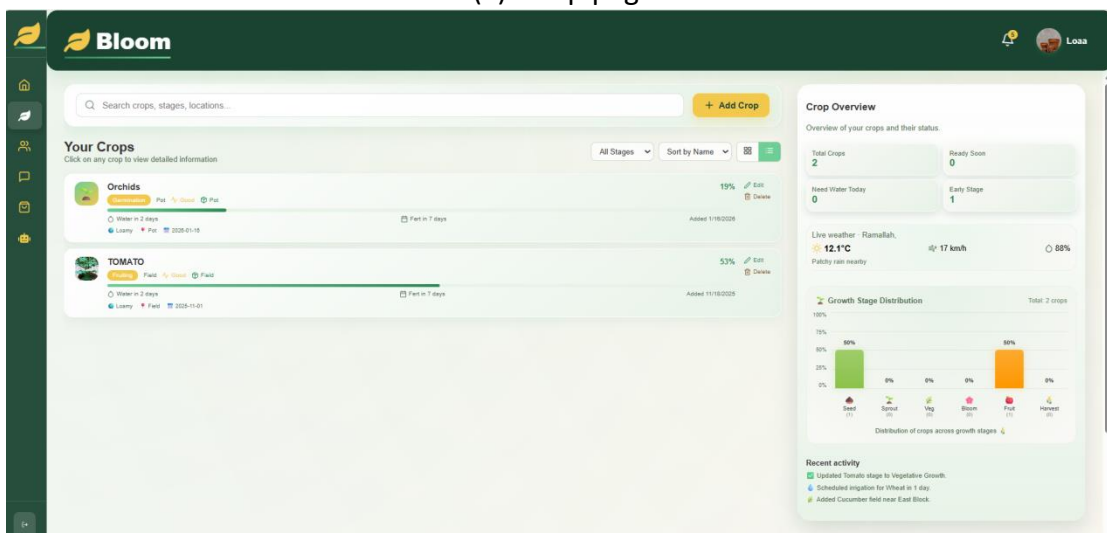
- All crops page

The All Crops page in the Bloom platform displays all crops owned and managed by the farmer in one organized interface. It allows the user to easily search for specific crops and perform crop management tasks such as viewing and tracking their farming information. The page also includes a side Crops Overview section, which provides a quick summary of the farmer’s crop status and helps the user monitor their crops efficiently.

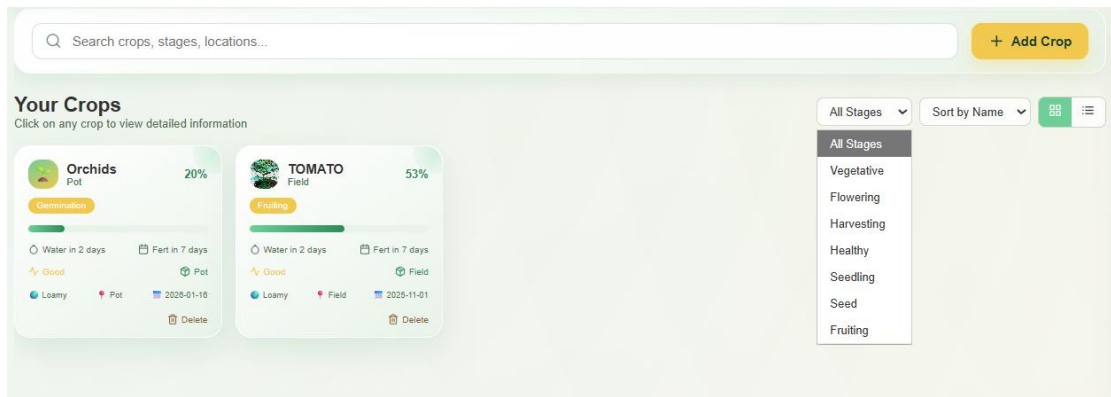
In addition, the page contains a button to add a new crop, enabling farmers to expand and update their crop list at any time. When the user selects a specific crop from the list, they are able to open the crop profile and view its detailed information, including important data related to that crop.



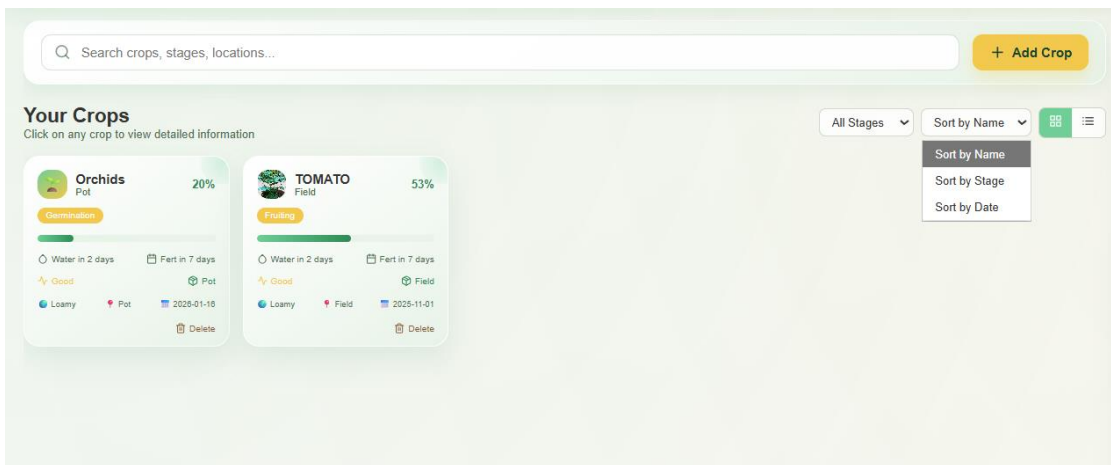
(a). Crop page



(b). Crop page 2



(c). Filter by stage



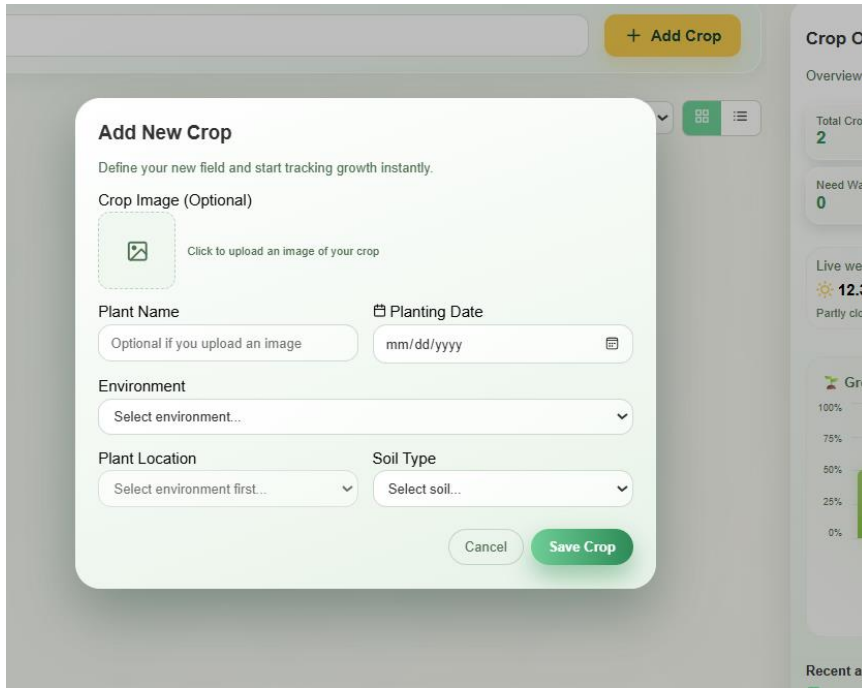
(d). Sort by stage or name or date

Figure 3.4: All Crops on the web interface

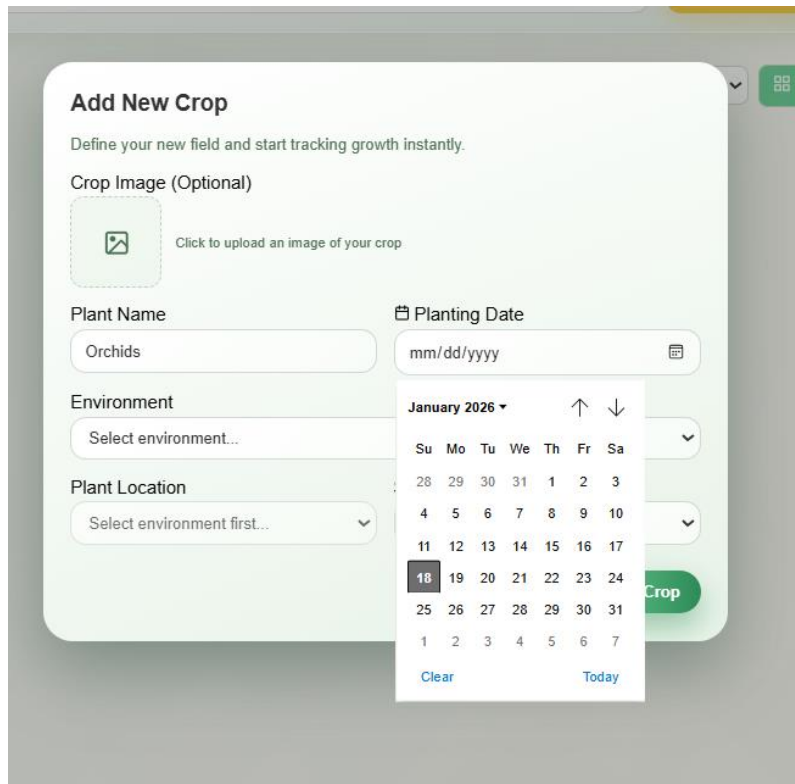
- **Add new crops**

In the **Add New Crop** feature, the user can create a new crop profile by entering the crop **name**, the **planting date**, whether the crop is grown **indoor or outdoor**, the **soil type**, and the **planting location**. The system also allows the user to upload a crop **image**. If the user uploads an image without entering the crop name, the AI module automatically identifies the plant name based on the provided image.

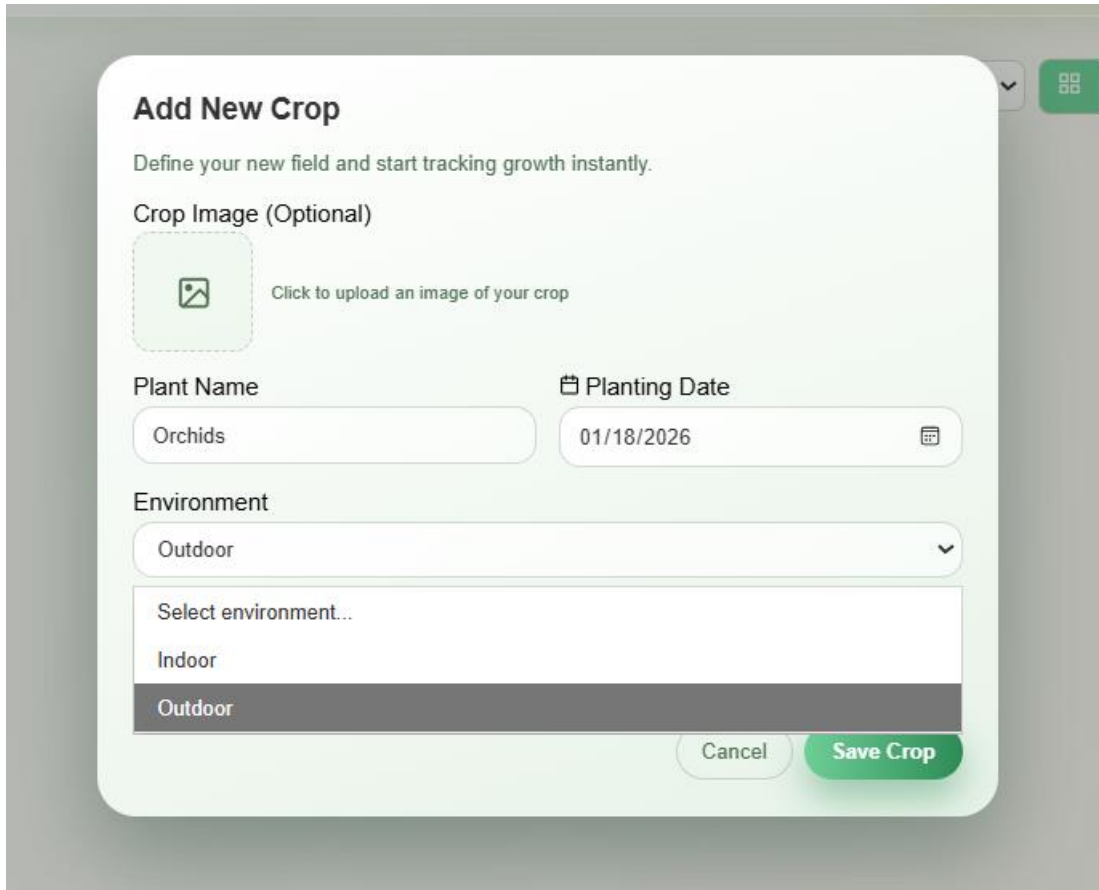
After the crop data is submitted, the system sends the collected information to the AI service for evaluation. The AI analyzes the selected environment and checks whether it is suitable for the identified crop. If the environment is suitable, the user can proceed to add the crop normally. However, if the environment is not suitable, the AI provides feedback explaining that the selected conditions are not appropriate and suggests the recommended environment for that plant. The user is then given the option to either **modify the crop information** according to the AI recommendation or **ignore the advice** and add the crop as it is.



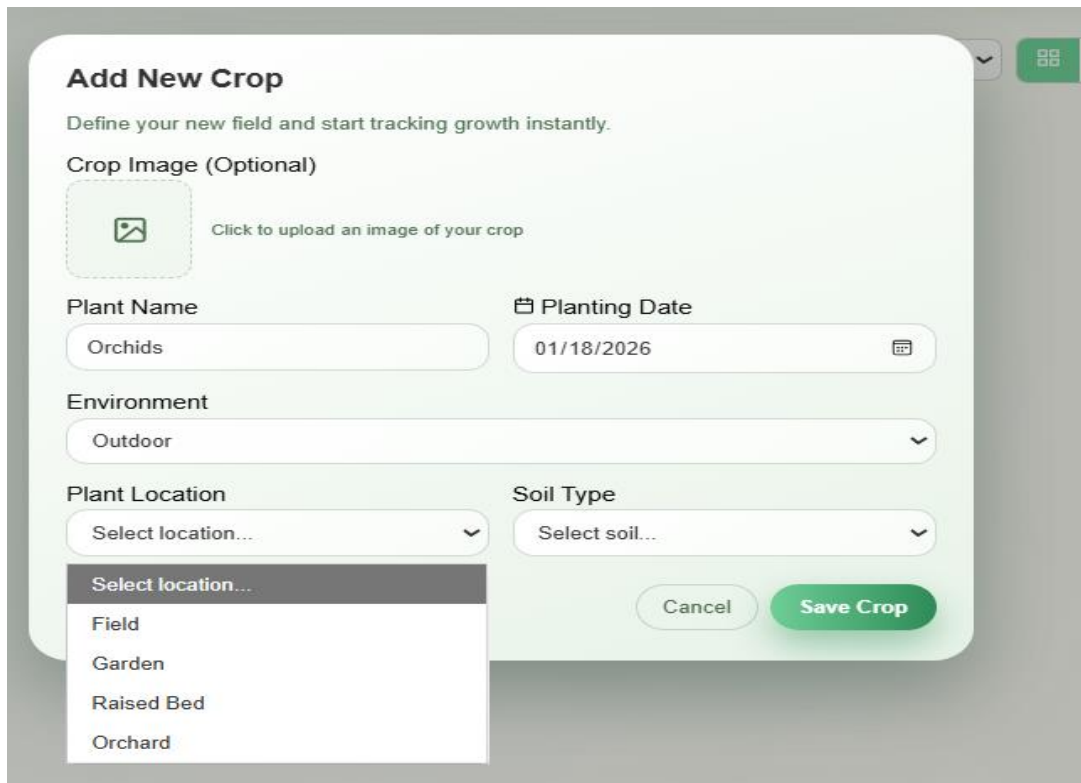
(a). Add new crop



(b). Select the date



(c). Select the environment



(d). Select the location if environment is outdoor

Add New Crop
Define your new field and start tracking growth instantly.

Crop Image (Optional)
Click to upload an image of your crop

Plant Name: Orchids
Planting Date: 01/18/2026

Environment: Outdoor

Plant Location: Select location...
Soil Type: Select soil...
 Select soil...
 Loamy
 Clay
 Sandy
 Silty
 Peaty
 Chalky
 Potting Mix

(e) Select the soil

Add New Crop
Define your new field and start tracking growth instantly.

Crop Image (Optional)
Click to upload an image of your crop

Plant Name: Orchids
Planting Date: 01/18/2026

Environment: Indoor

Plant Location: Select location...
Soil Type: Select soil...
 Select location...
 Greenhouse
 Container
 Pot
 Grow Room

Cancel Save Crop

(f). Select the location if environment indoor

Add New Crop

Define your new field and start tracking growth instantly.

Crop Image (Optional)

Click to upload an image of your crop

Plant Name: orchid

Planting Date: 01/18/2026

Environment: Outdoor

Plant Location: Garden

Soil Type: Clay

⚠ Not recommended for the selected environment

Most common orchids are epiphytes and will die in clay soil due to lack of aeration. Nablus winter temperatures can drop below 10C at night, which is dangerous for tropical orchids like Phalaenopsis.

Recommended environment: Indoor • Location: A bright window facing East or West with filtered sunlight • Soil: Orchid bark mix consisting of fir bark, perlite, and charcoal

[Edit Details](#) [Add Anyway](#)

[Cancel](#) [Save Crop](#)

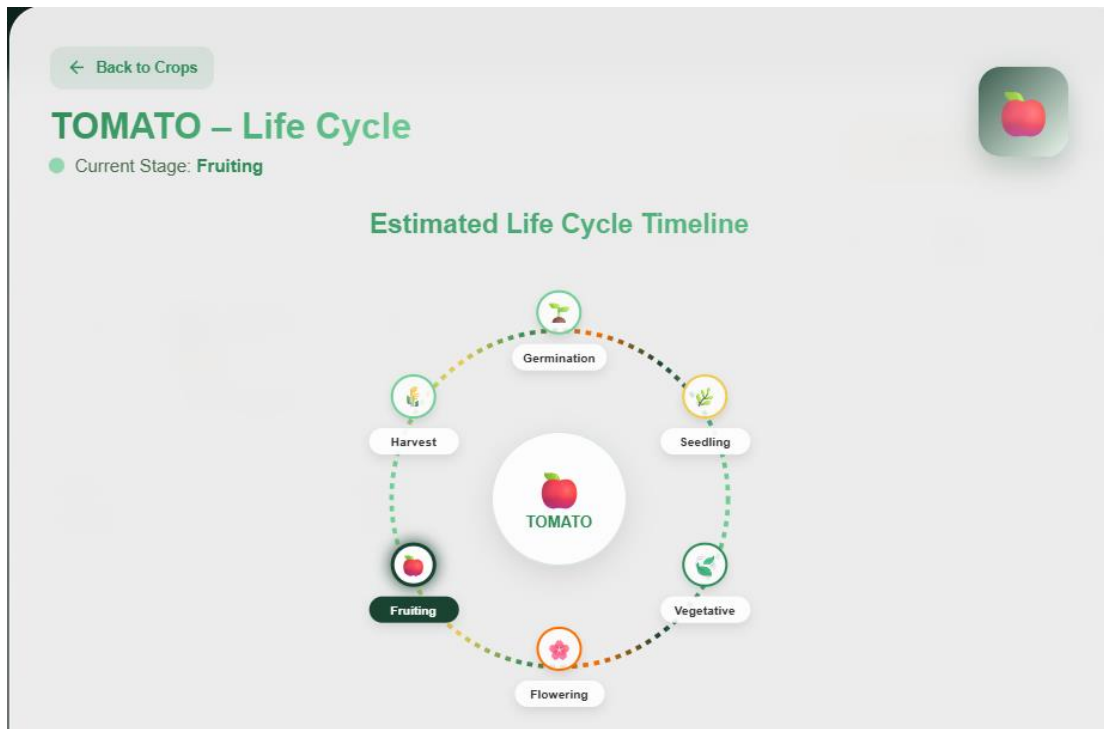
(g). AI advice when choose wrong environment

Figure 3.5: Add new crops on the web interface

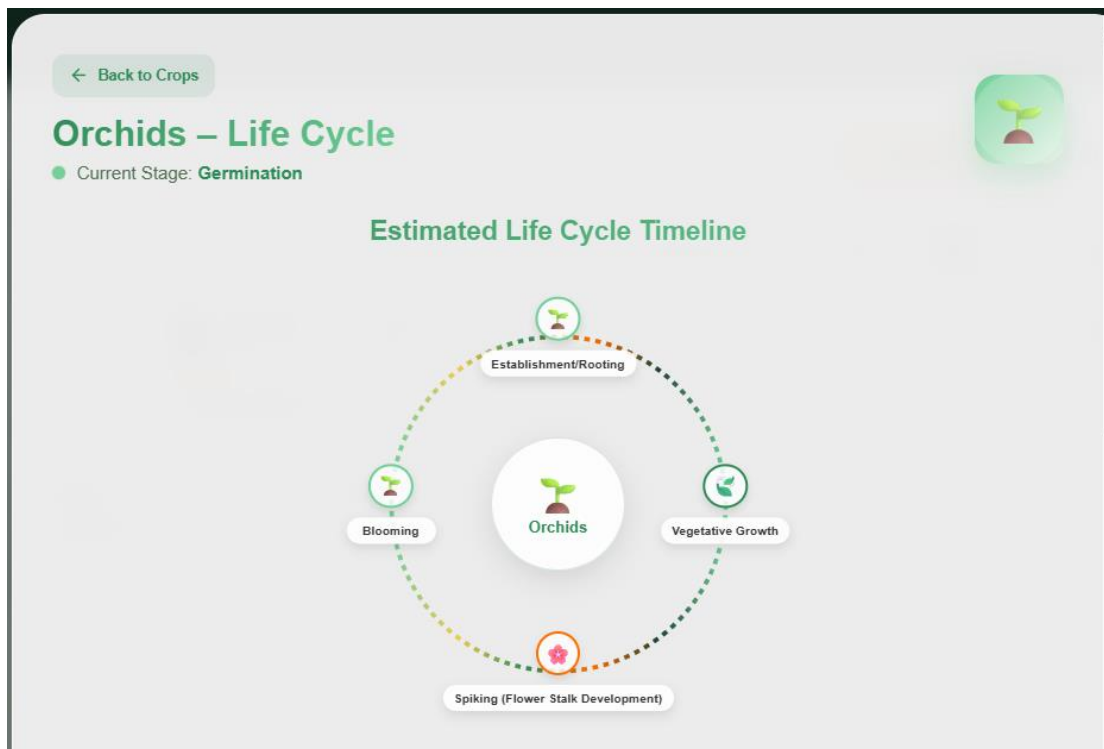
- **Crop details**

In the **Crop Details** page, the system provides smart support to help the farmer manage each crop more effectively. After adding a new crop, Bloom sends the crop's **planting date** and selected **environment details** to the AI service. Based on this information, the AI generates the crop's **life cycle timeline**, including the expected growth stages and the estimated duration of each stage depending on the plant type. In addition, the AI provides personalized care recommendations such as how often the crop should be **watered**, when to apply **fertilizer**, and other guidance that supports healthy growth.

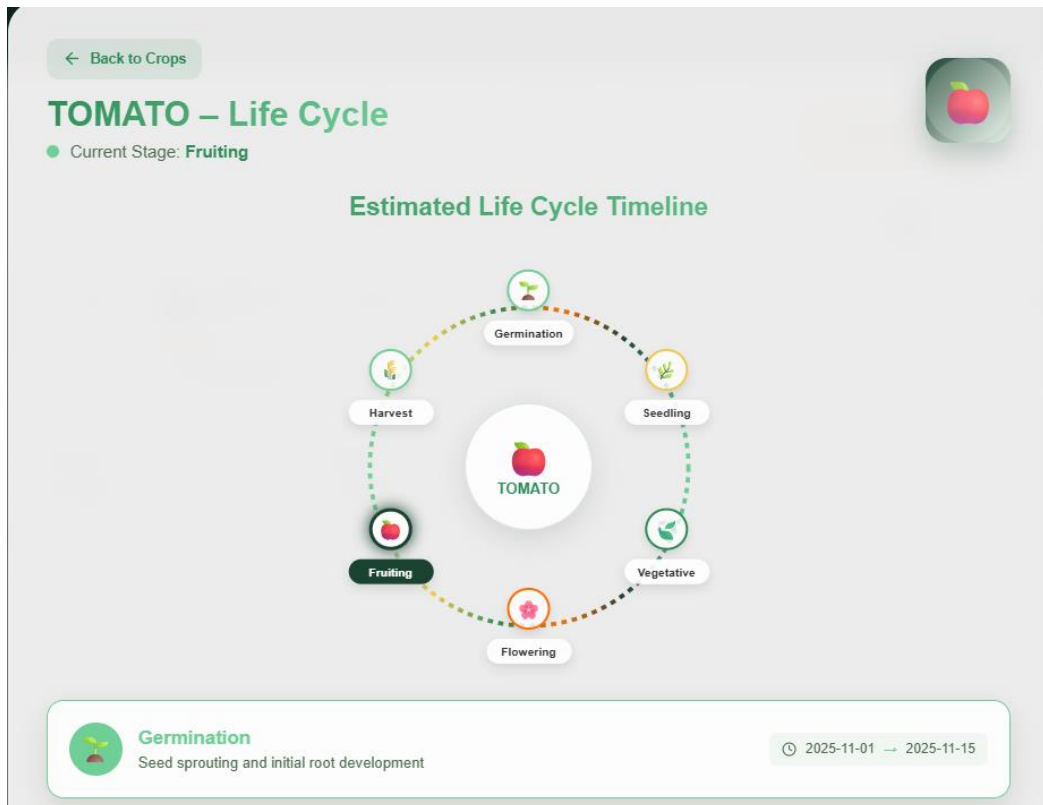
The Crop Details page also includes a plant health checking feature. The user can upload an image of the crop to evaluate its current condition and verify whether it is progressing correctly. The AI analyzes the image and helps the user determine if the plant appears healthy and whether it matches the expected stage of growth.



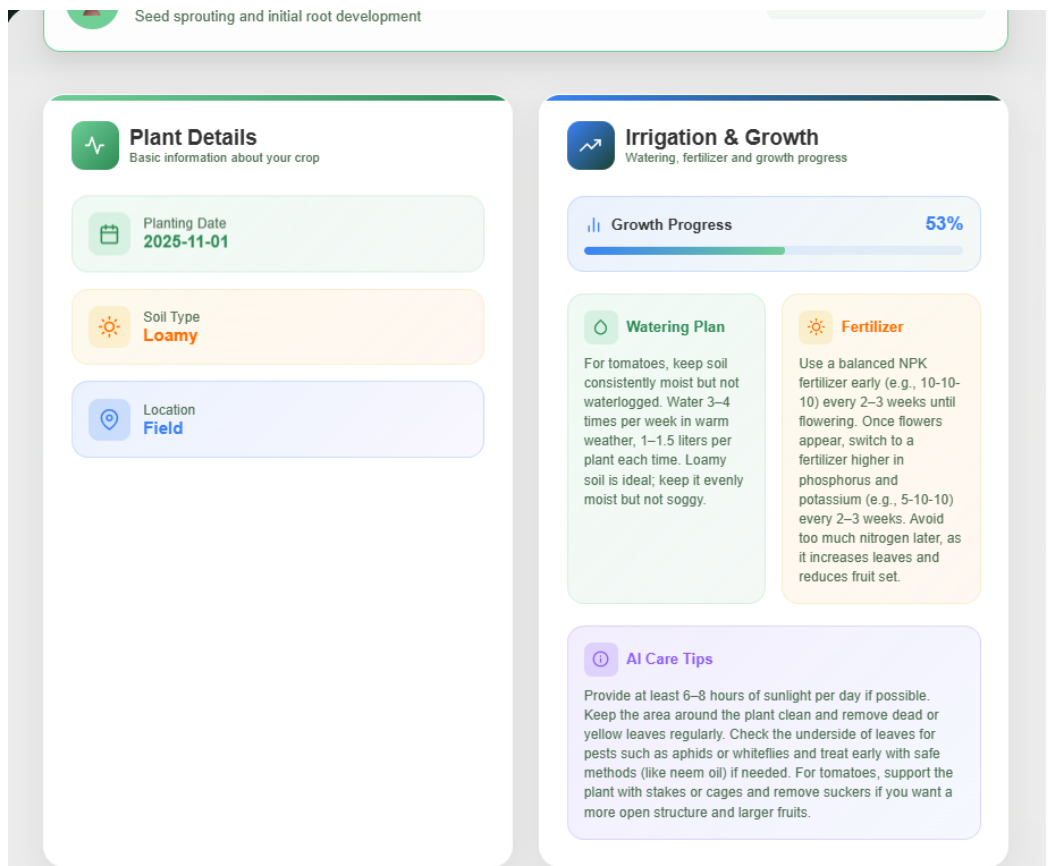
(a). Crop life cycle for tomato



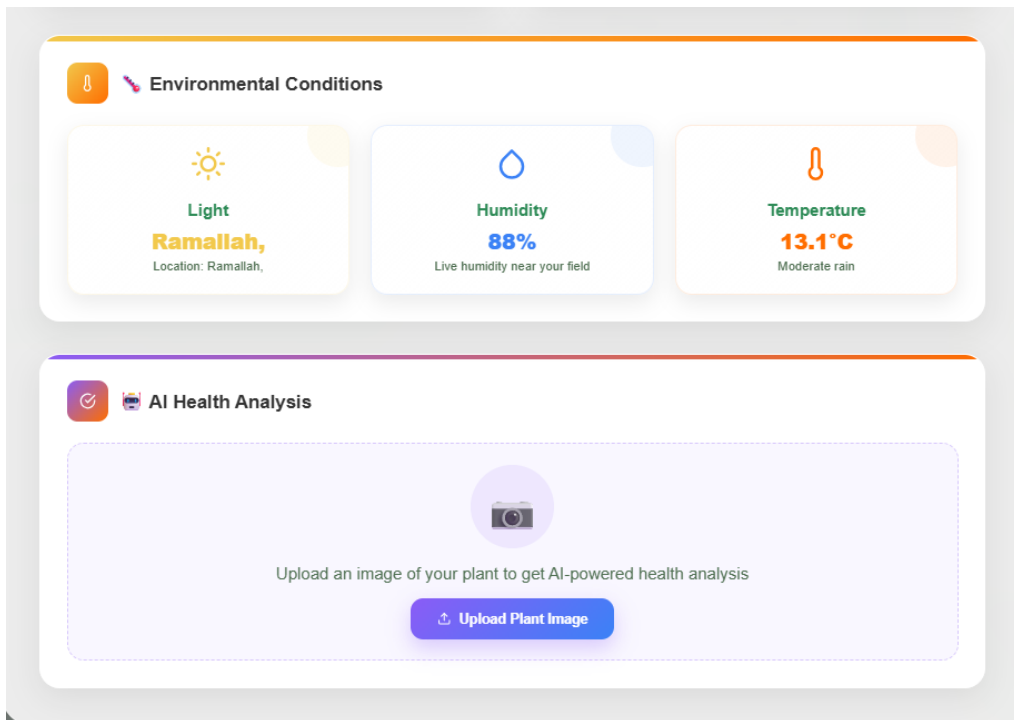
(b). Crop life cycle for orchids



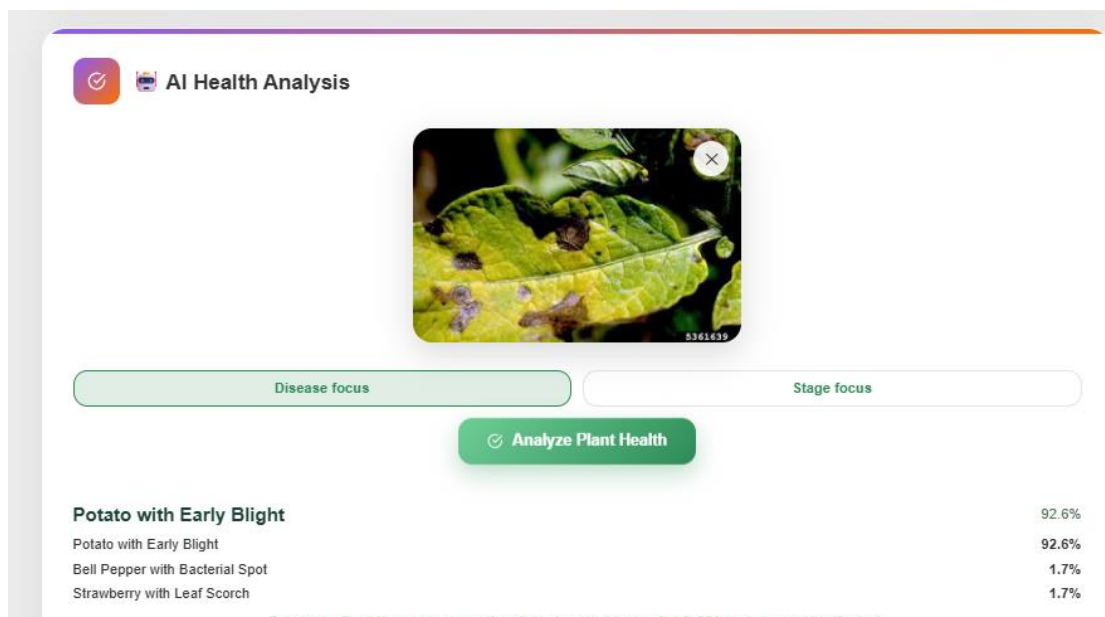
(c). When click on each stage show the start date and ending date for each stage



(d). Plant info and how to take care of it



(e). Environmental Conditions & AI health analysis section

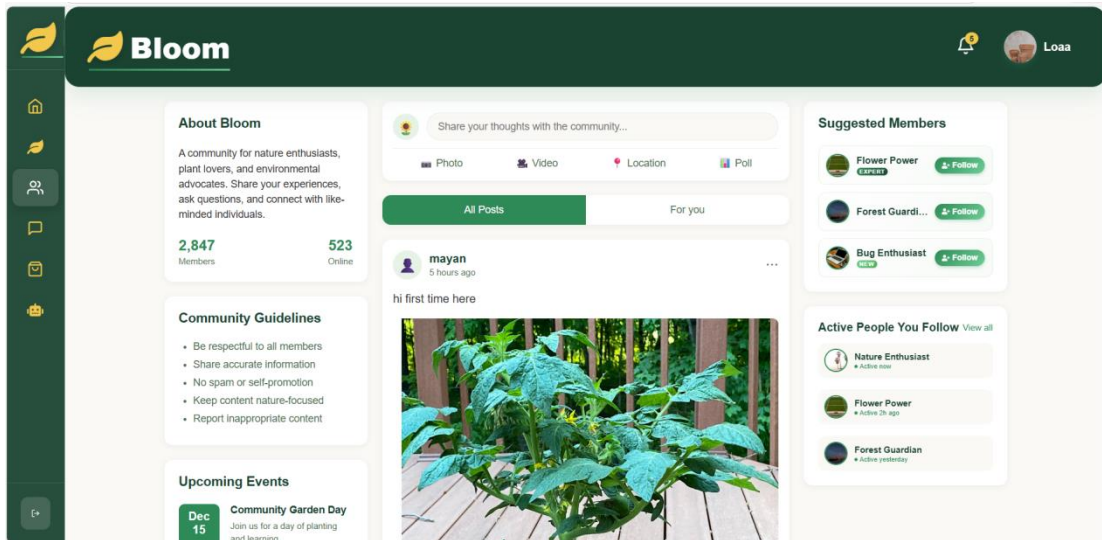


(f). Use Ai to see the Disease

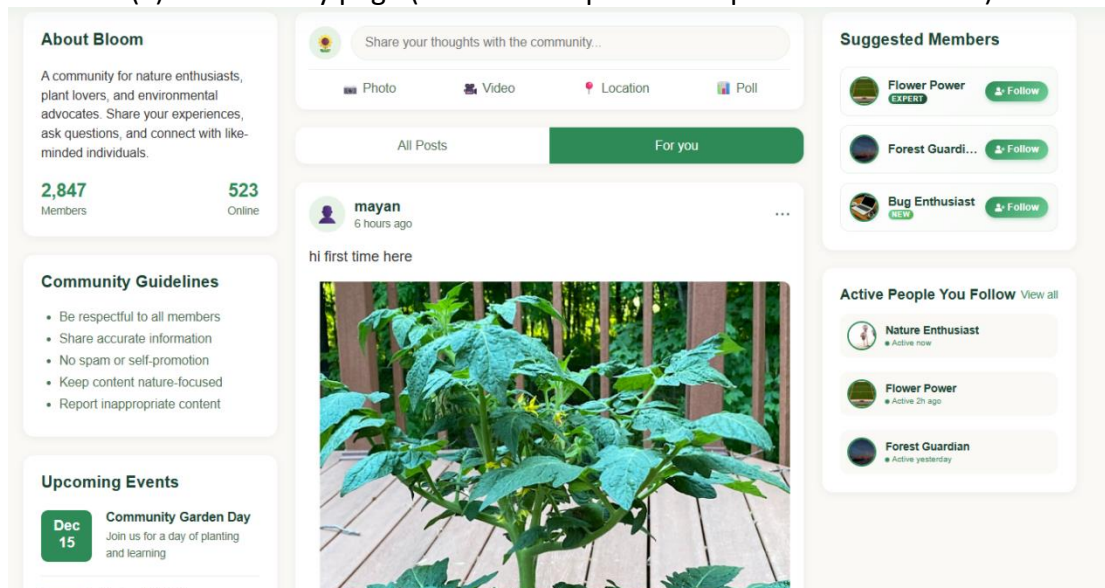
Figure 3.6: Crop details on the web interface

- **Community**

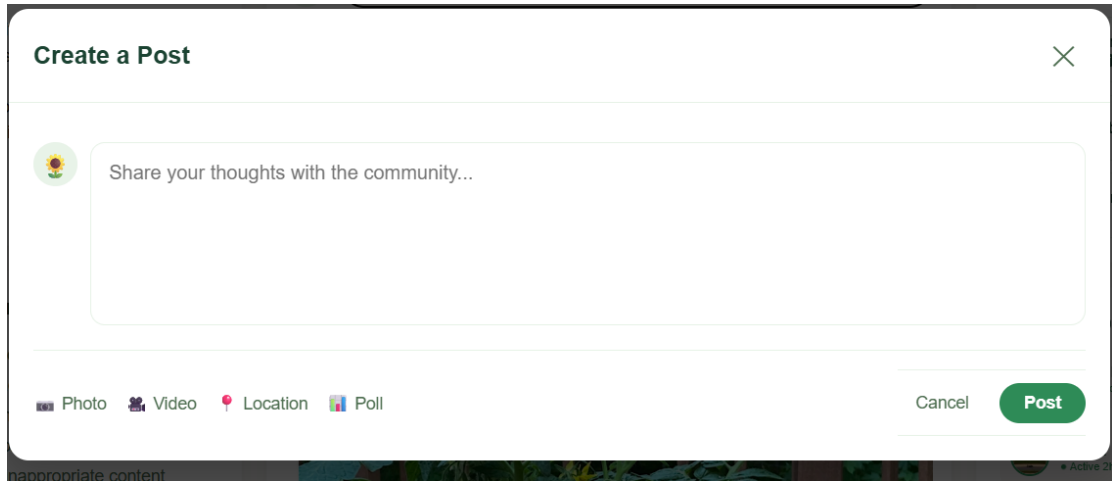
The Community section in Bloom provides an interactive space where farmers can share experiences, ask questions, and exchange agricultural knowledge. It allows users to create posts related to crop problems, farming practices, or general discussions, and other farmers can engage by commenting, reacting, and providing helpful feedback. This feature supports collaboration between users and helps build a stronger agricultural network inside the platform.



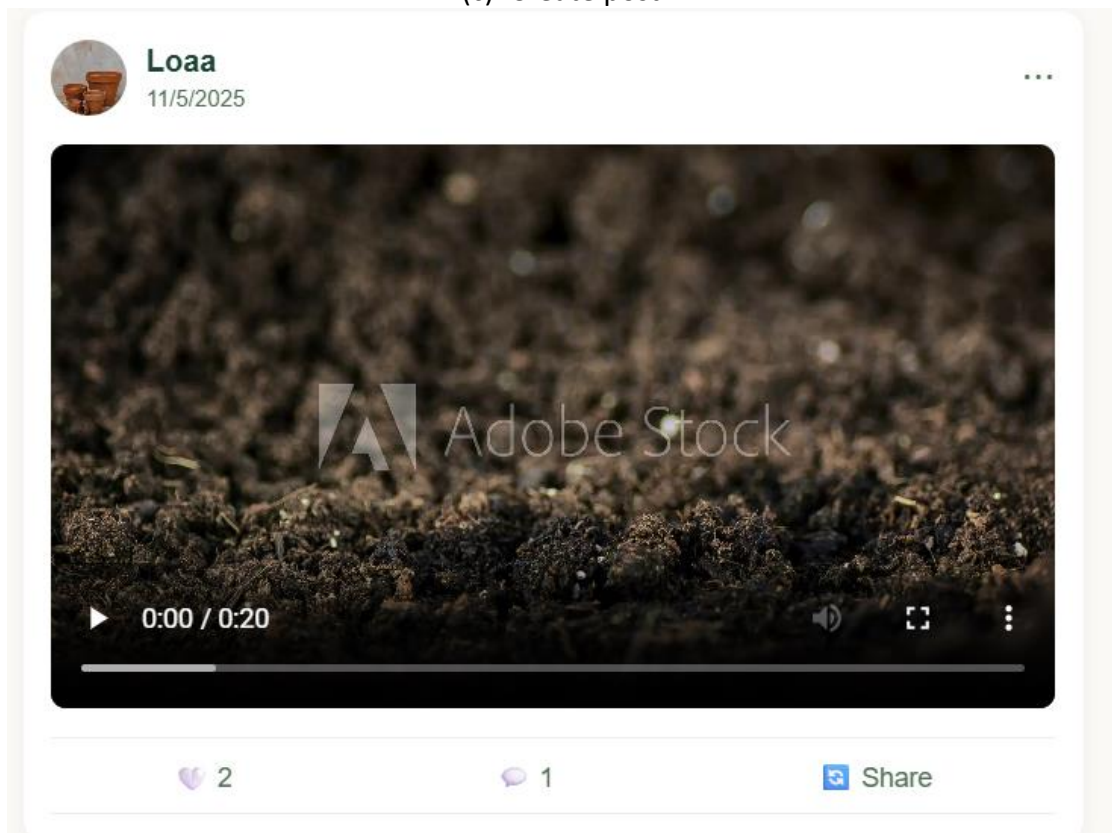
(a). Community page (all users can post & see posts from all users)



(b). Community page (for you see posts from friends only)




(c). Create post






(d). Video post

 **Loaa**
11/3/2025 ...

hi  POLL


<input type="radio"/> 2	0% 0 votes
<input checked="" type="radio"/> 1	100% 2 votes Leading


2 votes

 0  0  Share


(e). Poll post

 **Loaa**
11/3/2025 ...


 نابلس, منطقة أ, الضفة الغربية, الأراضي الفلسطينية


 0  0  Share




(f). Location share

 **Loaa**
11/3/2025




nice



 Loaa







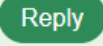
 1  0  Share



(g). Repost



 0  4  Share

Loaa 11/3/2025
hi
 1  1 Reply

 **Loaa** 11/3/2025
hi
 0  Reply

Loaa 11/3/2025
wow
 0  0 Replies

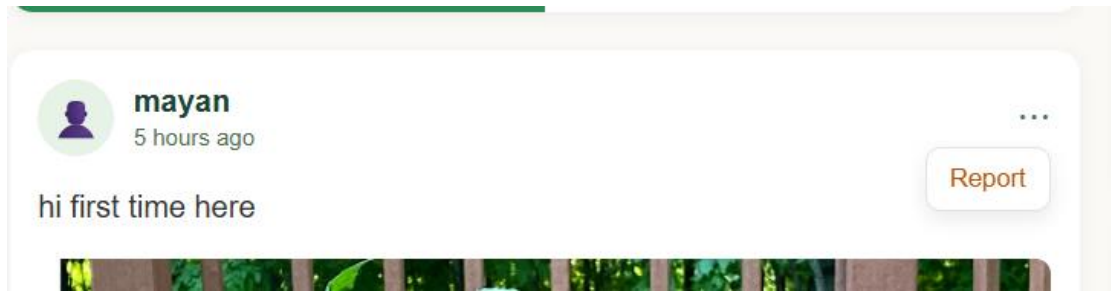
Loaa 11/3/2025
hhhaaa
 1  0 Replies

Show less ▲

(h). Comments and likes



(i). Edit and delete post



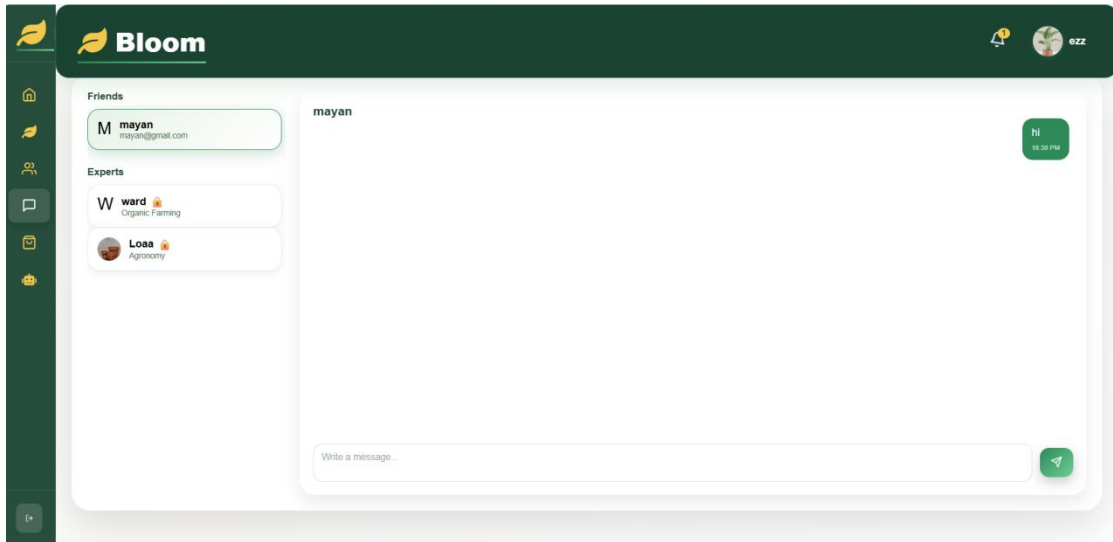
(j). Report post

Figure 3.7: Community on the web interface

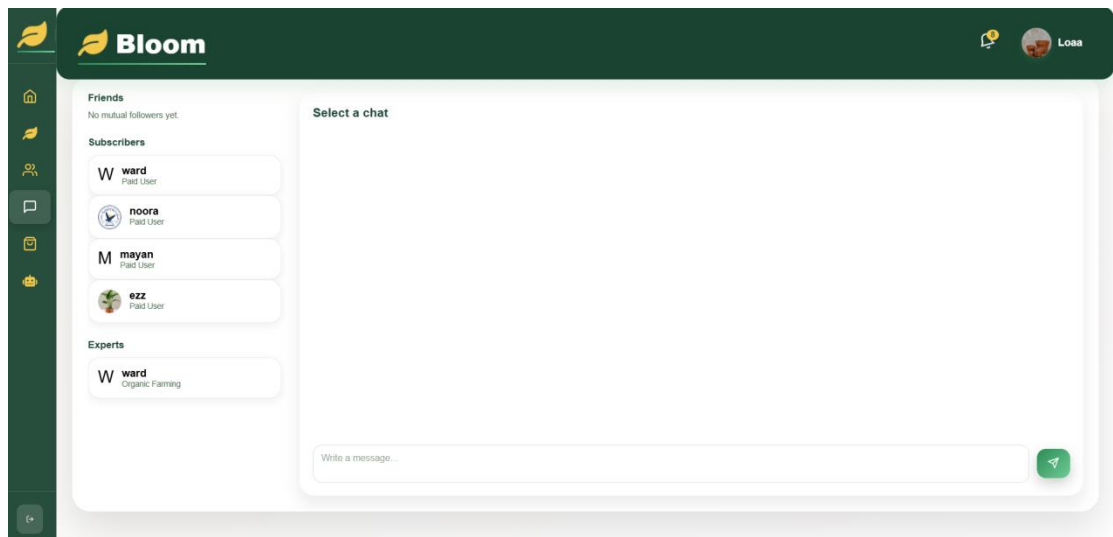
- **Messages (Chat) page**

The **Messages** page in Bloom is designed to support communication between users while applying access rules based on user roles and permissions. For a regular farmer user, the messaging page displays a list of **friends**, where a friend connection is created when two users follow each other. This allows direct messaging between connected users through private conversations. In addition to the friends list, the page also shows a list of available **experts** registered in the platform. To start a private conversation with an expert, the user must complete a payment process first, which ensures that expert consultation is provided in an organized and controlled way.

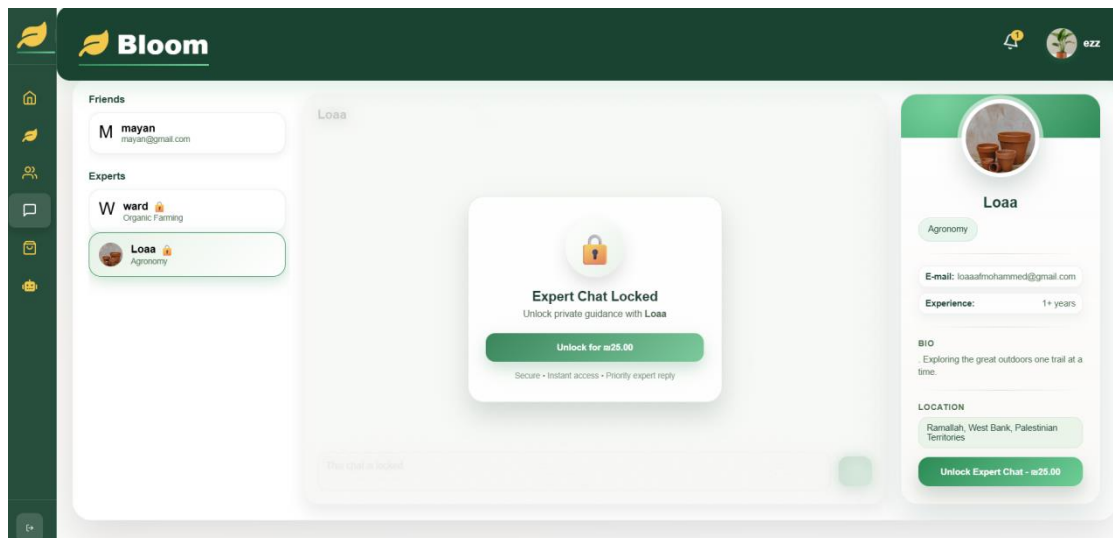
For an expert user, the Messages page includes the list of **friends** as well, allowing normal social communication. Additionally, it displays a separate list of users who have **paid to communicate with the expert**, enabling the expert to easily identify active consultation conversations. The expert view also provides access to a full list of experts in the platform, supporting visibility and communication within the expert community when needed.



(a). Chat page for the farmer



(b). Chat page for expert



(c). Locked chat with expert

Unlock Expert Chat

Get full access to chat with **Loaa**.

₪25.00

App revenue 10%: ₪2.50

Card Number *

Cardholder Name *

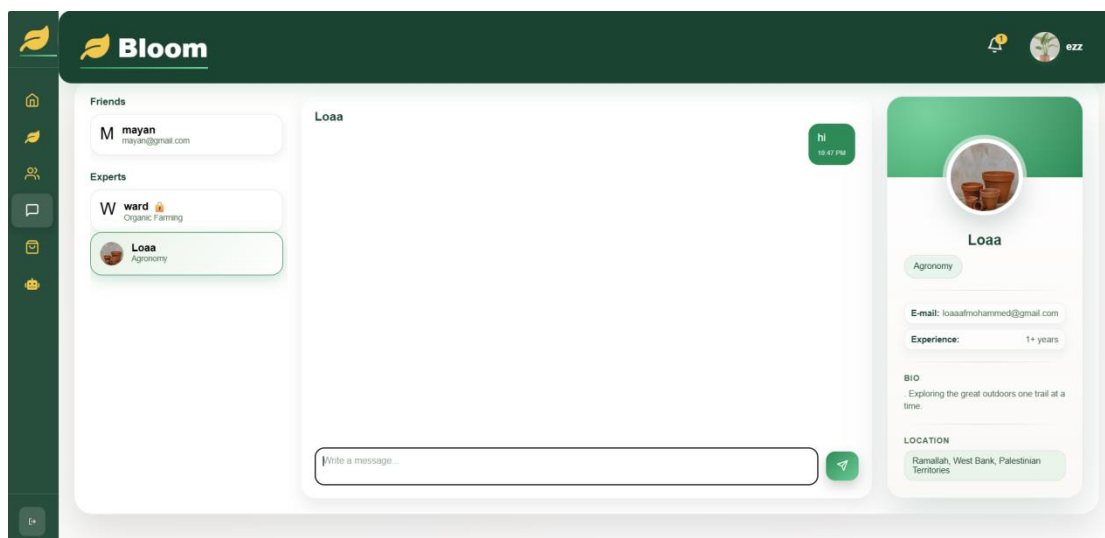
Expiry Date * CVV *

Save card for future payments

Pay & Unlock

Cancel

(d). Payment page to unlock chat with expert

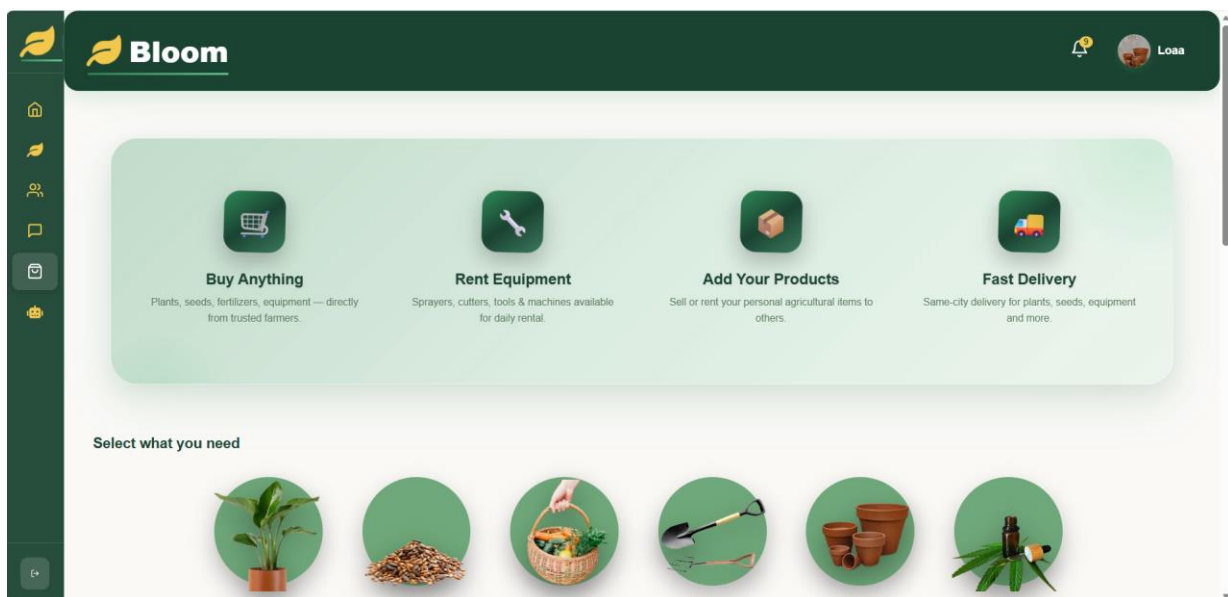


(e). Chat with expert after payment

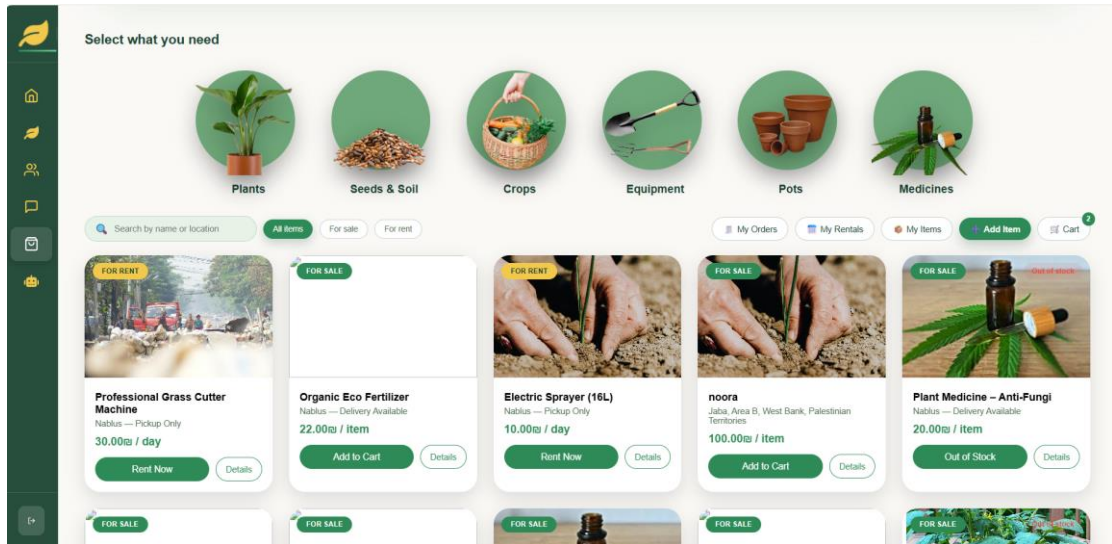
Figure 3.8: Messages page on the web interface

- **Store page**

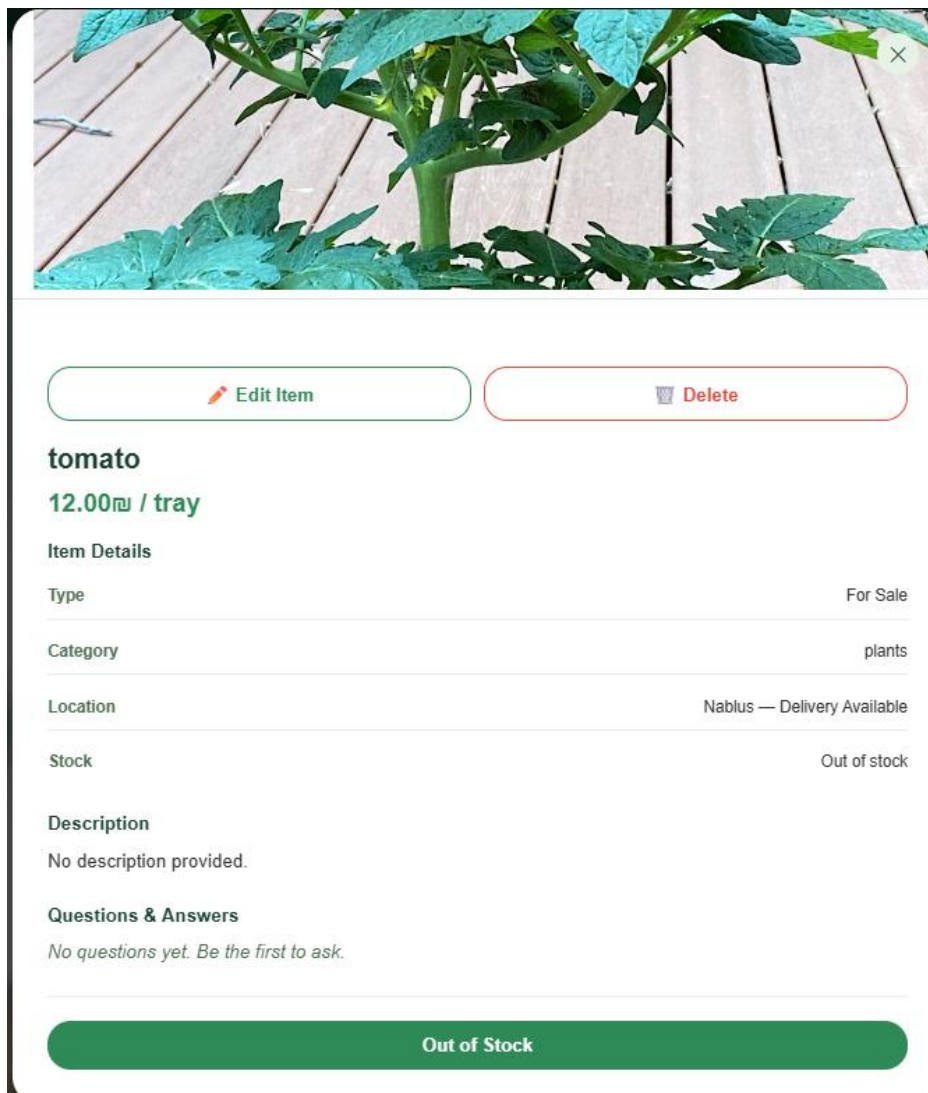
The Store page in the Bloom platform provides an integrated marketplace experience that allows farmers to easily browse, buy, sell, and rent agricultural products and tools. The page includes a full catalog of items organized by categories, with support for searching and filtering products to help users find what they need quickly. Each product card displays important information such as the product name, category, price (sale or rent), availability, and seller details. The Store also supports viewing detailed product information through a dedicated details view, where the user can read the description, check stock status, and interact with the product in a more complete way. Additionally, the page includes core marketplace features such as adding items to the cart, proceeding to checkout, selecting delivery information and location, and tracking the user's activity through sections like My Orders and My Rentals. The Store page also allows farmers to manage their own listed items by adding new products, editing existing listings, and viewing their personal items within the platform. To enhance communication and transparency between buyers and sellers, the Store includes a Product Questions and Answers feature, allowing users to ask questions about specific items and receive answers from the seller. Finally, reporting functionality is available to allow users to report inappropriate or suspicious listings, supporting a safer and more trustworthy marketplace environment.



(a). Store page



(b). Store page



(c). Item details (for user's item)

(d). Edit item details

(e). Item details for other users



Professional Grass Cutter Machine

30.00₪ / day

Item Details

Type	For Rent
Category	equipment
Location	Nablus — Pickup Only
Stock	1

Description

Heavy-duty electric cutter for farms and gardens.

Questions & Answers

No questions yet. Be the first to ask.

Ask a question about this product...

Public

Ask Question

Rent This Item

Choose your rental window before confirming.

3 blocked ranges

Start Date

End Date

mm/dd/yyyy

mm/dd/yyyy

Unavailable dates are blocked.

2026-01-01 → 2026-01-03

2025-12-25 → 2025-12-30

2025-12-11 → 2025-12-18

Confirm Rental

Report Item

Add Rental to Cart

(f). Rent item

Questions & Answers

No questions yet. Be the first to ask.

is this good for tomato ?

Public

Ask Question

Public

Private

Report Item

Add to Cart

(g). Product Questions and Answers

Plant Medicine – Anti-Fungi

50.00₪ / ml

Item Details

Type	For Sale
Category	medicines
Location	Burqa, Area B, West Bank, Palestinian Territories
Stock	7

Description

No description provided.

Questions & Answers

Loaa 1/20/2026, 2:25:35 PM Private

is this good for tomato ?

No answers yet.

Write an answer...

Post Answer

Loaa 1/20/2026, 2:24:40 PM

is this good for tomato ?

No answers yet.

Write an answer...

(h). Product Questions and Answers

Plant Medicine – Anti-Fungi
50.00₪ / ml

Item Details

Type	For Sale
Category	medicines
Location	Burqa, Area B, West Bank, Palestinian Territories
Stock	7

Description
No description provided.

Questions & Answers

Loaa 1/20/2026, 2:24:40 PM
is this good for tomato ?
No answers yet.


Write an answer...

Post Answer

Ask a question about this product...

(i). Product Questions and Answers ONLY PUBLIC will appear for other users


My Items
✕



Electric Sprayer (16L)
10.00₪ / day
 For rent • Nablus — Pickup Only

Stock: 2


[Details](#)



noora
100.00₪ / item
 For sale • 32.299386, 35.193545

Stock: 1


[Details](#)



Plant Medicine – Anti-Fungi
20.00₪ / item
 For sale • Nablus — Delivery Available

Stock: 0

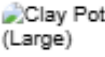
[Details](#)



Plant Medicine – Anti-Fungi
15.00₪ / item
 For sale • 31.926028, 35.238922

Stock: 1


[Details](#)



Clay Pot (Large)
12.00₪ / item
 For sale • Nablus — Delivery Available

Stock: 1


[Details](#)



tomato
12.00₪ / tray
 For sale • Nablus — Delivery Available

Stock: 0

[Details](#)



Plant Medicine – Anti-Fungi
25.00₪ / item
 For sale • Nablus — Delivery Available

Stock: 63

[Details](#)

Close

Add Item

(j). User items

Add Item ✕

Item Name *

Category * ▼ Type * ▼

Price (₹ / item) * Unit ▼

Stock Quantity *

Location *

Use My Location

Choose a point on the map to autofill latitude and longitude.

Image URL

No file chosen

Description

(k). Add new item

Add Item [Close]

Item Name *
Professional Grass Cutter

Category *
Plants [v]

Type *
For Sale [v]

Unit
item [v]

Image URL
https://example.com/image.jpg

[Choose File] No file chosen

Description
Describe your item in detail...

[Cancel] [Add Item]

(l). Category

Add Item [Close] **Add Item** [Close]

Item Name *
Professional Grass Cutter

Category *
Plants [v] Type *
For Sale [v]

Price (p / item) *
120 Unit
item [v]

Stock Quantity *
0 [item, seeding, tray, pot]

Location *
e.g., 31.952200, 35.233200

[Use My Location]

Image URL
https://example.com/image.jpg

[Choose File] No file chosen

Description
Describe your item in detail...

[Cancel] [Add Item]

Item Name *
Professional Grass Cutter

Category *
Crops [v] Type *
For Sale [v]

Price (p / kg) *
120 Unit
kg [v]

Stock Quantity *
0 [kg, box, sack]

Location *
e.g., 31.952200, 35.233200

[Use My Location]

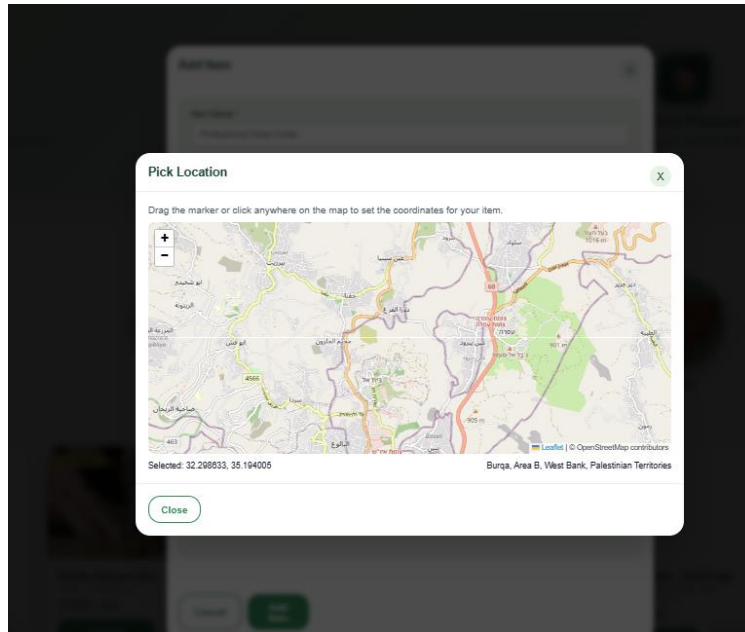
Image URL
https://example.com/image.jpg

[Choose File] No file chosen

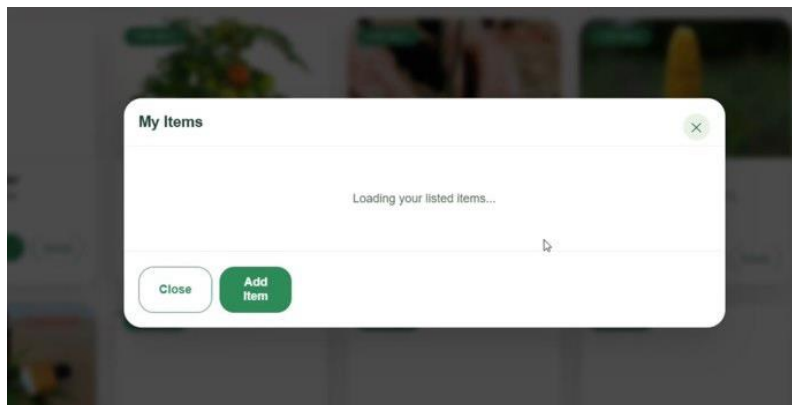
Description
Describe your item in detail...

[Cancel] [Add Item]

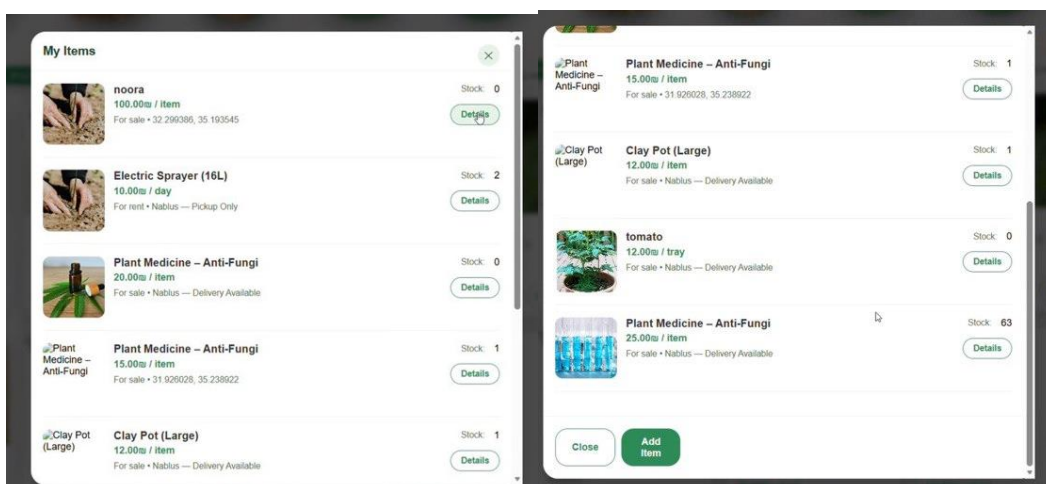
(m). Unit change according the category



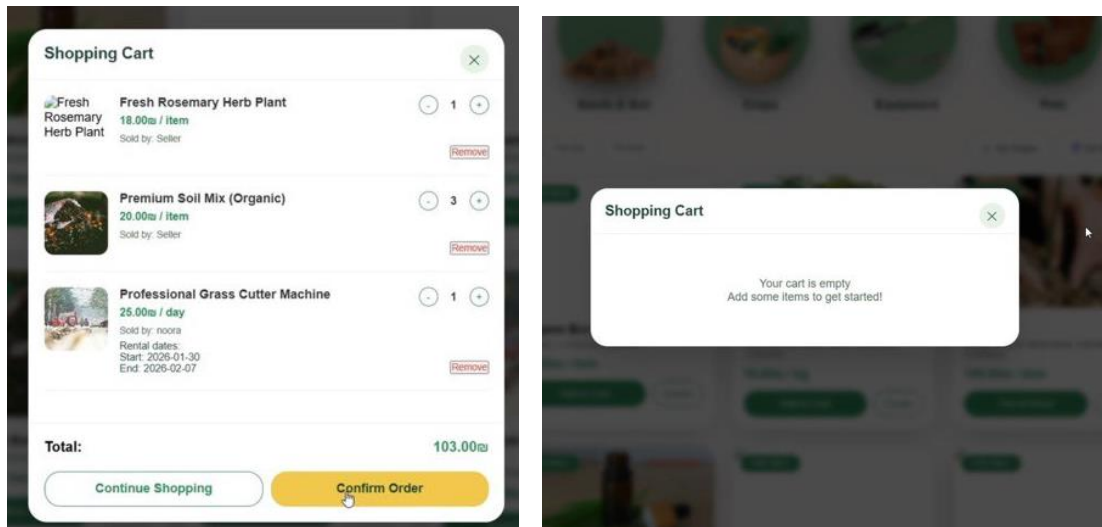
(n). Pick location from map



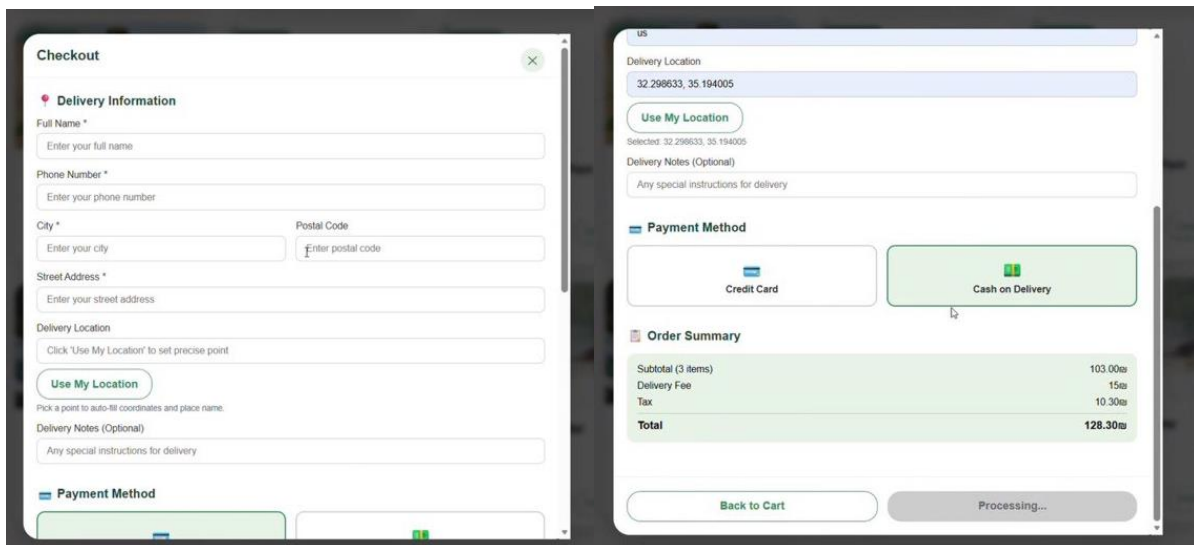
(o). My Items Page



(p). My Items Page



(q). Cart Page



(r). Checkout and Payment Page

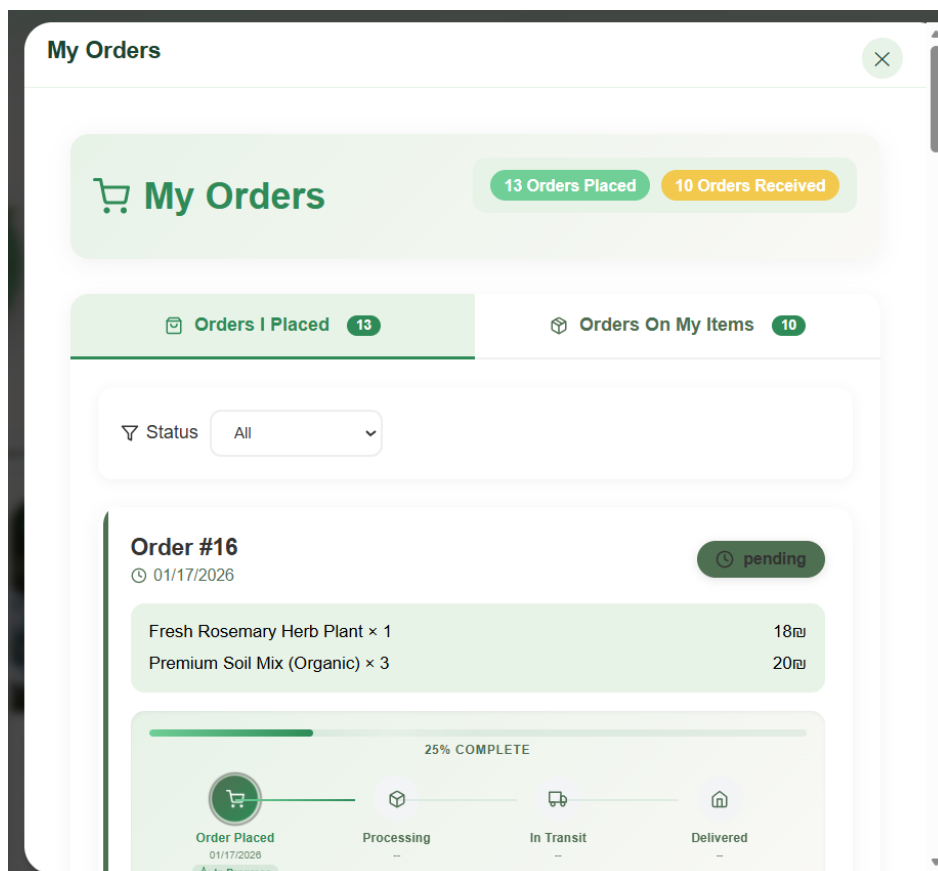
Figure 3.9: Store Page on the web interface

- **My Orders page**

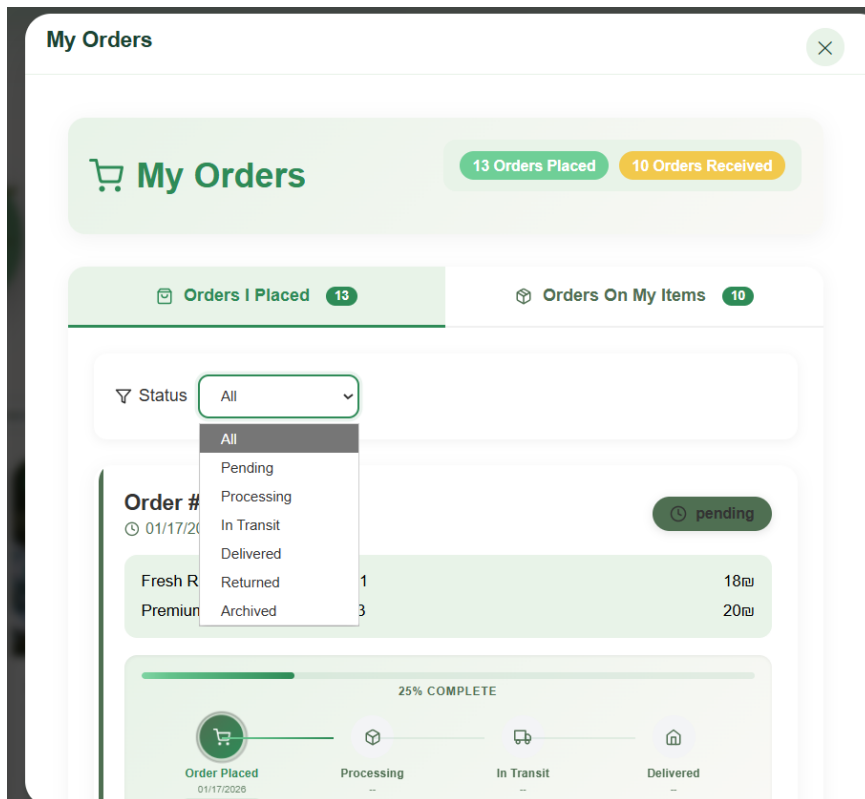
The **My Orders** page allows the user to view and track all orders they have placed through the Bloom marketplace in an organized way. It displays each order with its main details such as the ordered items, total cost, order status, and date, helping the user follow the progress of their purchases easily. The page also supports reviewing past orders and monitoring updates as the seller changes the order status.

- **Pending:** The order is placed by the buyer and is waiting for the seller to confirm and start processing it.

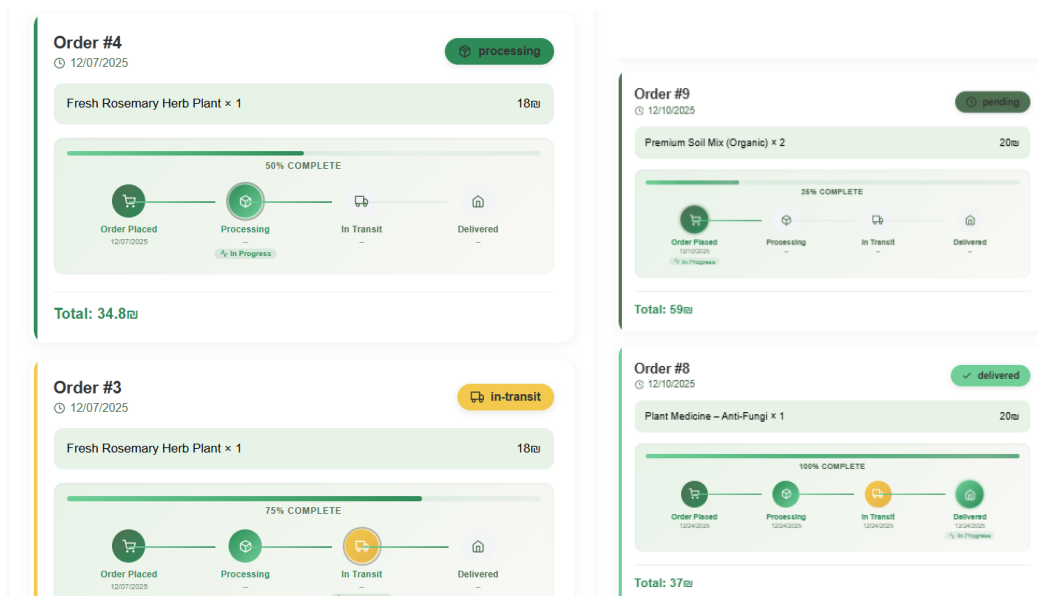
- **Processing:** The seller has accepted the order and is preparing it (packing the items and getting it ready).
- **In Transit:** The order has been shipped and is currently on the way to the buyer.
- **Delivered:** The order has arrived successfully to the buyer. After delivery, the buyer has a limited period to request a return if needed.
- **Returned:** The buyer returned the order after it was delivered (for example, due to damage or wrong item).
- **Archived:** This is the final status of the order. If the order stays **Delivered for 3 days** and the buyer does not return it, the system automatically moves it to **Archived**, meaning the order is completed and closed.



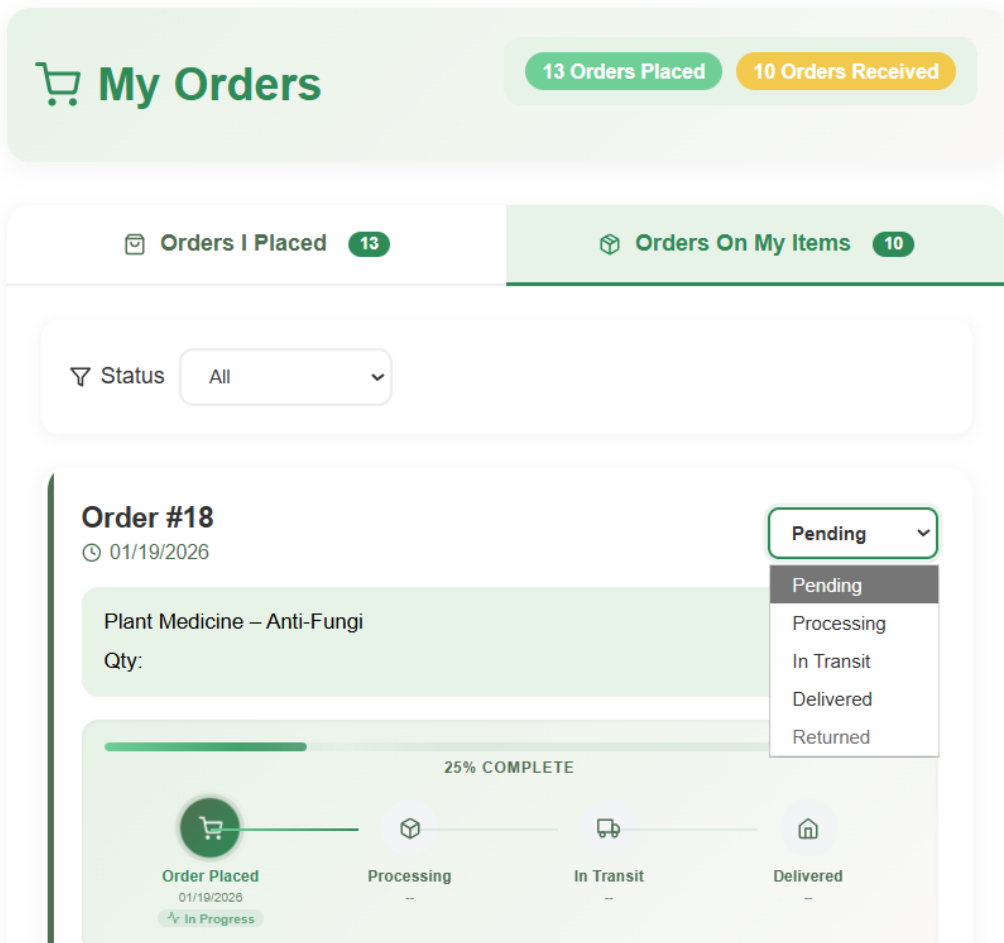
(a). My Orders page



(b). Filter order according the status



(c). Order status

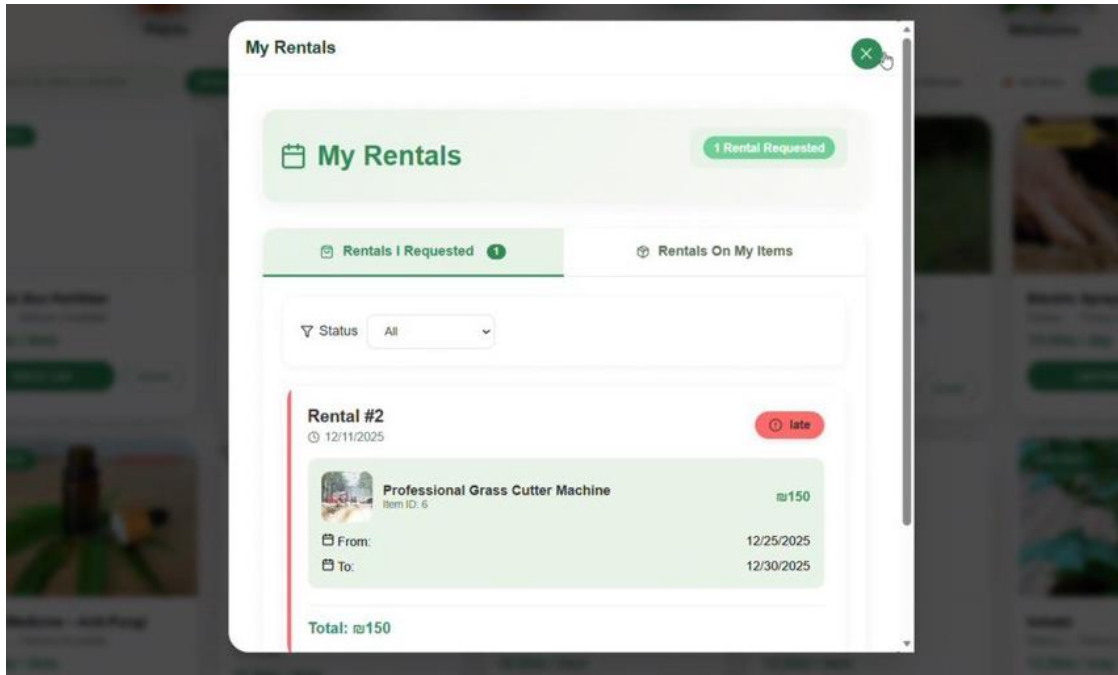


(d). Change the status of the other user order

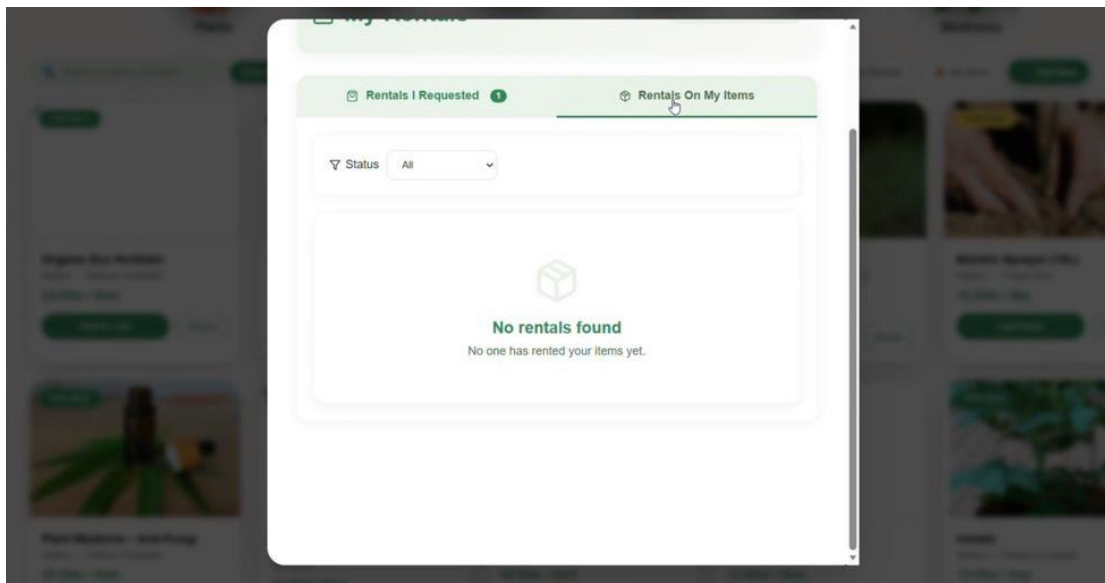
Figure 3.10: My Orders page on the web interface

- **My Rentals page**

The **My Rentals** page allows the user to view and manage all rental requests made through the Bloom marketplace. It displays each rental with its main details such as the rented item, rental period (start and end dates), total cost, and current rental status. The page helps users track active rentals, review past rentals, and follow any updates or changes made by the seller during the rental process.



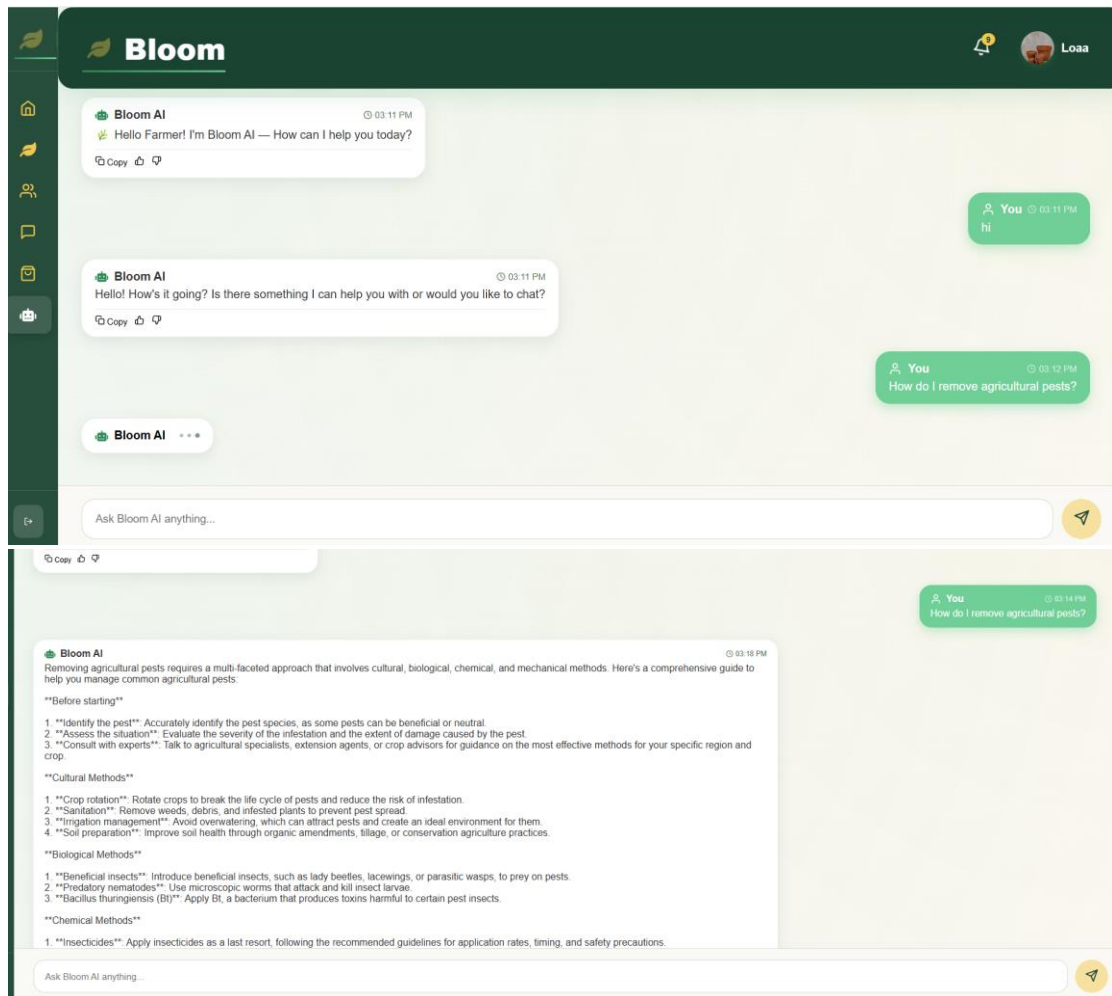
(a). My Rentals page



(b). My Rentals page

Figure 3.11: My Rentals Page on the web interface

- AI Chat Bot



(a). AI Chat Bot


Figure 3.12: AI Chat Bot on the web interface

- User Profile page

The **User Profile** page in Bloom provides a complete and organized view of the user's personal information and activity within the platform. It displays key profile details such as the user's name, profile photo, bio and location. The profile also shows important statistics including the number of posts, listed store items, followers, and following, giving a clear overview of the user's engagement. The profile supports editing features for the account owner, allowing them to update their name, bio, avatar, and location. Location can be selected manually or chosen directly from an interactive map for more accurate information. When viewing other users' profiles, Bloom supports social interaction through the follow/unfollow feature and includes a reporting option to help maintain a safe community environment. In addition, the profile page includes an account verification feature that allows a farmer to request verification to become an expert by submitting their expertise field, years of experience, and uploading an official document for review by the admin.

noora's Profile

← Back **Profile**



noora

No bio available.

nablus


[Edit Profile](#) [Verify Account](#)

2 Posts

4 Items

4 Followers

1 Following




noora

1/13/2026, 7:49:27 PM

hi

♥ 1
💬 2
📢 Share



noora

11/5/2025, 2:44:09 PM


first time here

♥ 1
💬 1
📢 Share

(a). Farmer profile

ward's Profile

← Back **Profile**



ward Expert

No bio available.

nablus, West Bank, Palestinian Territories


[Edit Profile](#)

1 Posts

0 Items

1 Followers

1 Following



ward


1/13/2026, 2:10:07 PM

hi

♥ 1
💬 0
📢 Share

(b). Expert profile

← Back Profile



ezz

No bio available.

Location not set


Follow
Report

1 Posts

0 Items

1 Followers

1 Following



ezz


1/18/2026, 8:29:02 PM

hi

❤️ 0
💬 0
🔗 Share

(c). Other users profile

← Back Profile



ezz

No bio available.

Location not set


Following
Report

1 Posts

0 Items

1 Followers

1 Following



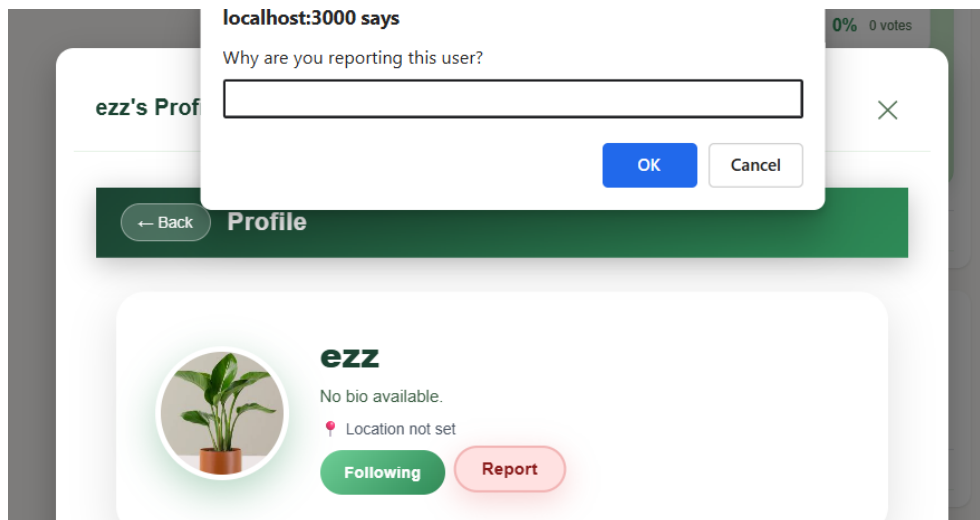
ezz

1/18/2026, 8:29:02 PM

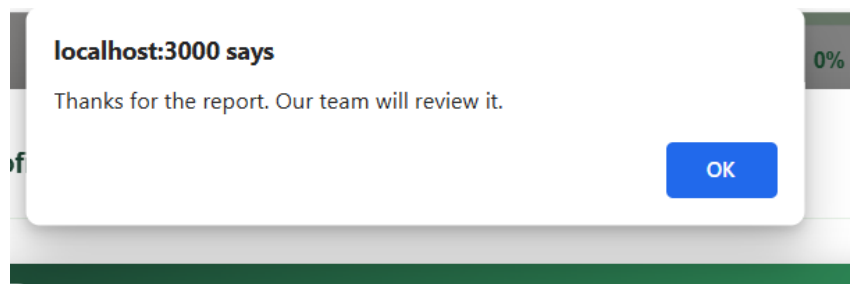
hi

❤️ 0
💬 0
🔗 Share

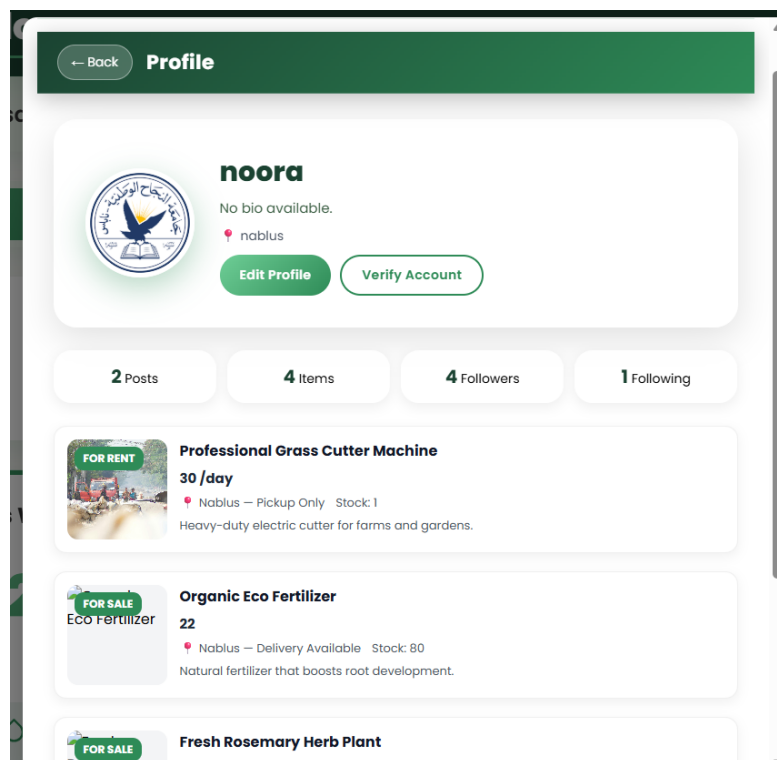
(d). Following other users



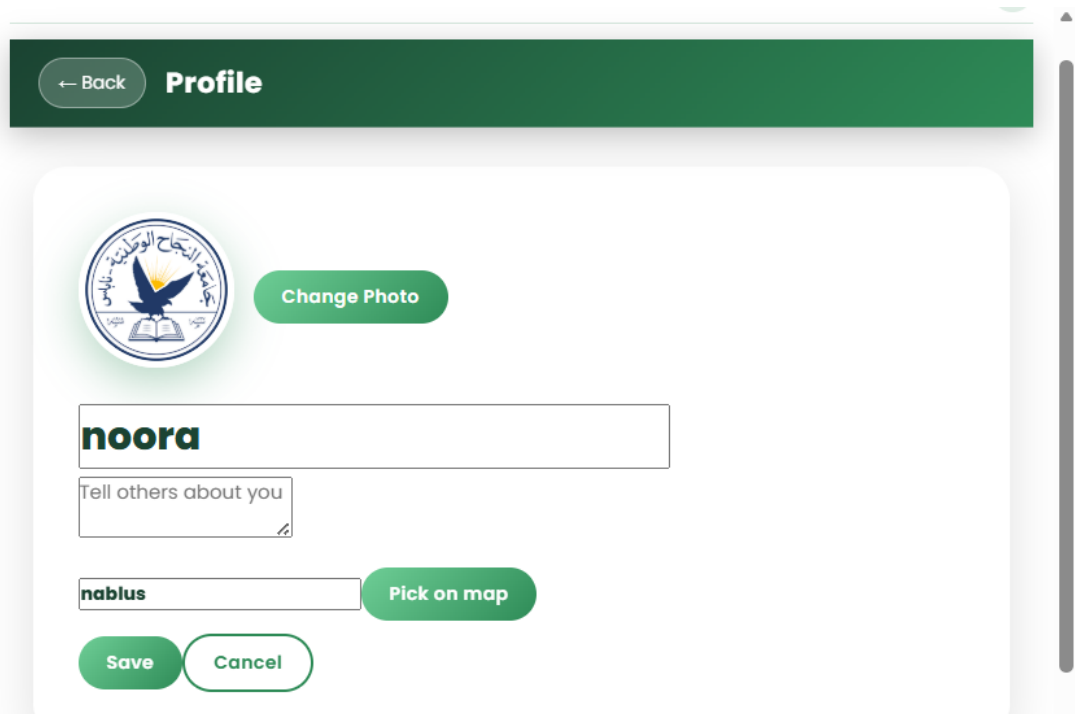
(e).Reporting other users



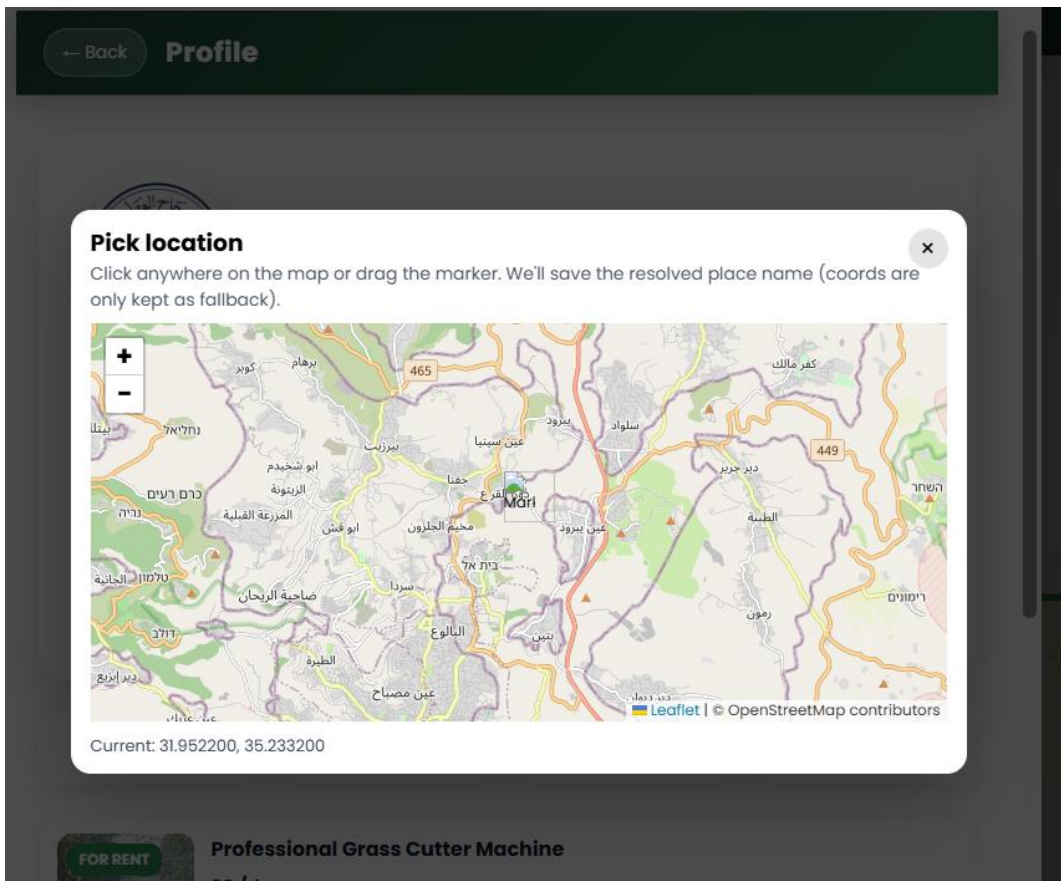
(f). Send report



(g). When click on an item, view user's items in the store



(h). Edit profile



(i). Pick location from map

Account Verification
Verify your expertise to build trust with the community

Expertise Field
Select your expertise

Years of Experience
Minimum 1 year of experience required

Verification Document
 University Degree
 Professional Certificate
 License / Membership
 (Agriculture, Biology, Environmental Science...)

Upload Document
Choose file (PDF, JPG, PNG)
Accepted formats: PDF / JPG / PNG

Cancel Submit Verification

(j). Profile verification page

Account Verification
Verify your expertise to build trust with the community

Expertise Field
Organic Farming

Years of Experience
2
Minimum 1 year of experience required

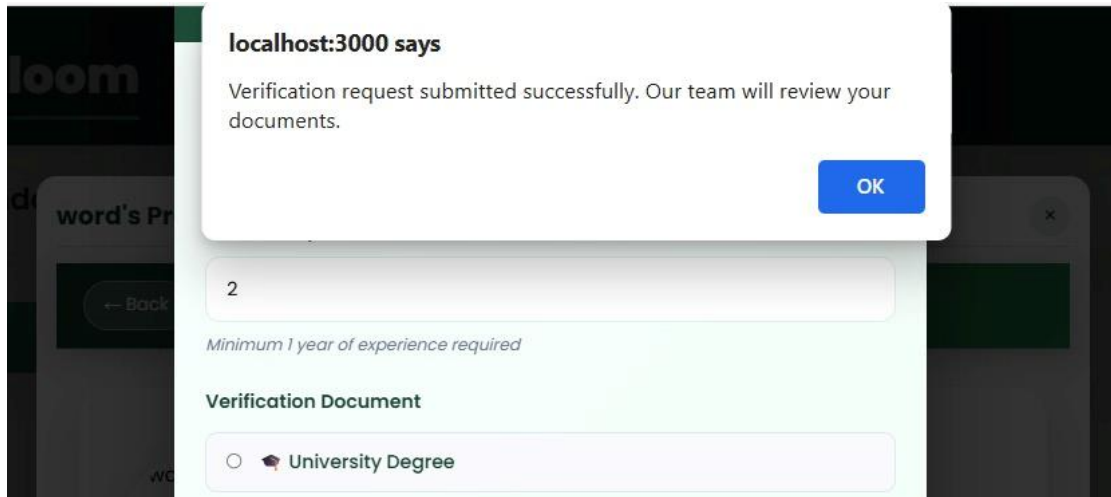
Verification Document
 University Degree
 Professional Certificate
 License / Membership

Upload Document
landing-organic-certificate.jpg
Accepted formats: PDF / JPG / PNG

ORGANIC FARM CERTIFICATE
 This is to certify that:
 Ken Center for Sustainable Agriculture
 George Knappier
 P.O. Box 518
 Phoenix, AZ 85003
 Ph: 313-447-9123
 Has met the Organic Standards outlined by USDA National Organic Program and adopted by
 LA AGRICULTURE

Cancel Submit Verification

(k). Information needed for verification



(I). Request sent to admin side

Figure 3.13: User Profile Page on the web interface

3.2.1.2 Use “BLOOM” Website as an Admin

- Admin pages

The **Admin** in Bloom is responsible for managing and monitoring the entire platform to ensure safety, reliability, and smooth operation. Through the admin dashboard, the administrator can view system statistics such as total users, products, orders, and active rentals, which helps track platform activity and performance. The admin also handles user management tasks including reviewing user accounts, controlling account status, and monitoring user behavior. In addition, the admin plays an important role in reviewing and approving or rejecting farmer requests to become verified experts, ensuring that expert accounts are trustworthy. The administrator can also manage marketplace content by reviewing products, handling reports, and monitoring orders and rental transactions. Finally, the admin oversees the community section by reviewing reported posts and maintaining a safe environment for all users.

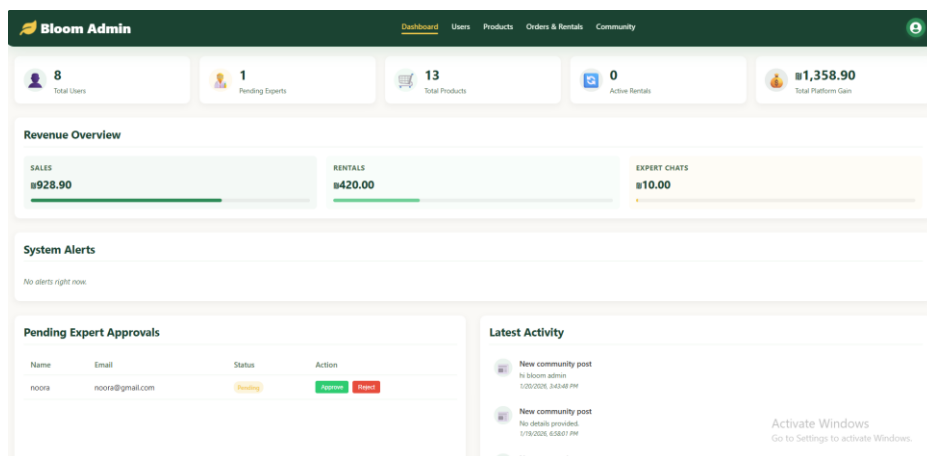


Figure 3.14: Admin Dashboard

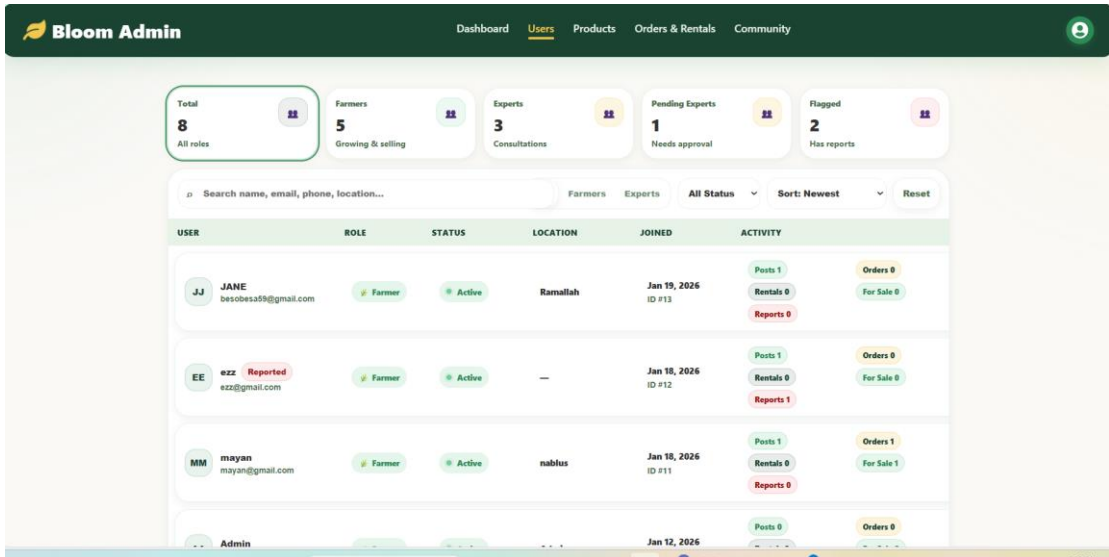


Figure 3.15: All users in Bloom (Admin Page)

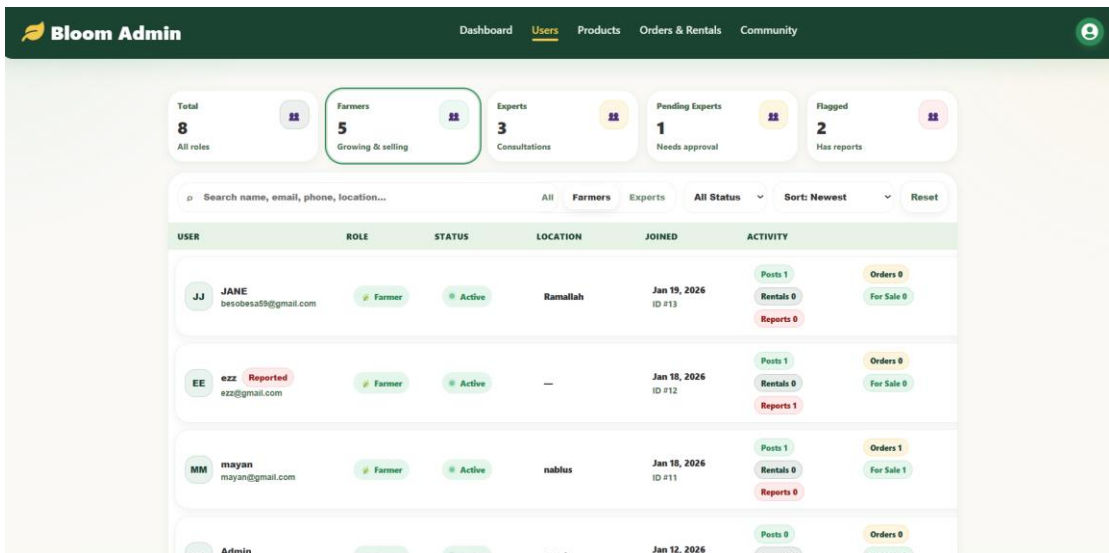


Figure 3.16: Show the farmers Only (Admin Page)

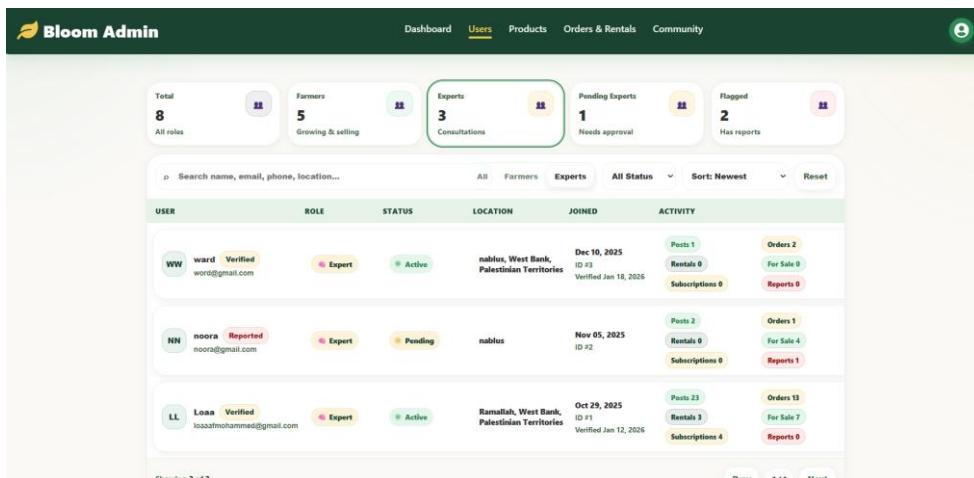


Figure 3.17: Show the experts Only (Admin Page)

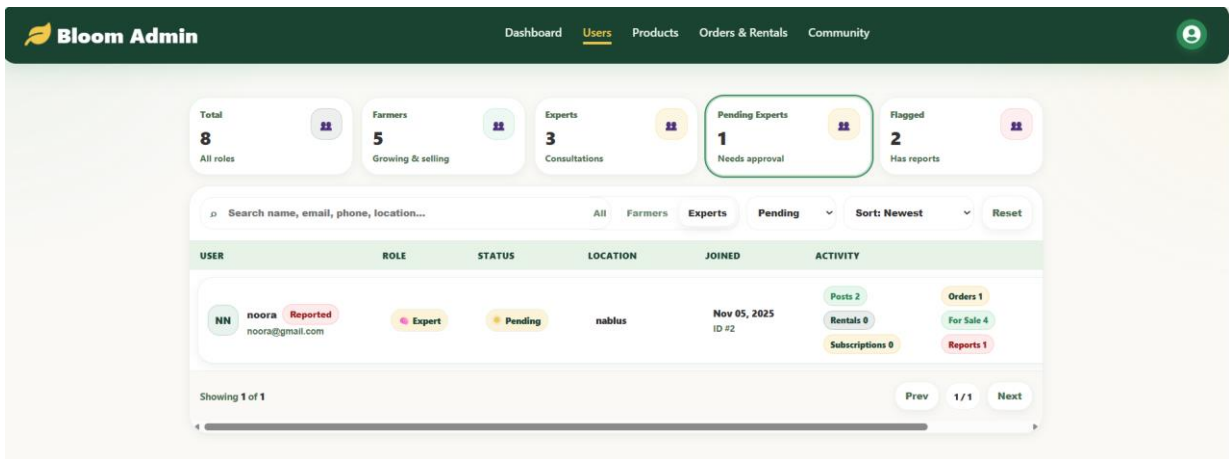


Figure 3.18: Expert needs to be approved (Admin Page)

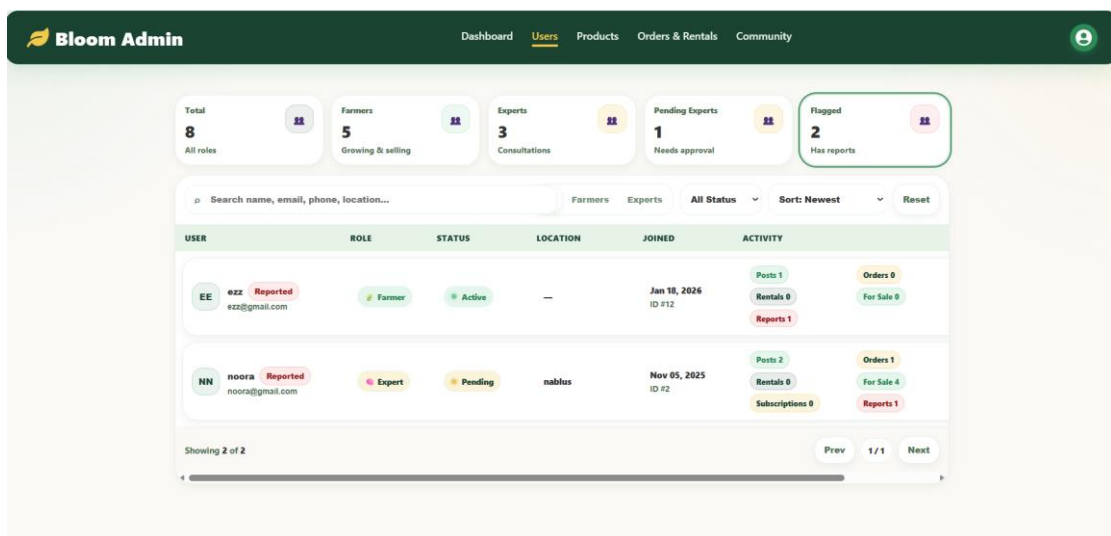


Figure 3.19: Reported Users (Admin Page)

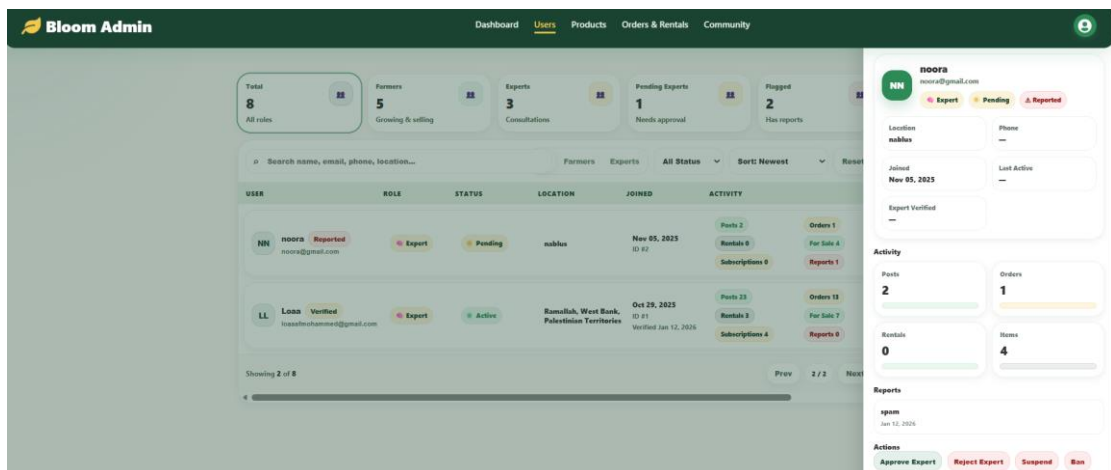


Figure 3.20: User's Info (Admin Page)

(can see user info and if there are any reports and what is it and can do action)

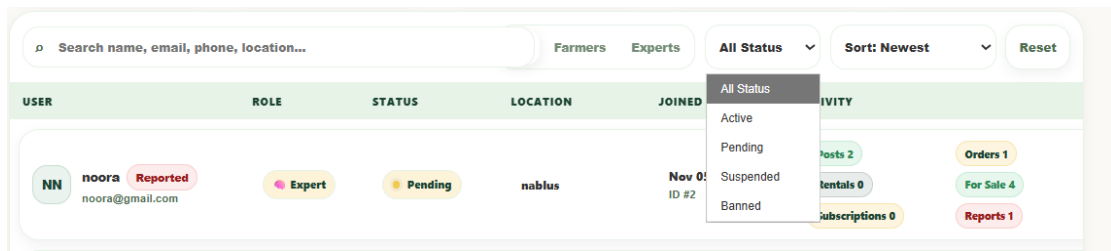


Figure 3.21: Filter by User status (Admin Page)

In the Bloom admin panel, user accounts can have different statuses to help the administrator control access and maintain platform safety. **Active** users are fully allowed to use the system normally and access all features based on their role. **Pending** refers to accounts that are waiting for admin review or approval, such as when a farmer submits a verification request to become an expert. **Suspended** users are temporarily restricted due to suspicious behavior or repeated reports, and their access may be limited until the admin takes further action. Finally, **banned** accounts are permanently blocked from using the platform because of serious violations or continuous misuse of the system.

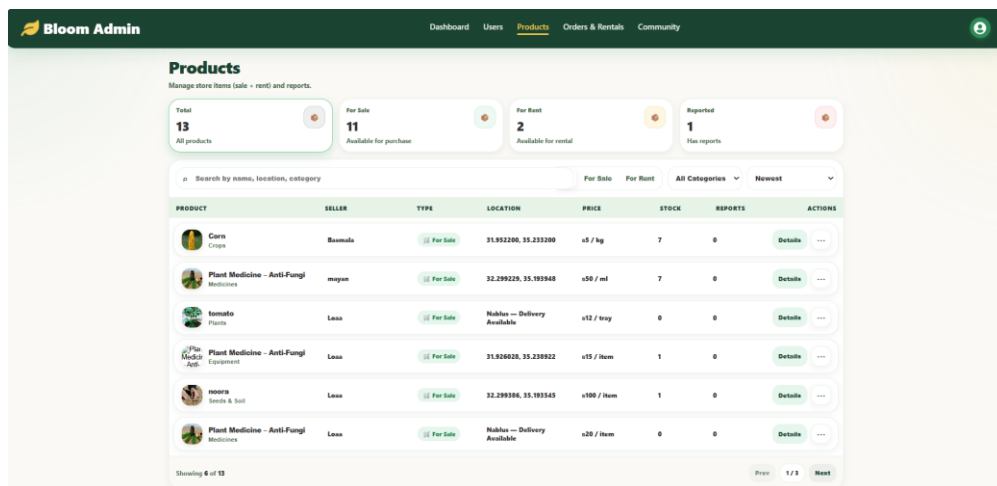


Figure 3.22: All Products (Admin Page)

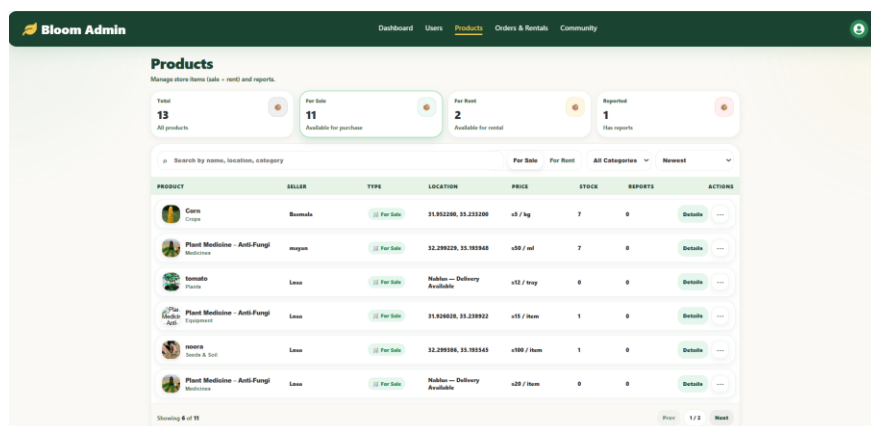


Figure 3.23: For Sale Products (Admin Page)

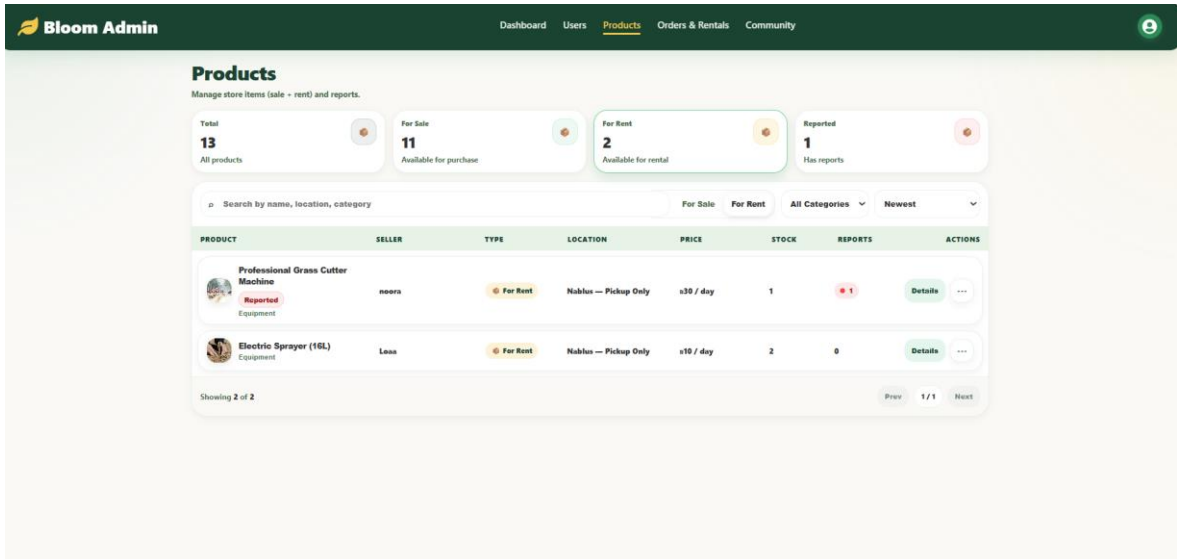


Figure 3.24: For Rent Products (Admin Page)

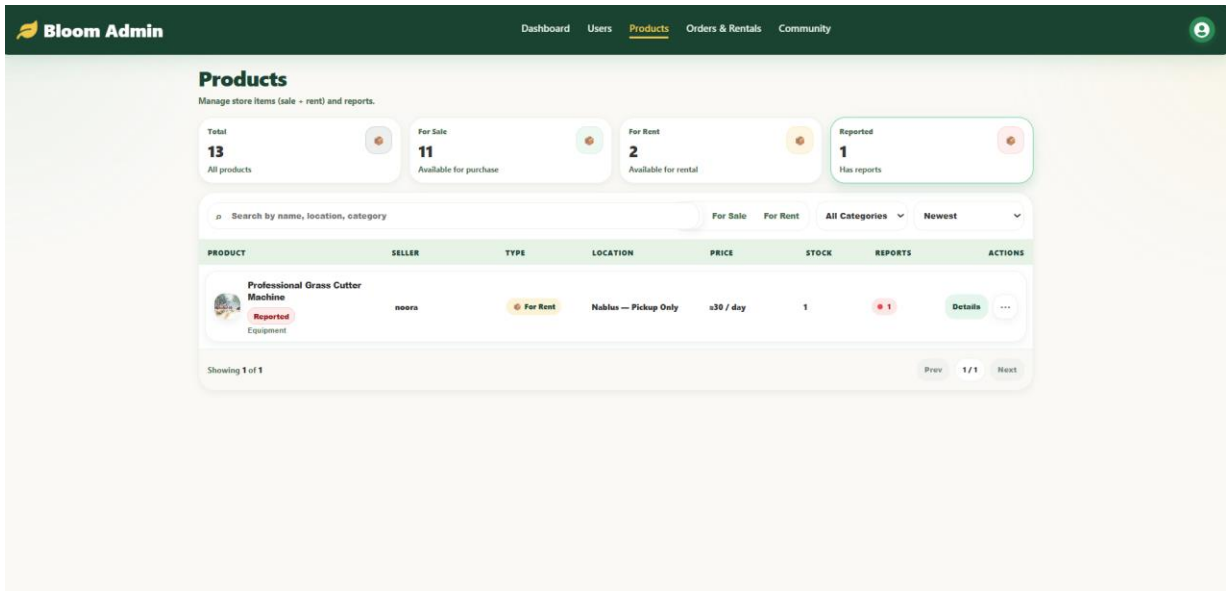



Figure 3.25: Reported Products (Admin Page)



[Edit Item](#) [Delete](#)

Professional Grass Cutter Machine

₪30 / day

Item Details

Type	For Rent
Category	Equipment
Location	Nablus — Pickup Only
Stock	1

Description

Heavy-duty electric cutter for farms and gardens.

Reports

spam

1/12/2026, 10:27:39 PM

Figure 3.26: Item Details (Admin Page)

(admin can see the info of items, edit, delete, and see the reports on it)



Item Name *

Professional Grass Cutter Machine

Category * Type *

Equipment For Rent (equipment only)

Price (# / day) * Unit

30 item

Stock Quantity *

1

Location *

Nablus — Pickup Only

Image URL

https://images.pexels.com/photos/7219537/pexels-photo-7219537.jpeg?auto=compress

Description

Heavy-duty electric cutter for farms and gardens.

Figure 3.27: Edit Item by Admin

PRICE	STOCK	REPORTS
30 / day	1	1

Figure 3.28: Sorting Items by filters (Admin Page)

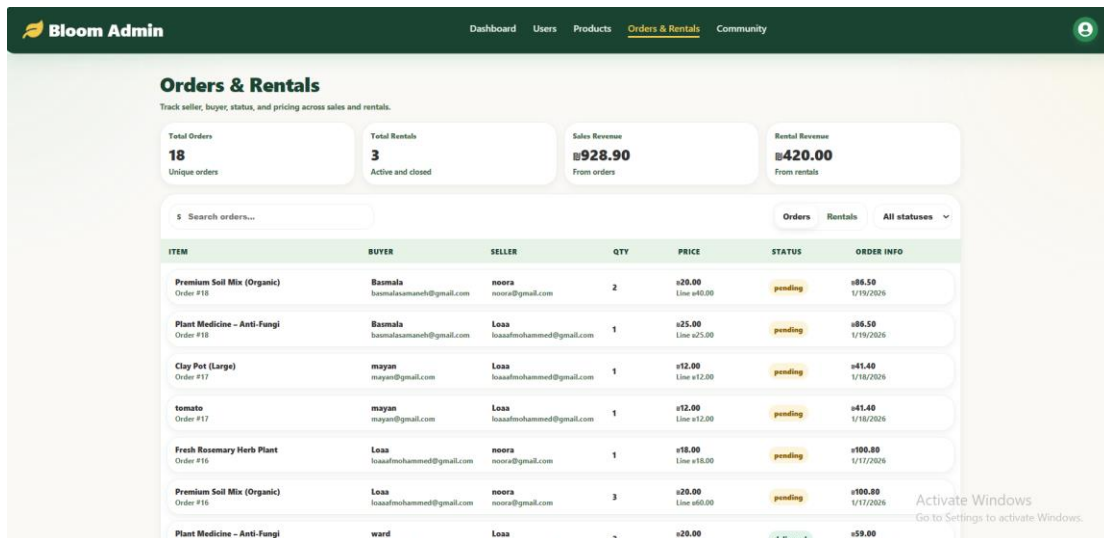


Figure 3.29: Selling Orders (Admin Page)

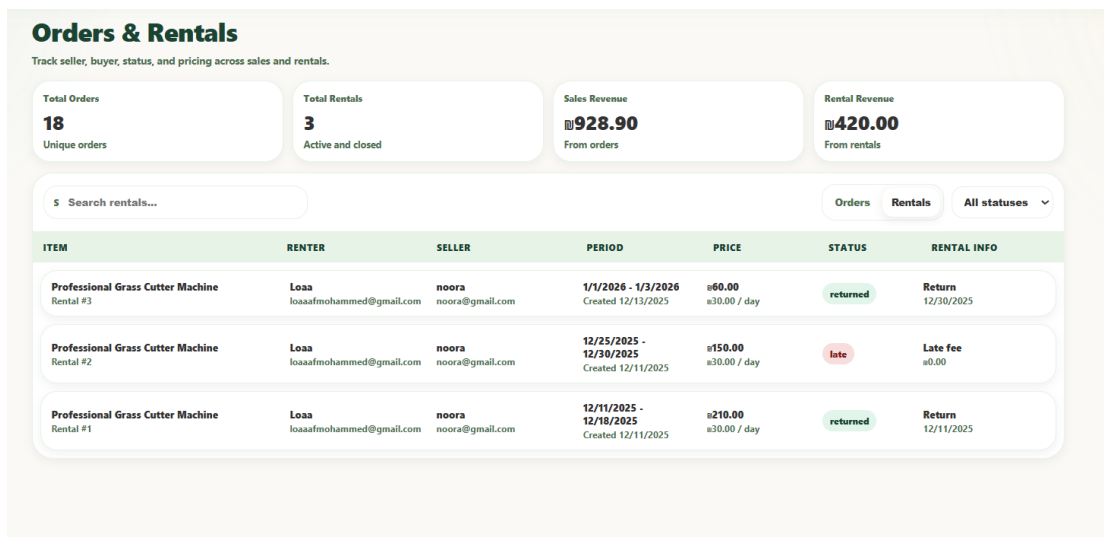


Figure 3.30: Rental Orders (Admin Page)

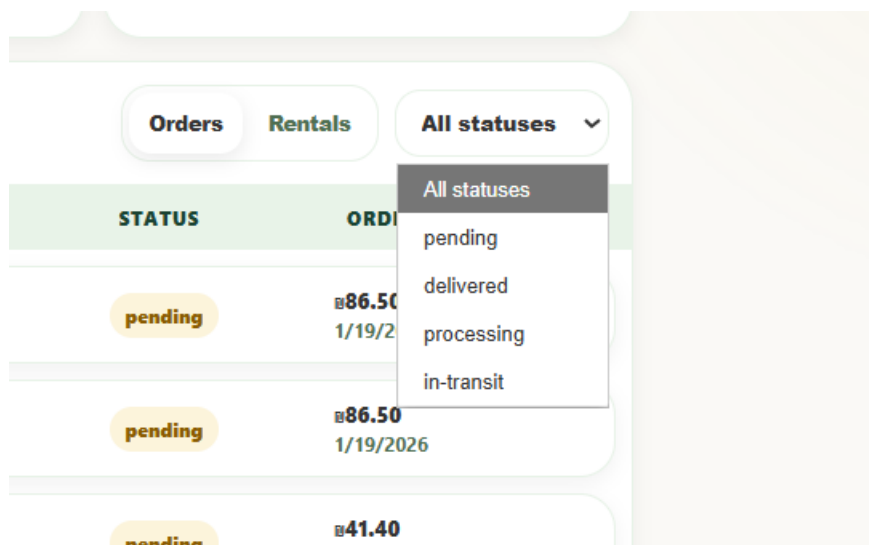


Figure 3.31: Filters for Orders

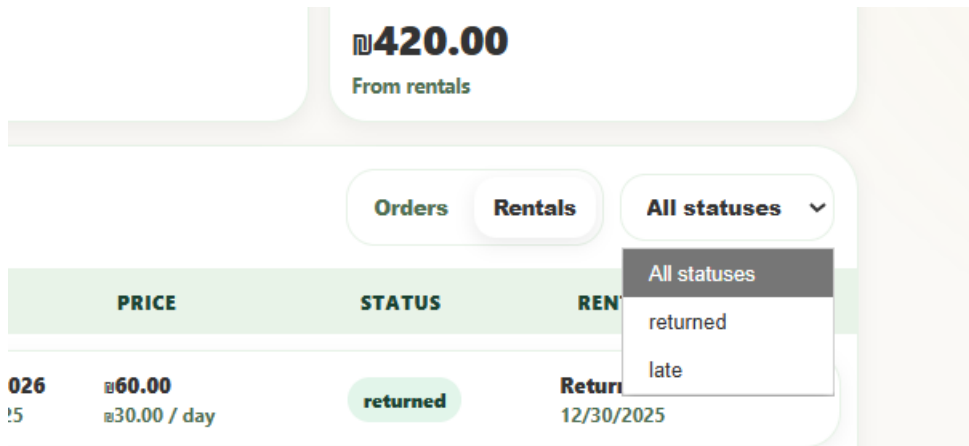


Figure 3.32: Filters for Rentals

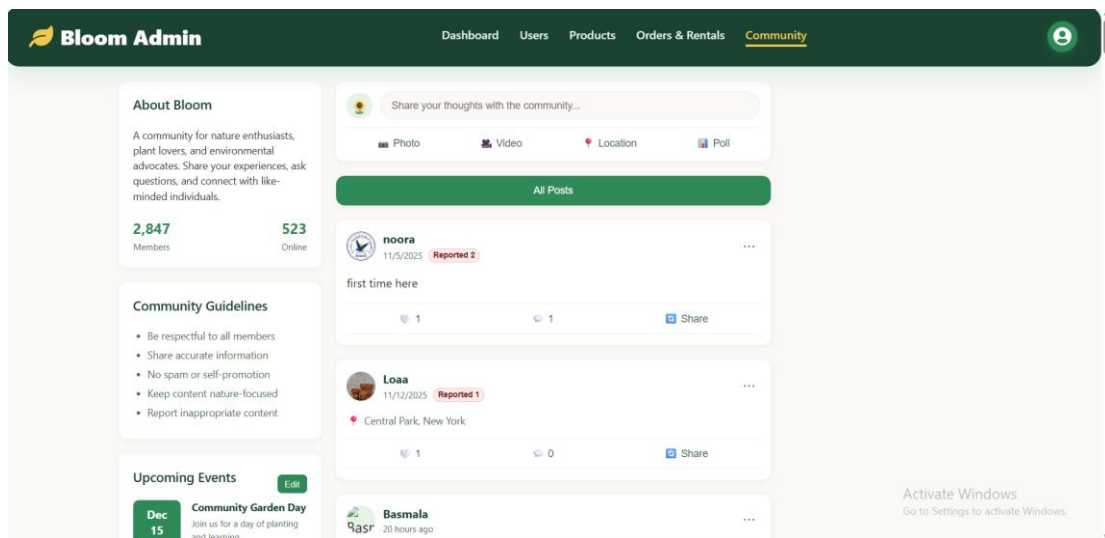


Figure 3.33: Community (Admin Page)

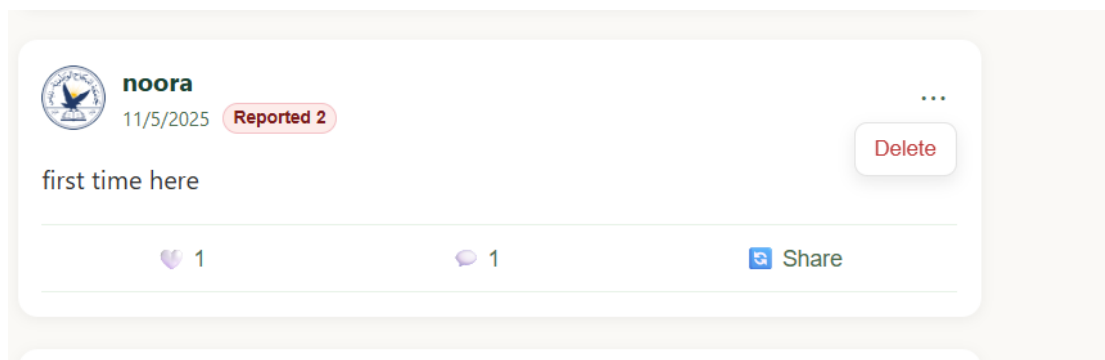


Figure 3.34: Delete Post by Admin

noora
11/5/2025 **Reported 2**

first time here

REPORTS

spam	open / 1/13/2026
Reporter: Loaa	
dont	open / 1/12/2026
Reporter: Loaa	

1 1 Share

Figure 3.35: See the reports by click on the reported sign

Upcoming Events Edit

Dec 15 **Community Garden Day**
Join us for a day of planting and learning

May 22 **Nature Walk & Photography**
Explore local trails and capture nature's beauty

Figure 3.36: Upcoming events (Admin Page)

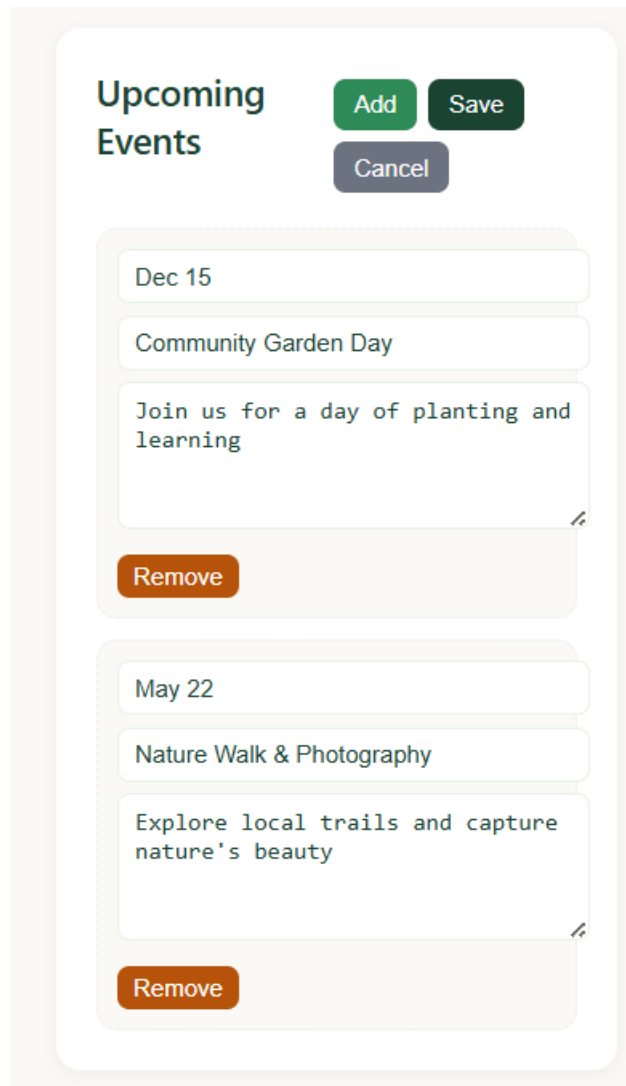


Figure 3.37: Upcoming event operation (Admin Page)

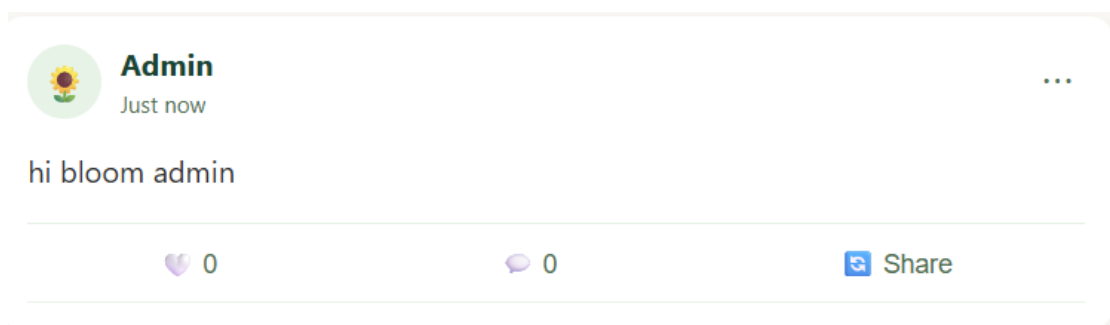


Figure 3.38: Create Post by Admin

Pending Expert Approvals


Name	Email	Status	Action
ward	word@gmail.com	Pending	Approve Reject

Figure 3.39: Expert Verification request (Admin Page)

Total Products
Active Rentals

Expert Application

Submitted: 1/20/2026, 1:42:43 PM

Name	noora
Email	noora@gmail.com
Location	nablus
Field / Specialization	Agronomy
Experience	2 yrs
Document	

Status: pending

Action: Approve Reject

No details provided.
1/19/2026, 6:58:01 PM

Figure 3.40: Details & Info of Expert Verification Application (Admin Page)

Expert approved successfully. Logout

7

Total Users

0

Pending Experts

12

Total Products

0

Active Rentals

\$1,269.9

Total Platform Gain

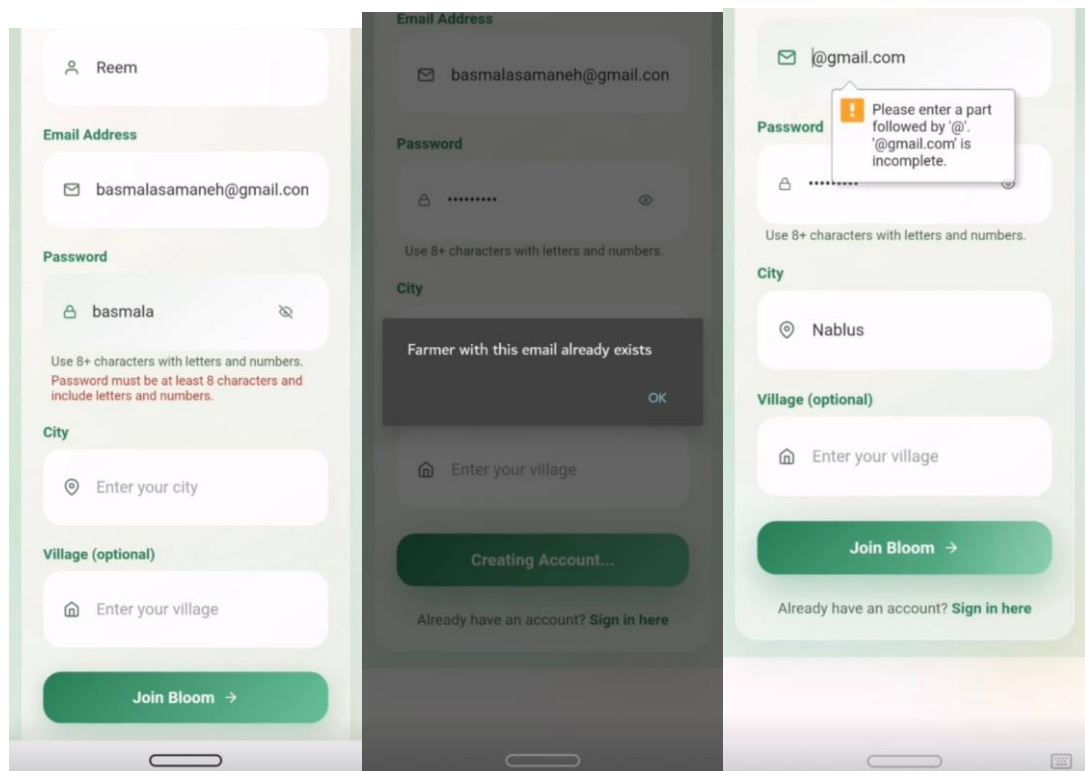
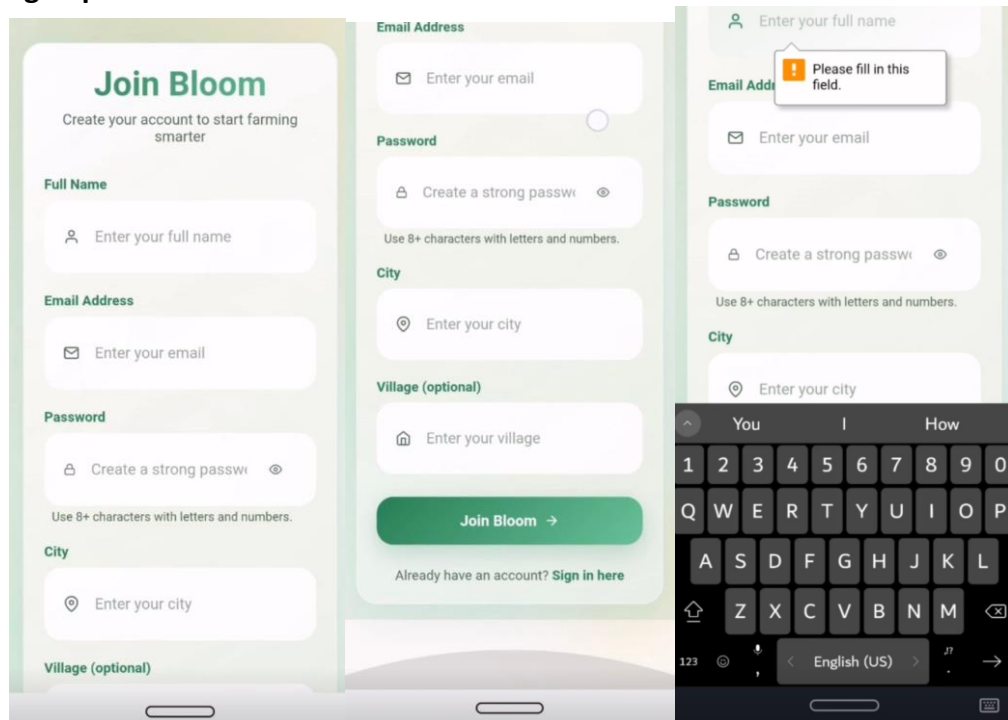
Revenue Overview

Figure 3.41: Approve Expert (Admin Page)

3.2.2 MOBILE APPLICATION

Bloom mobile app provides the same main services as the platform design (crop management, community, chat, store, AI, profile) so farmers can use the system easily in the field.

- Authentication Screens
 - Sginup Screens



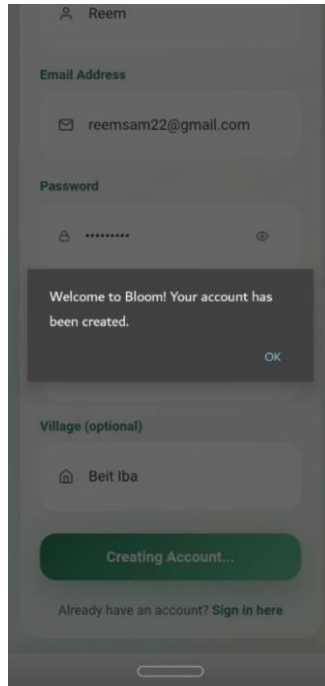
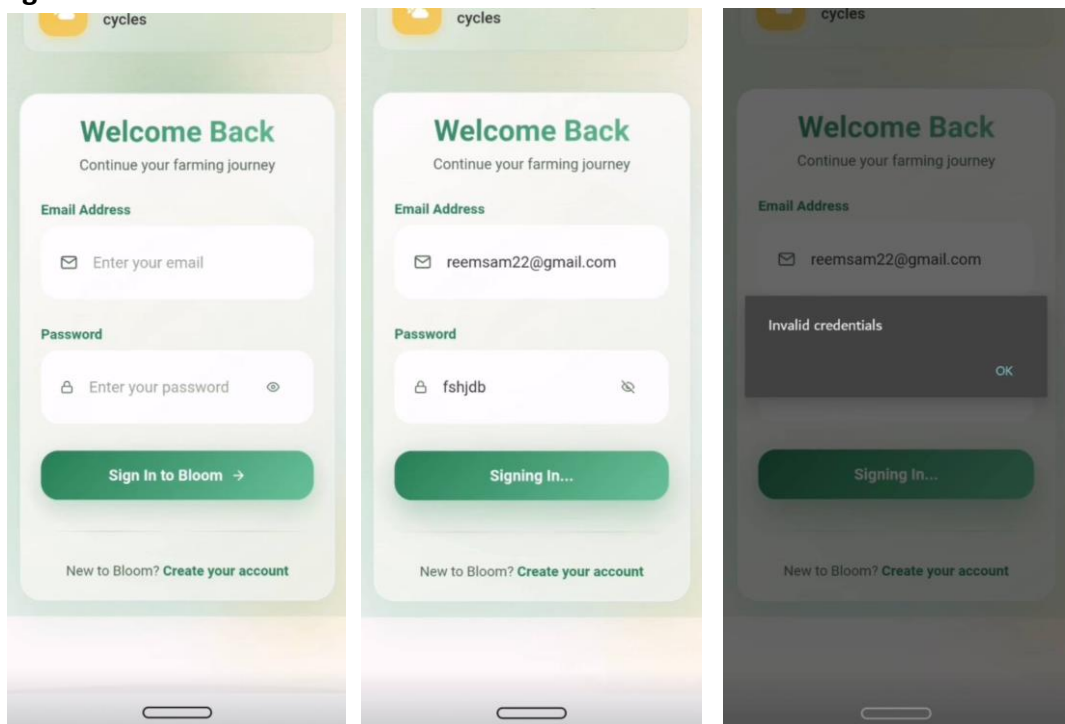


Figure 3.42: Signup Screens on the Mobile APP

– Sginin Screens



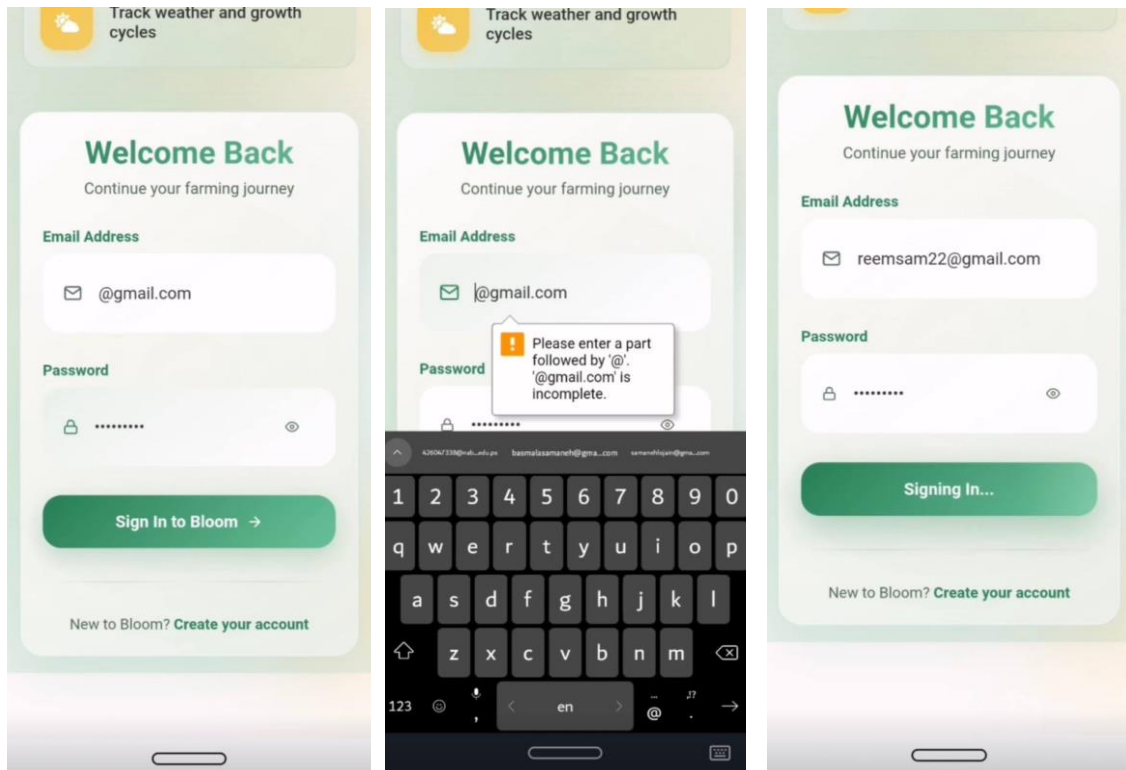
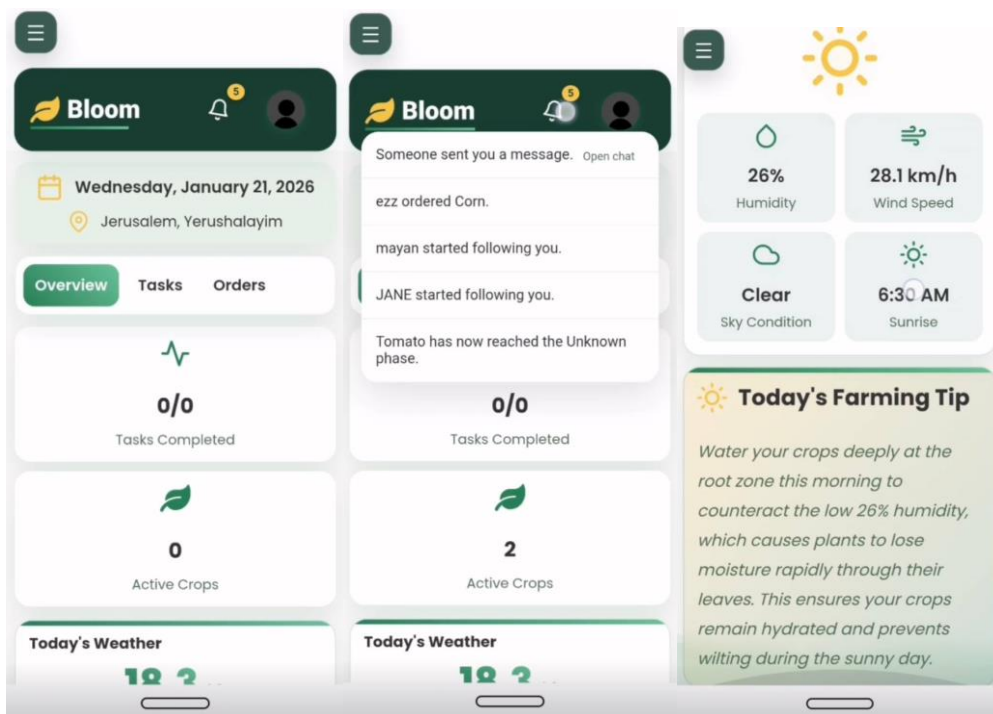


Figure 3.43: Signin Screens on the Mobile APP

3.2.2.1 Use “BLOOM” APP as a USER (Farmer/Expert)

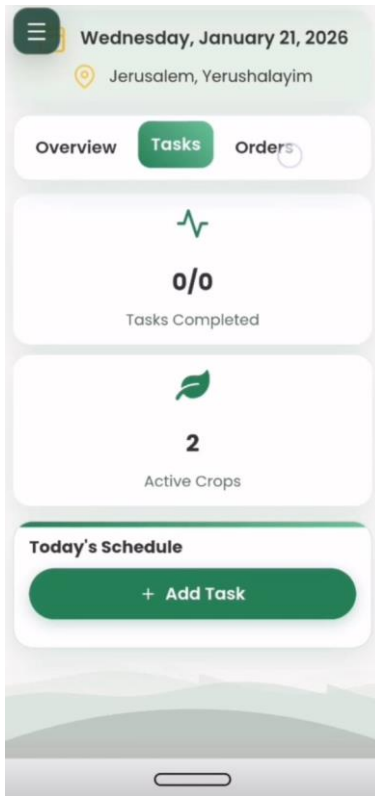
- User Home Page



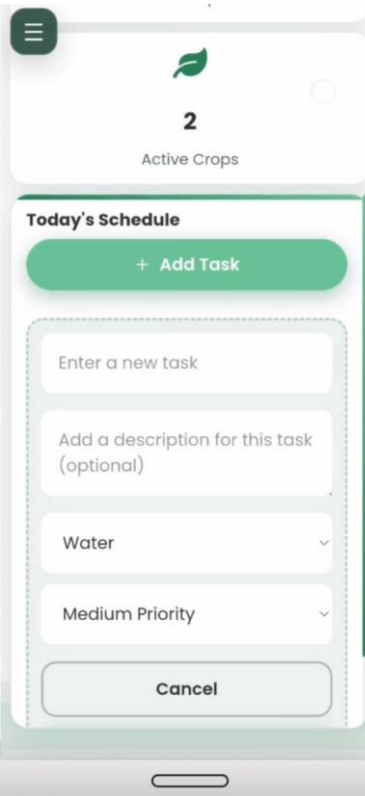
(a). home screen

(b). Notifications

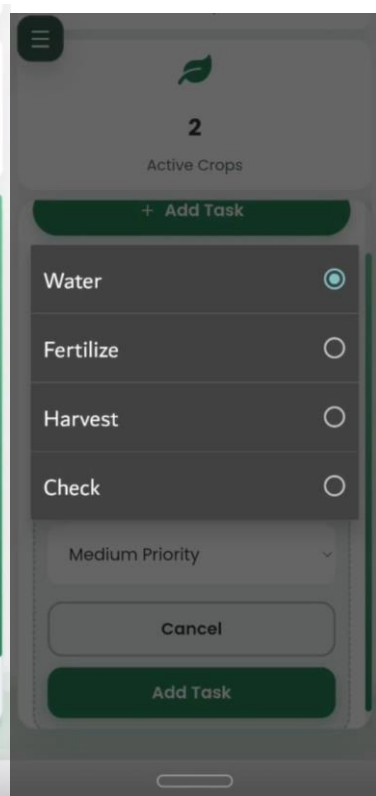
(c). Weather and AI tip



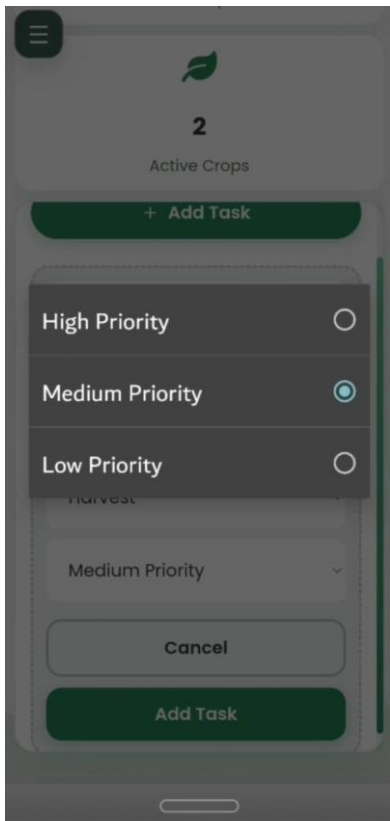
(d). Tasks tap



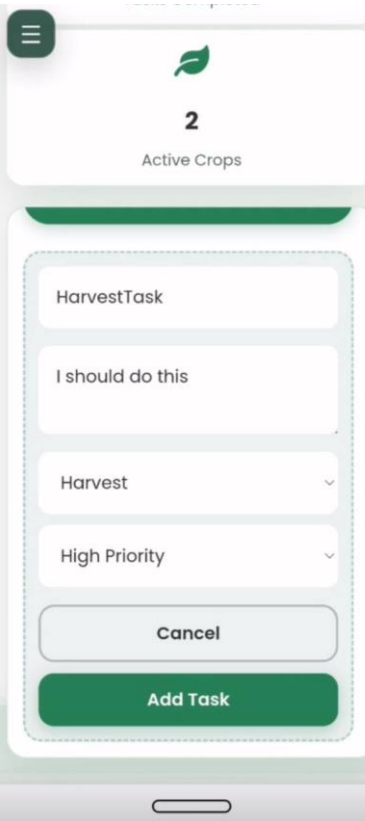
(e). Add new task manually



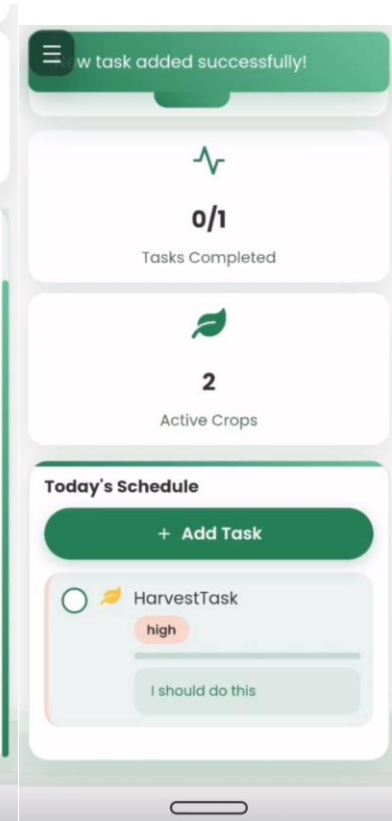
(f). Task type



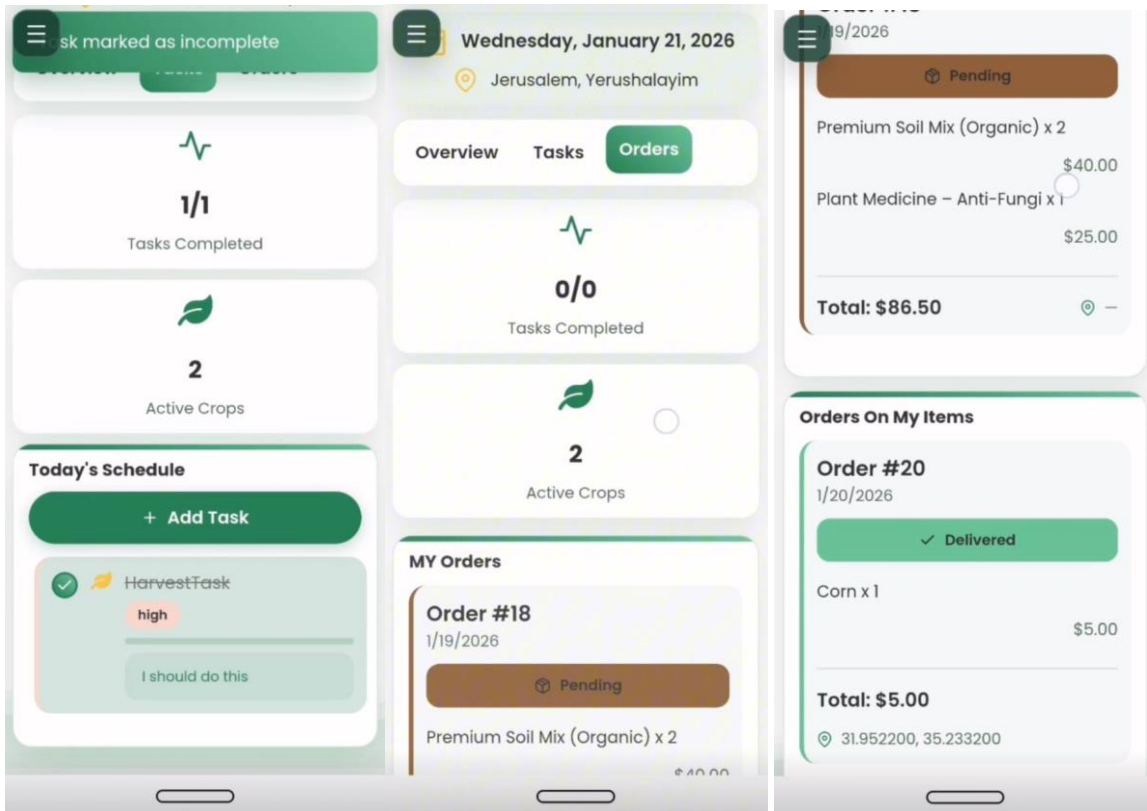
(g). Task priority



(h). Add task



(i). Task added



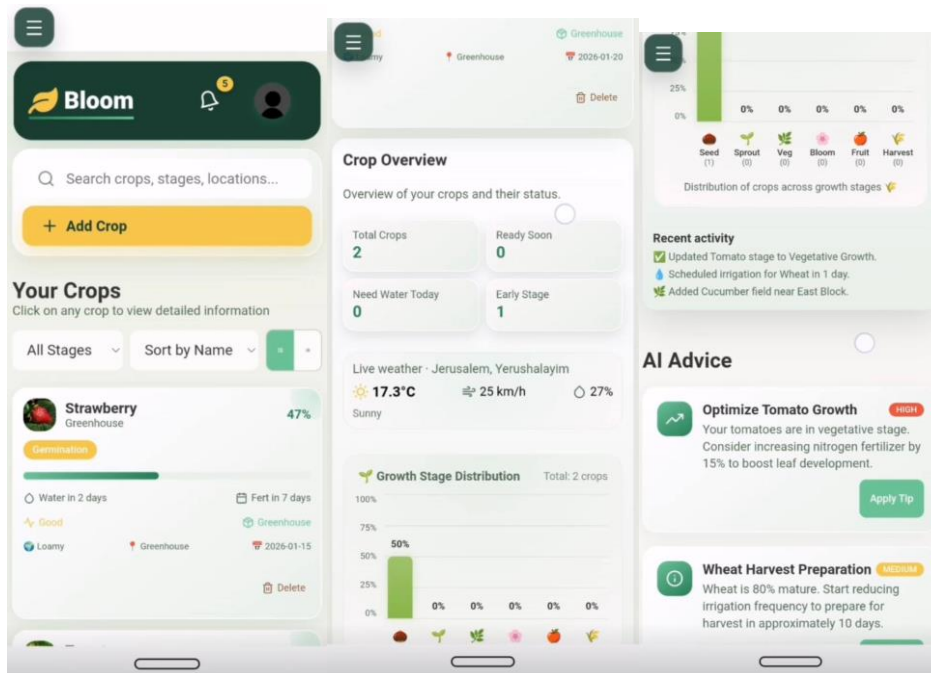
(j). Completed Task

(k). Orders tap1

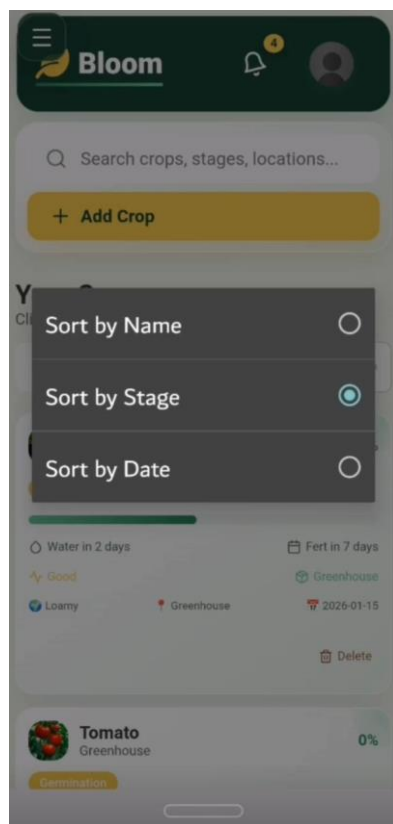
(l). Orders tab2

Figure 3.44: Home Screens on the Mobile APP

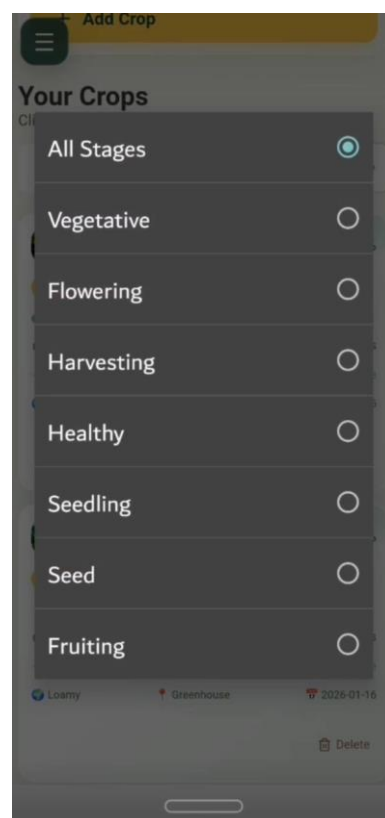
- All crops page



(a). Crop page.



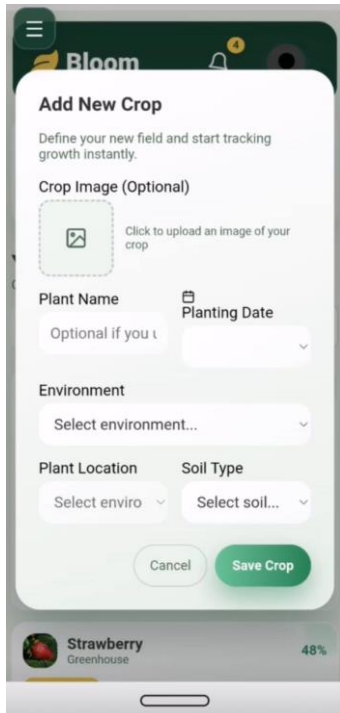
(b). Sort by Stage/Name/Date



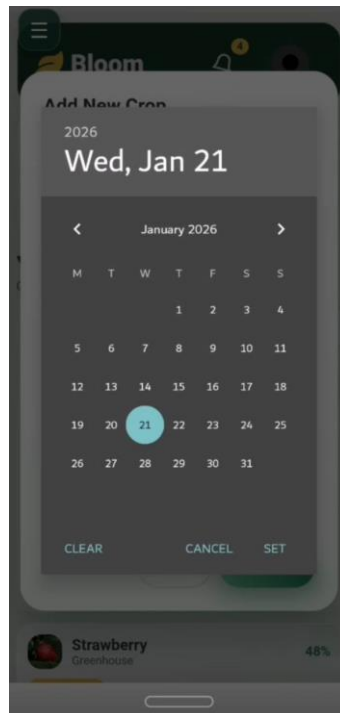
(c). Filter by stage

Figure 3.45: All Crops Page on the Mobile APP

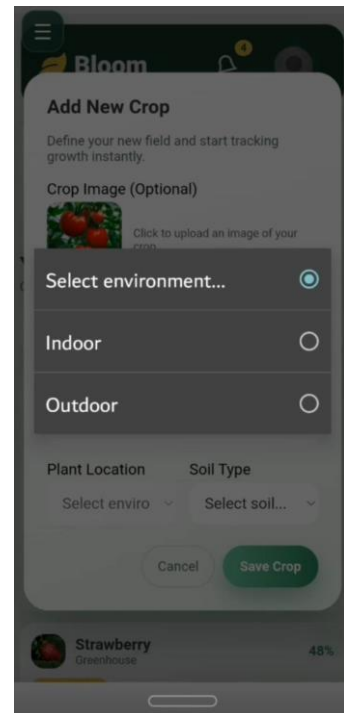
- Add new crops



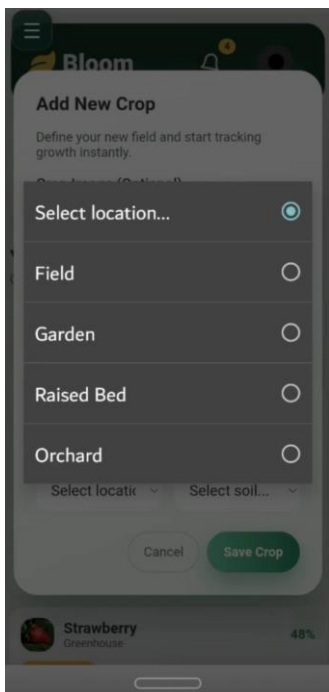
(a). Add new crop



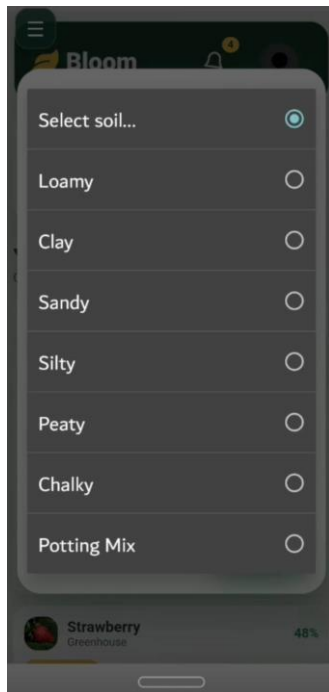
(b). Select the date



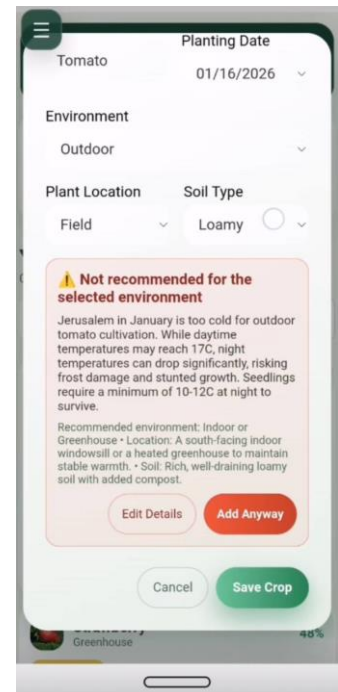
(c). Select the environment



(d). Select the location if environment is outdoor



(e). Select the soil



(g). AI advice when choose wrong environment

Figure 3.46: Add new crops on the Mobile APP

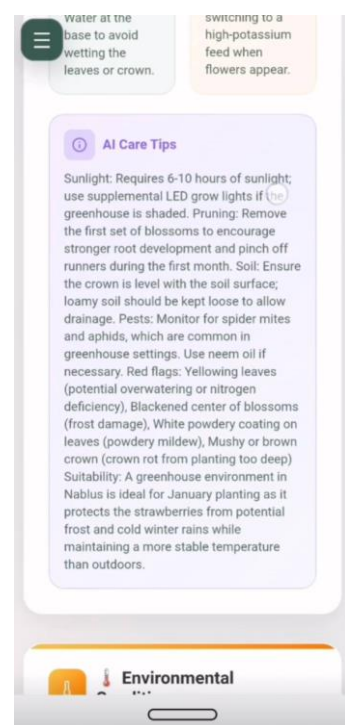
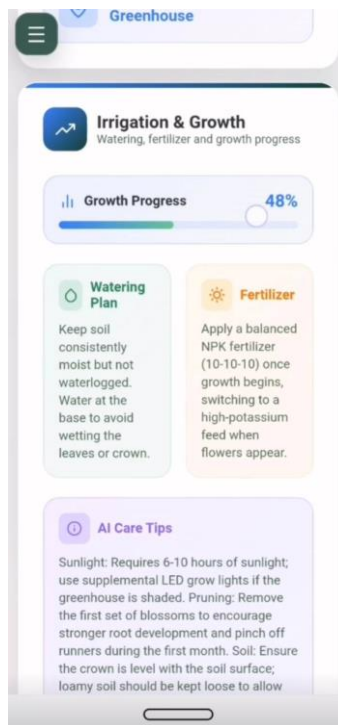
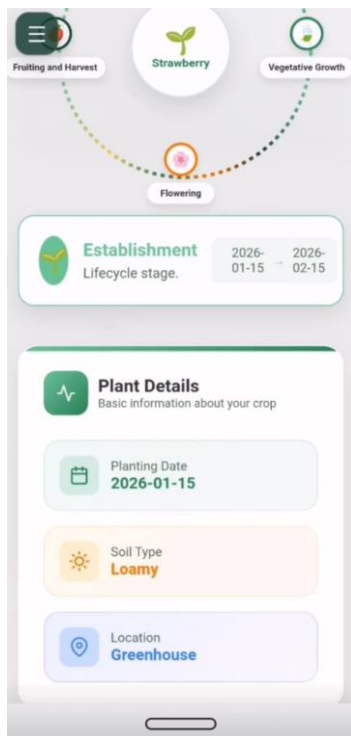
- Crop details



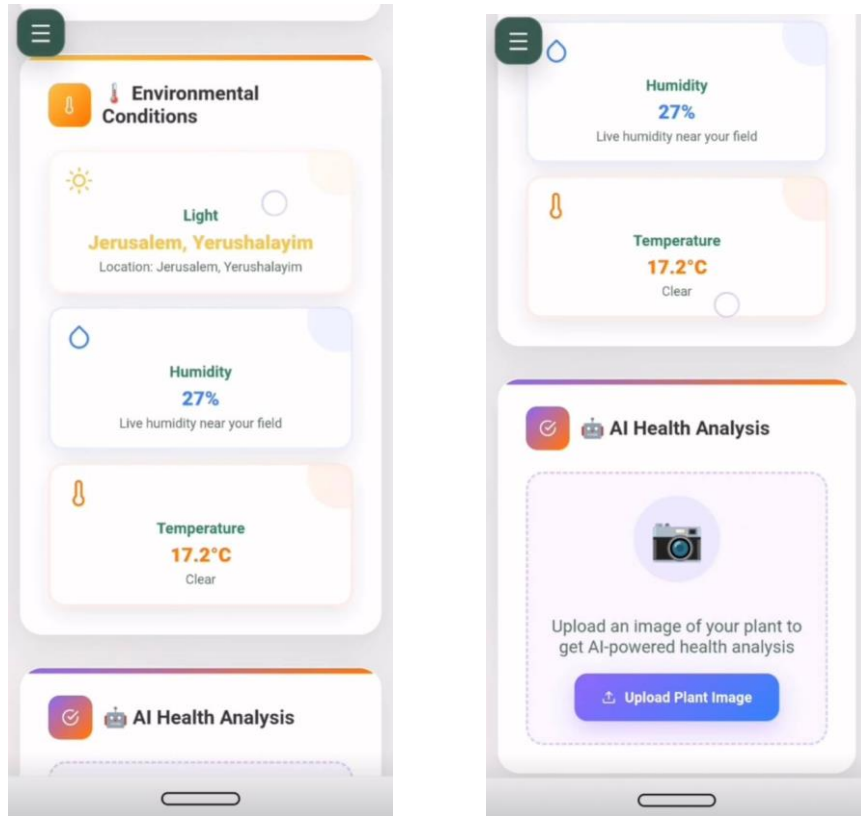
(a). Crop life cycle for tomato



(b). When click on each stage show the start date and ending date for each stage



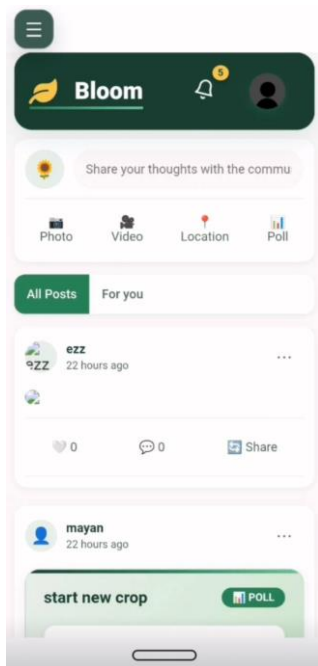
(c). Plant info and how to take care of it



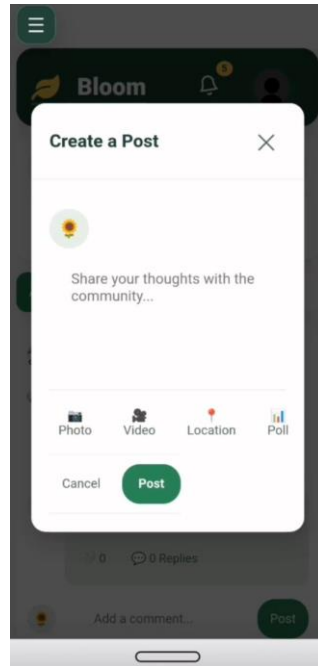
(d). Environmental Conditions & AI health analysis section

Figure 3.47: Crop Details on the Mobile App

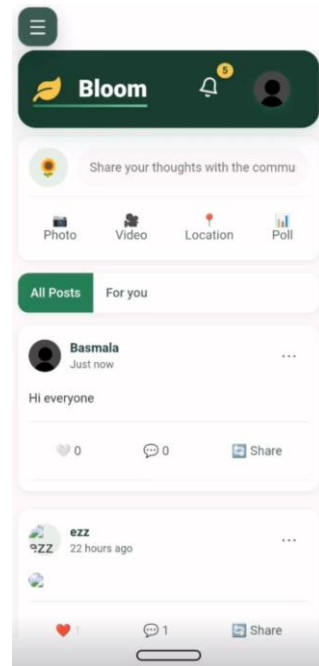
• Community



(a). Community page



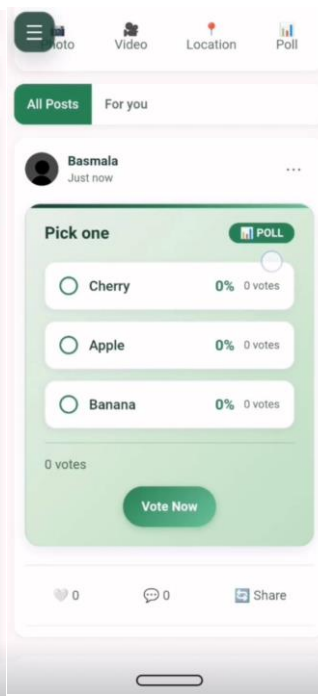
(b). Create post



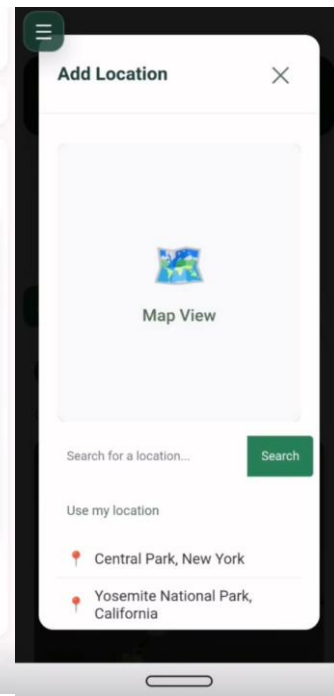
(all users can post & see posts from all users)



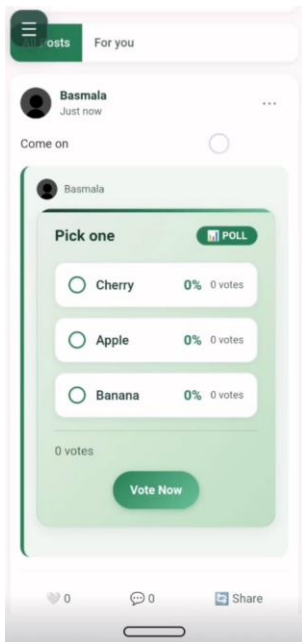
(c). Share an image



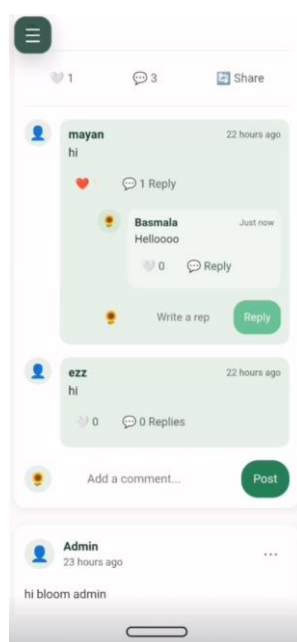
(d). Poll post



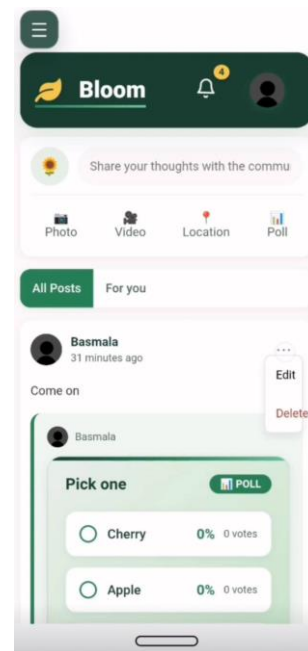
(e). Location share



(f). Repost



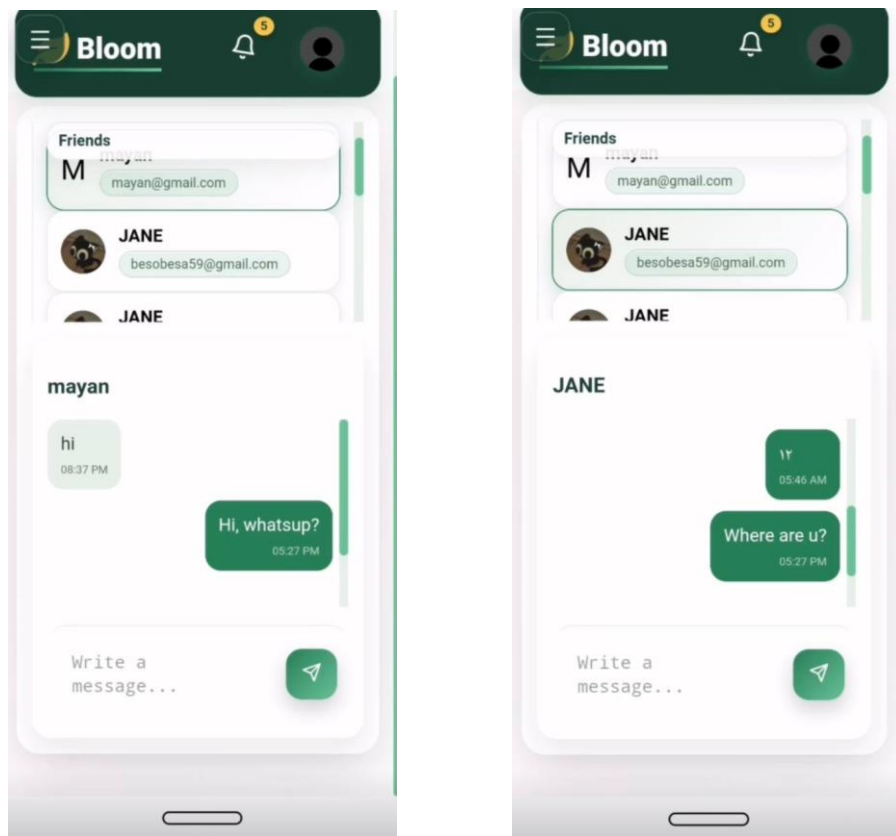
(g). Comments and likes



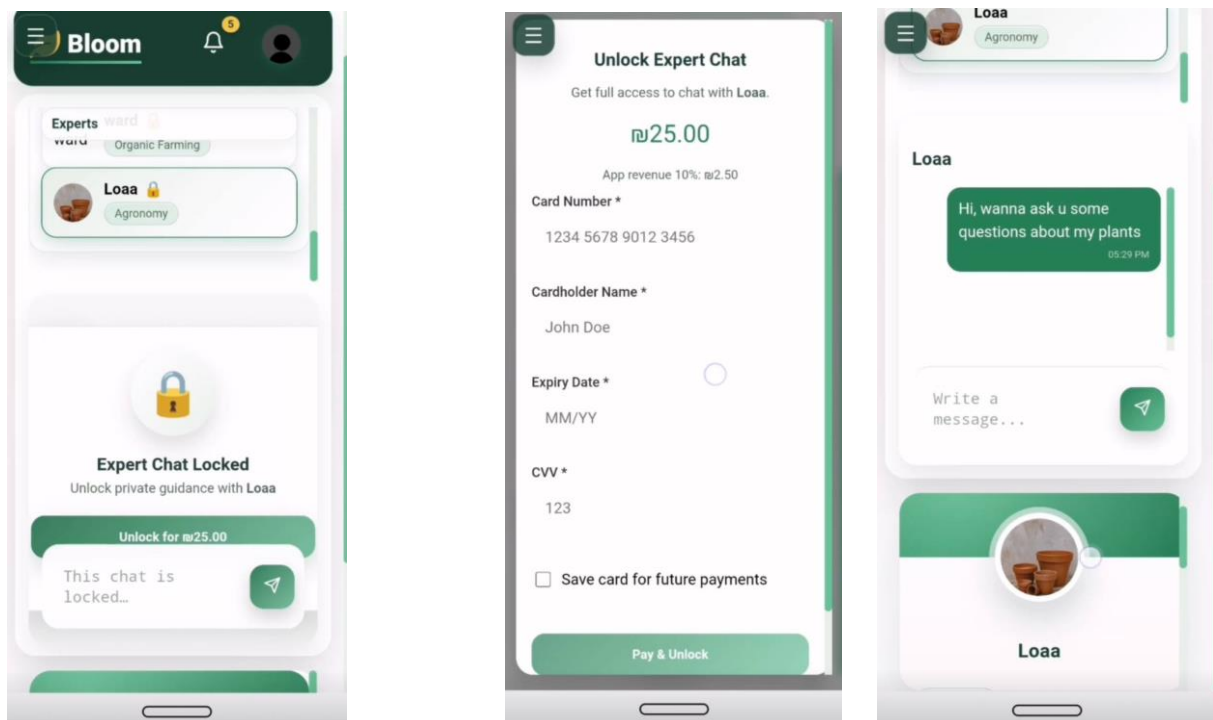
(h). Edit and delete post

Figure 3.48: Community on the Mobile APP

- Messages (Chat) page



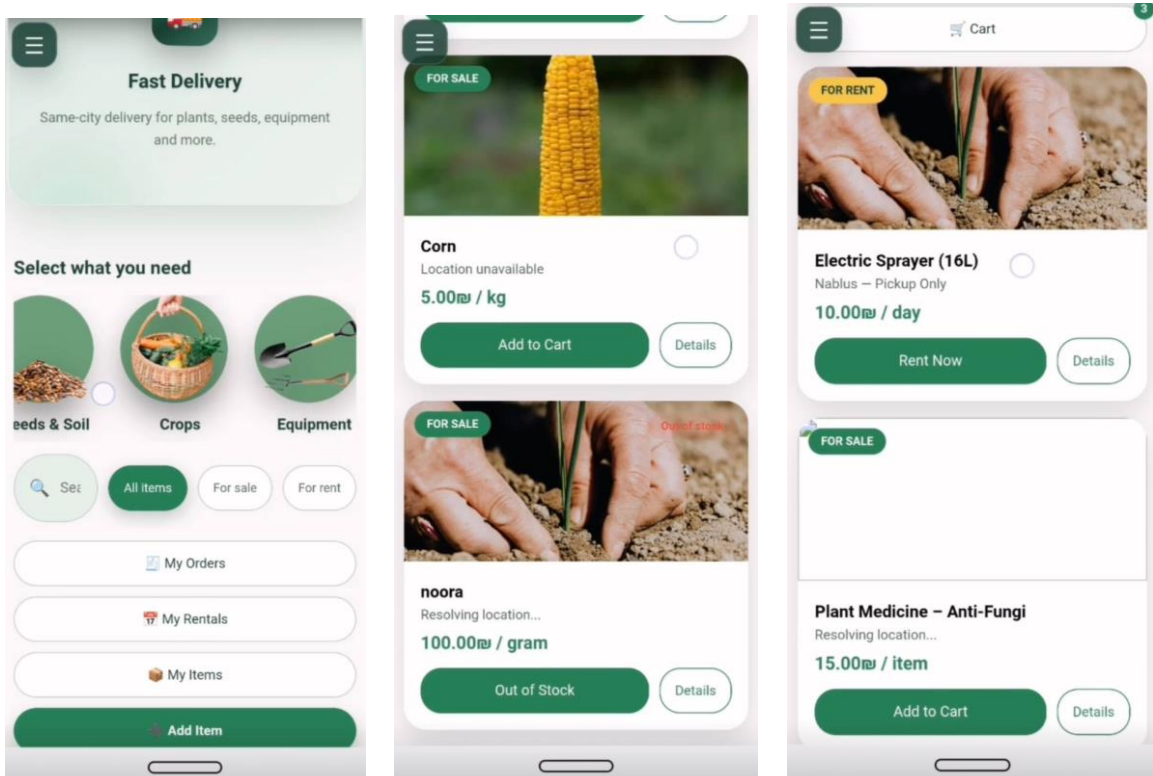
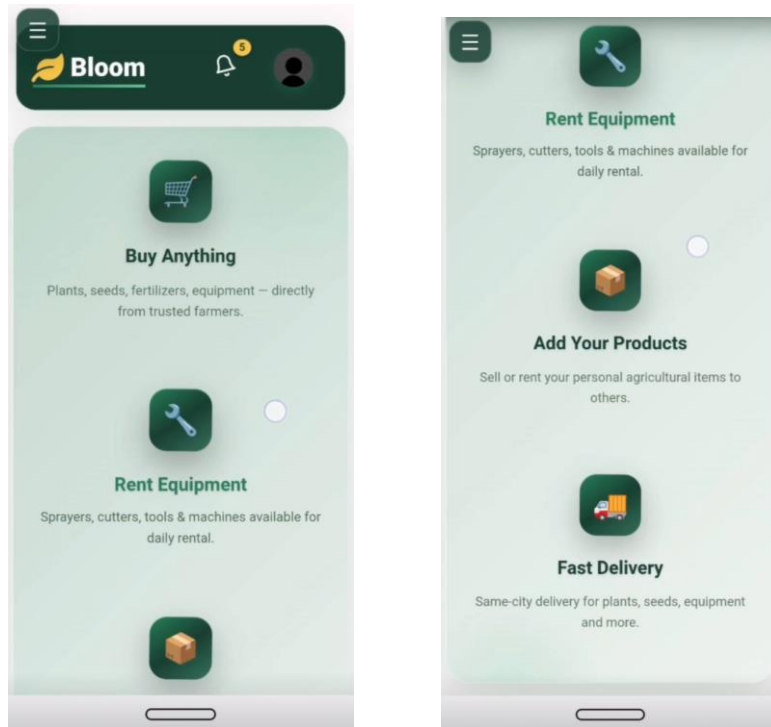
(a). Chat page for the farmer



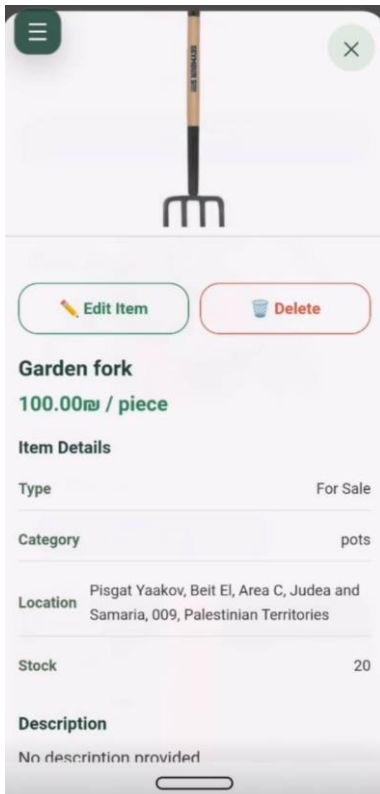
(b). Locked chat with expert (c). Payment page to unlock chat with expert (d). Chat with expert after payment

Figure 3.49: Messages Page on the Mobile App

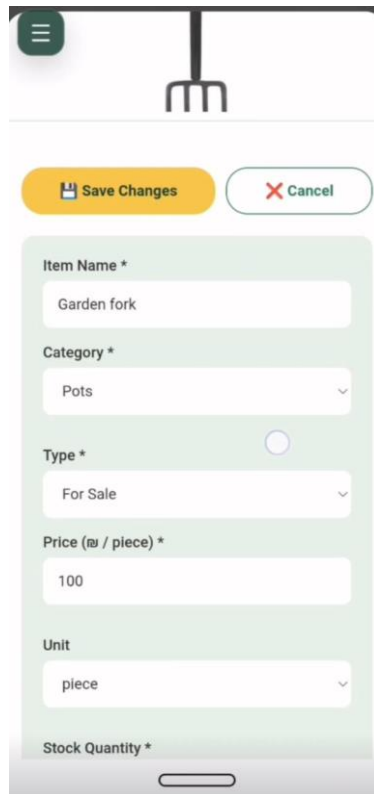
- Store page



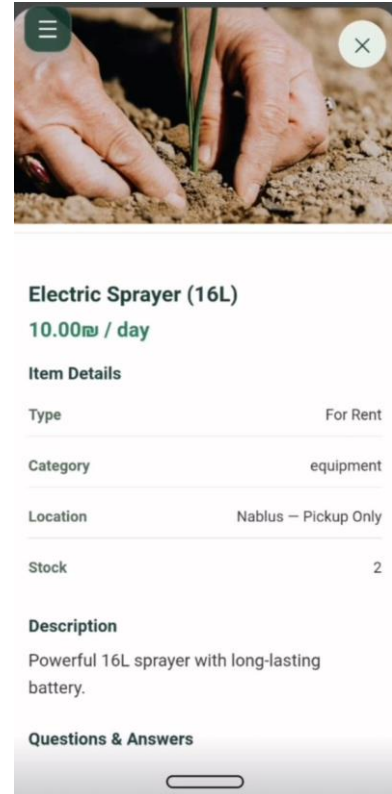
(a). Store page



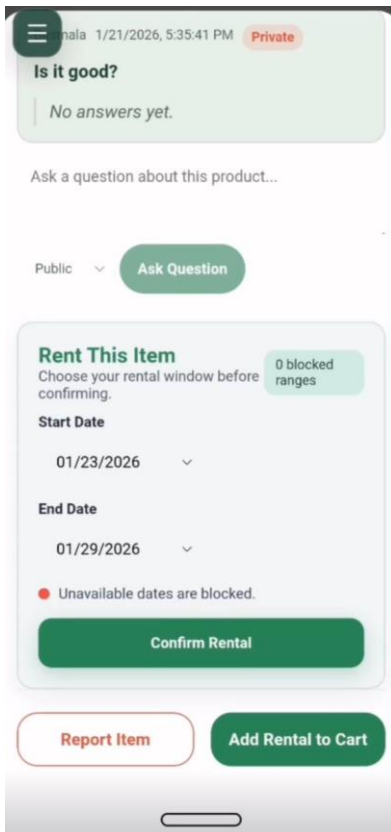
(b). Item details (for user's item)



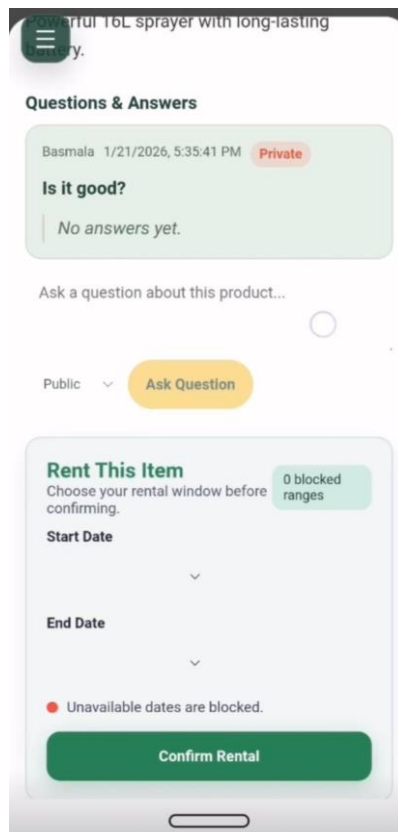
(c). Edit item details



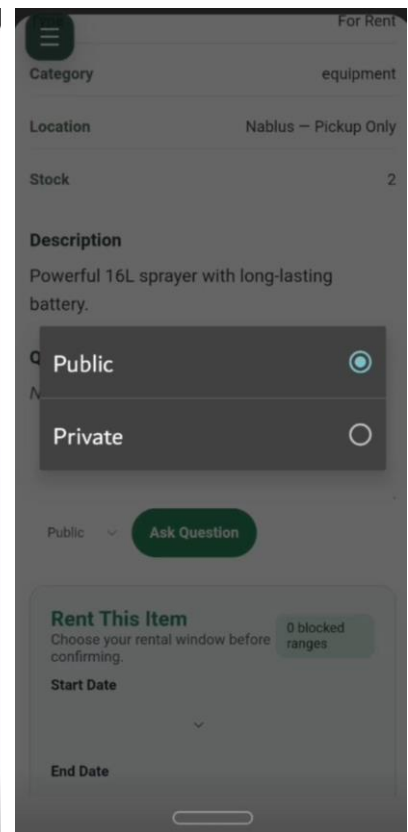
(d). Item details for other users



(e). Rent item



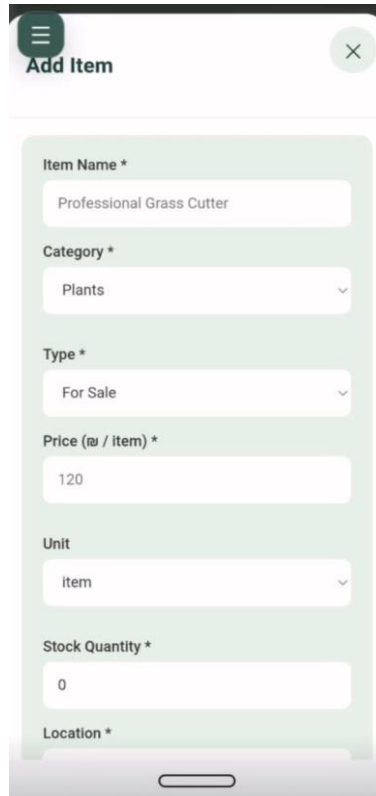
(f). Product Questions and Answers



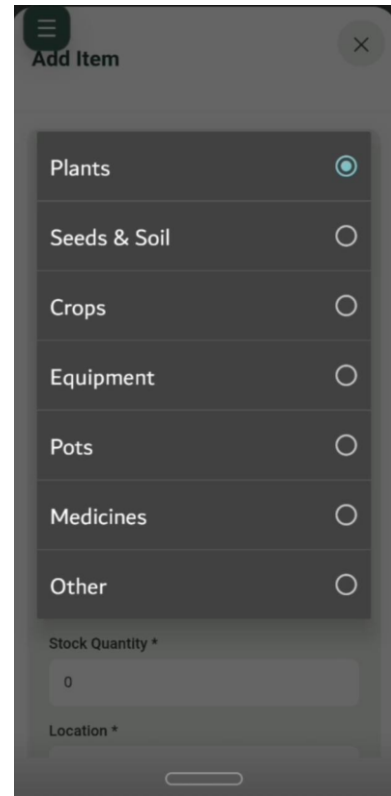
(g). Public/Private Question



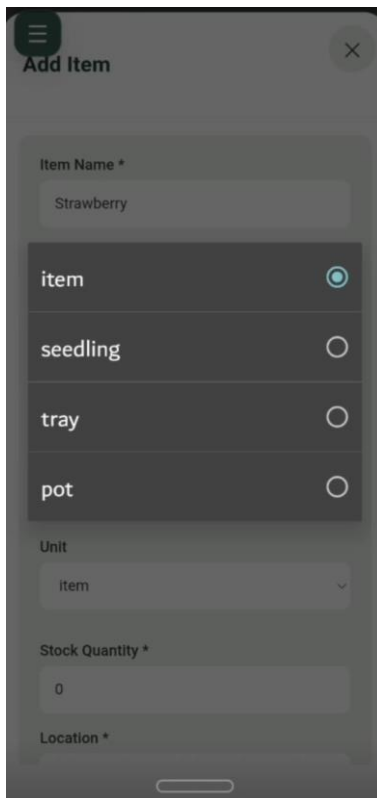
(h). User item



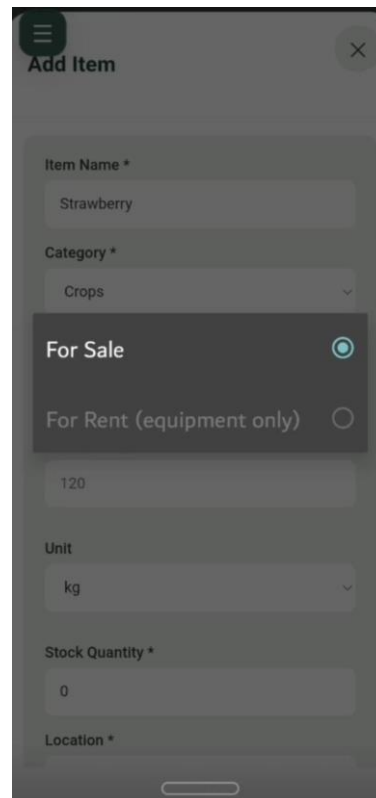
(i). Add new item



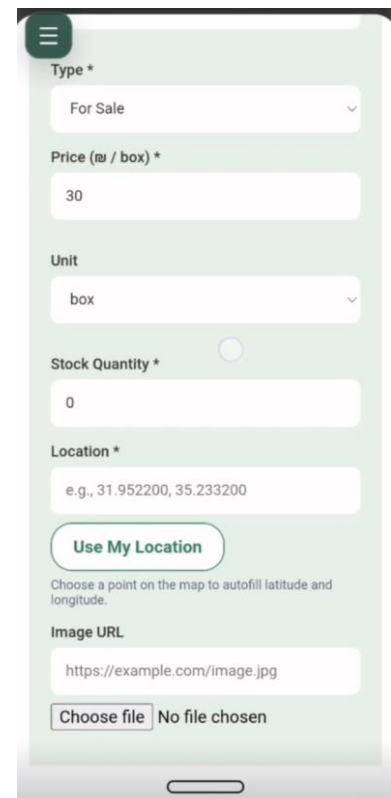
(j). Category

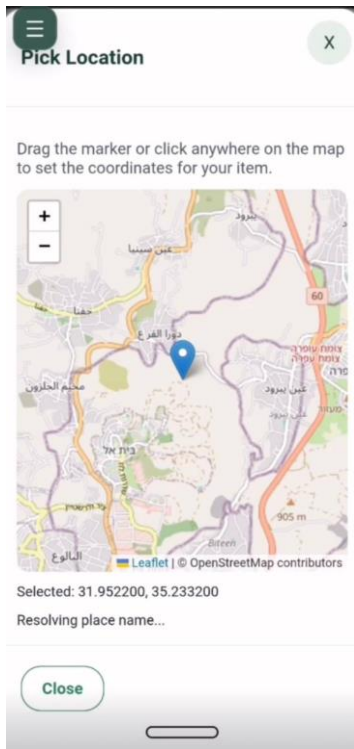


(k). Unit change according to the category

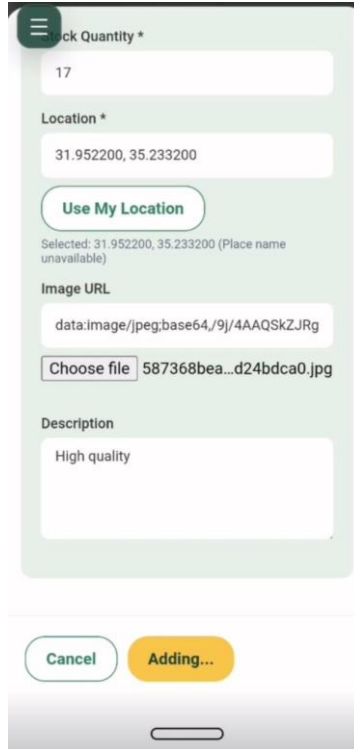


(l). For Sale/for Rent

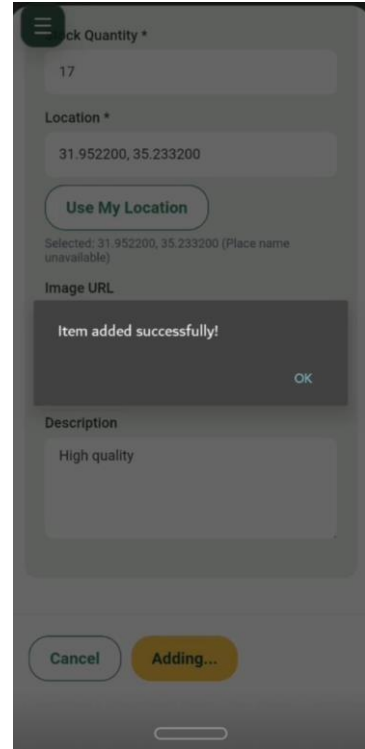




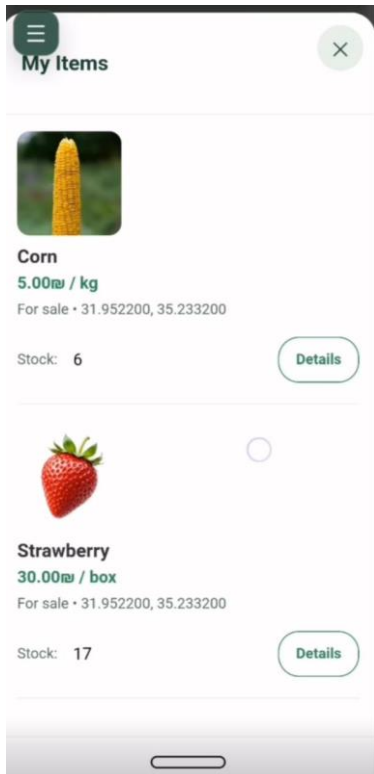
(m). Pick location from map



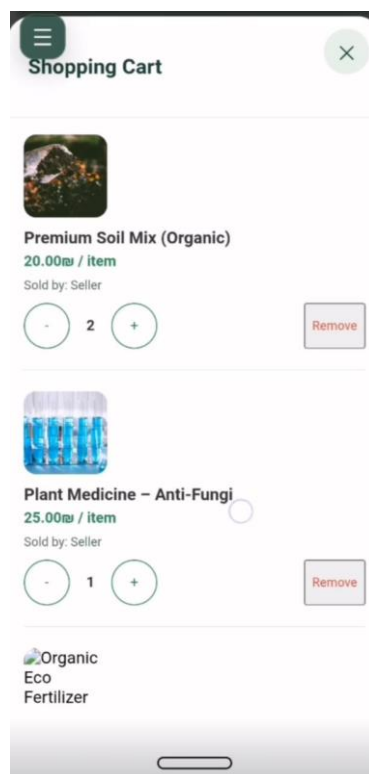
(n). Insert an image



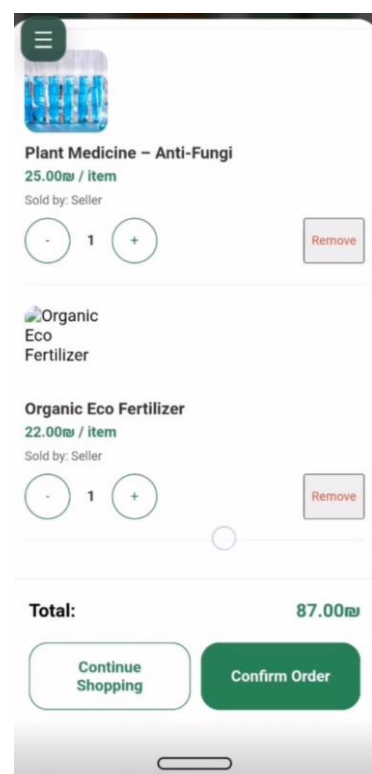
(o). Item added successfully

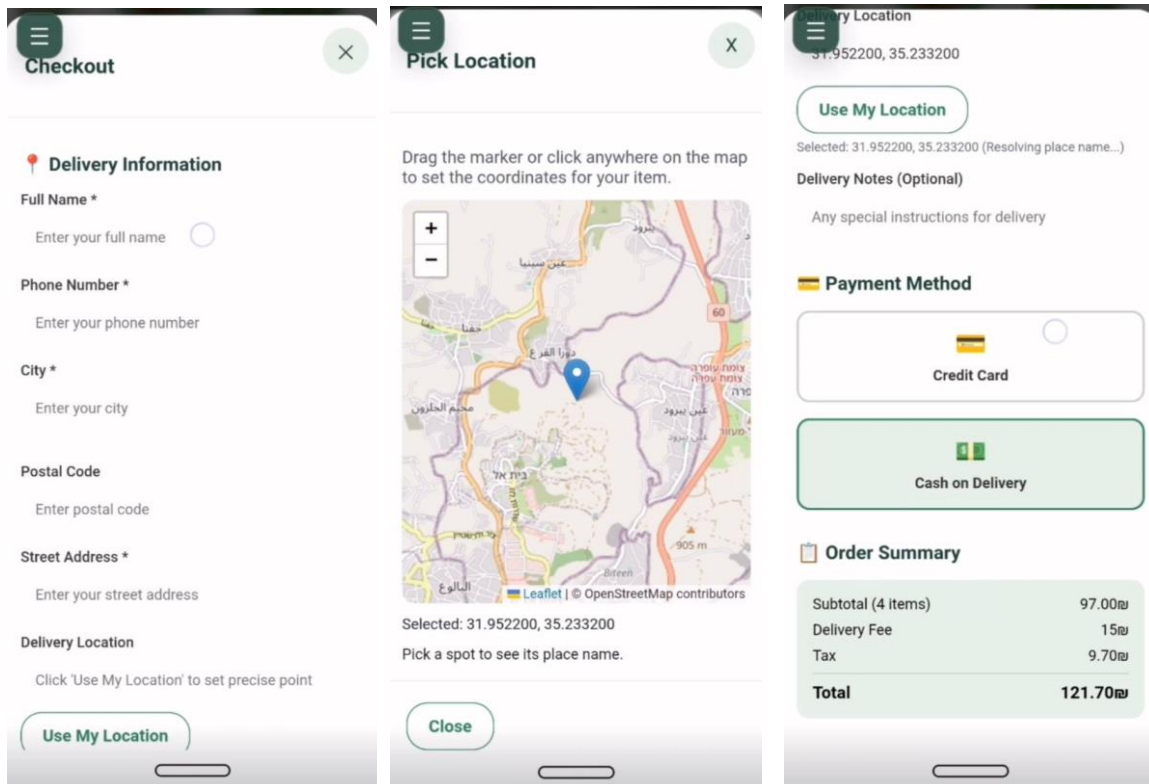


(p). My Items Page



(q). Cart Page

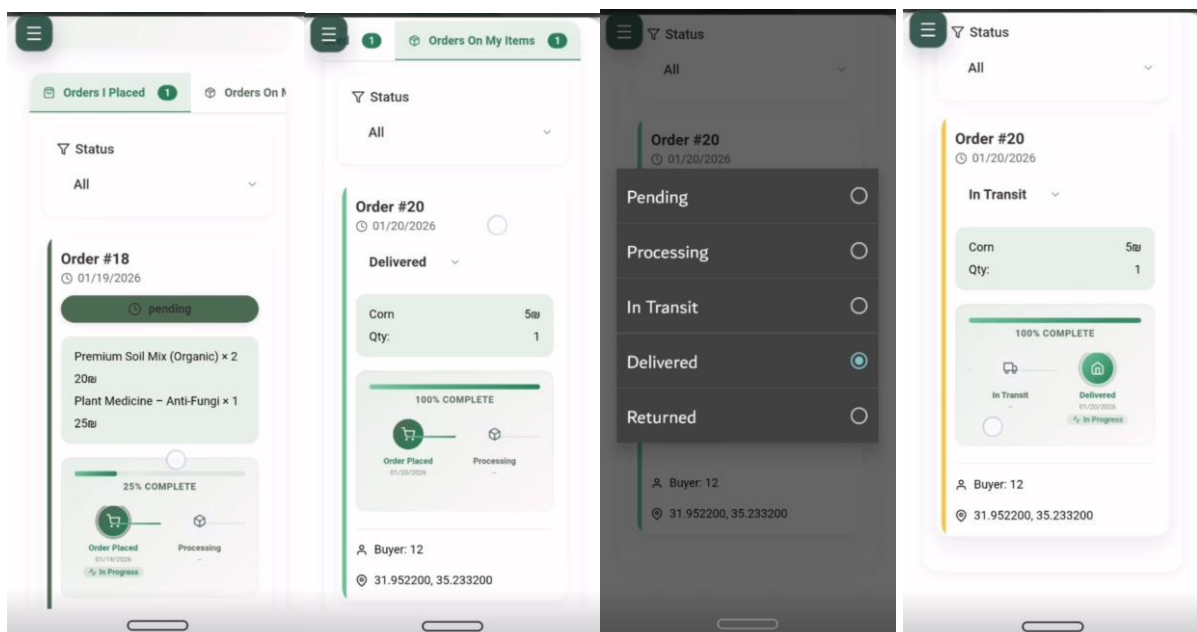




(r). Checkout and Payment Page

Figure 3.50: Store Page on the Mobile APP

• My Orders page



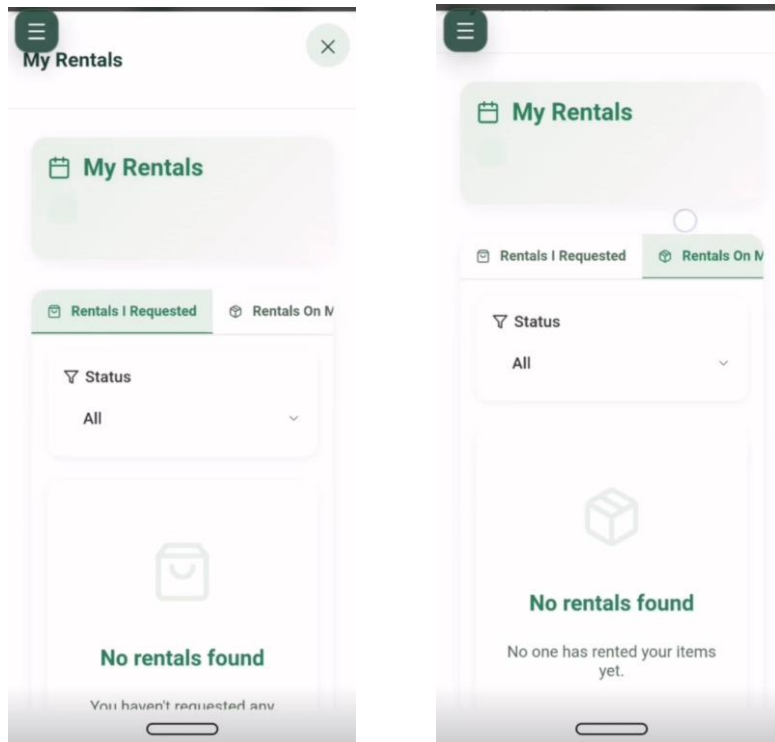
(a). My Orders page

(b). Filter order according the status

(c). Order status

Figure 3.51: My Orders Page on the Mobile APP

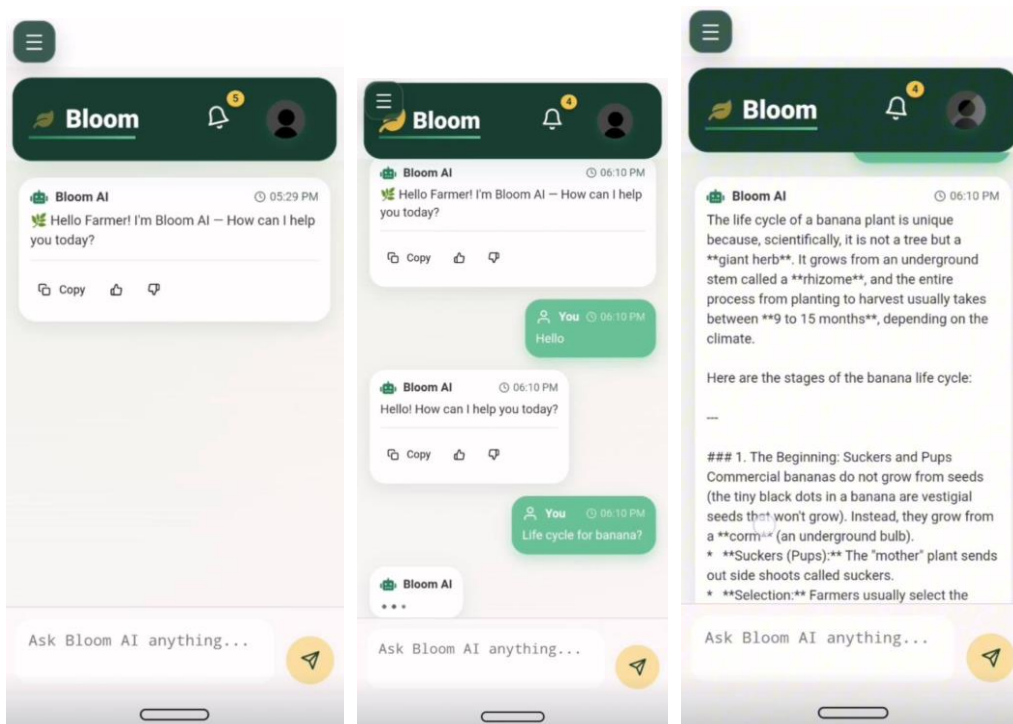
- My Rentals page



(a). My Rentals page

Figure 3.52: My Rentals Page on the Mobile APP

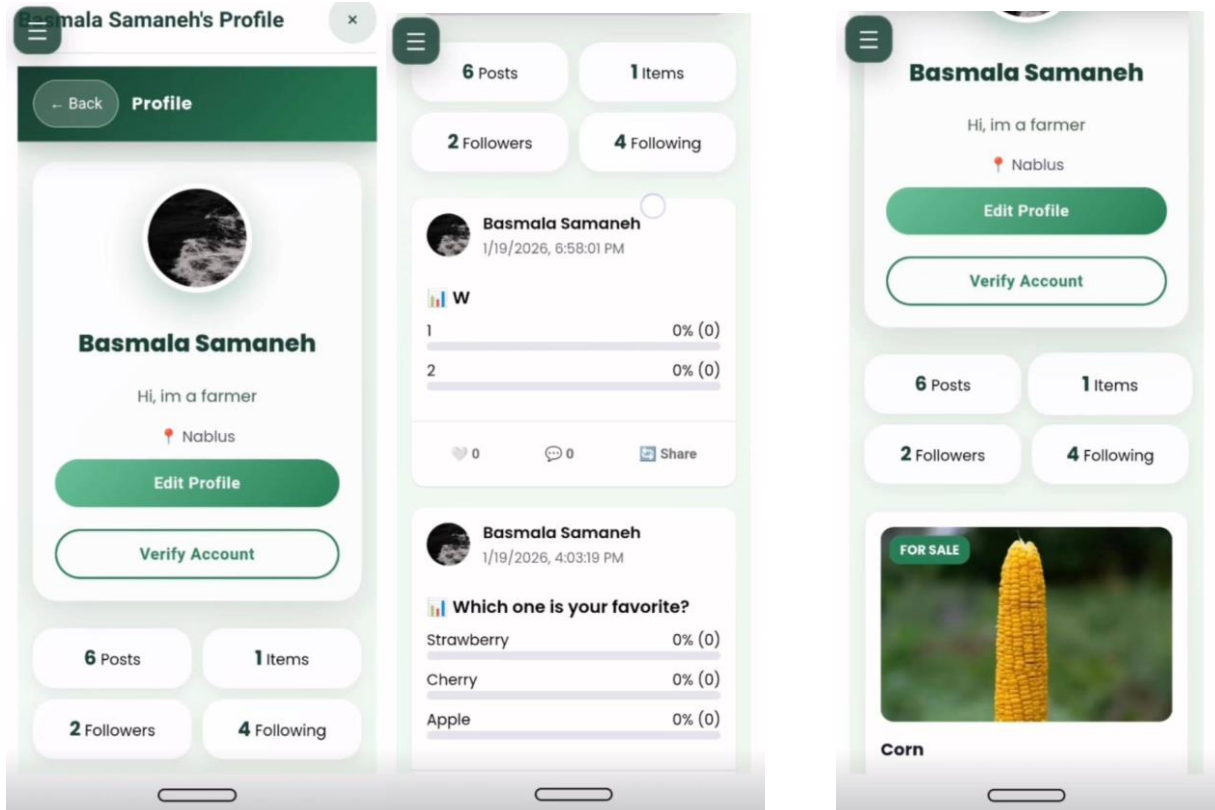
- AI Chat Bot



(a). AI Chat Bot

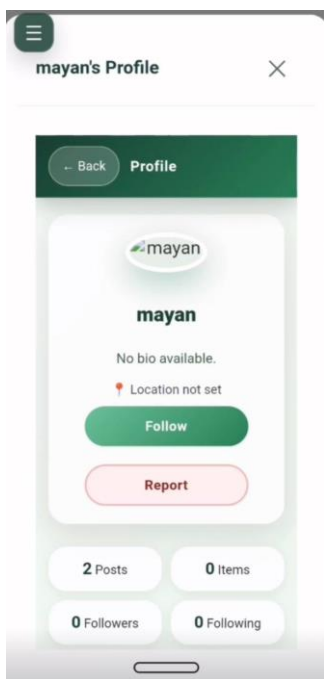
Figure 3.53: AI Chat Bot on the Mobile APP

• User Profile page

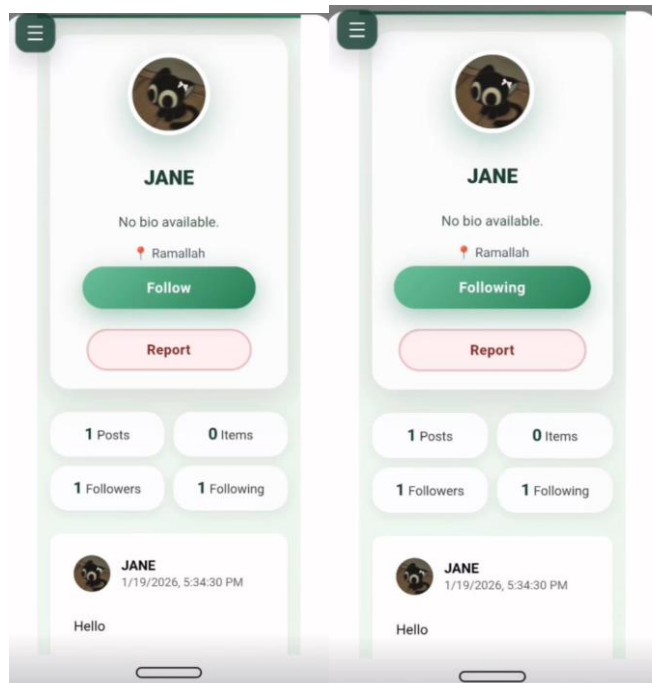


(a). Farmer profile

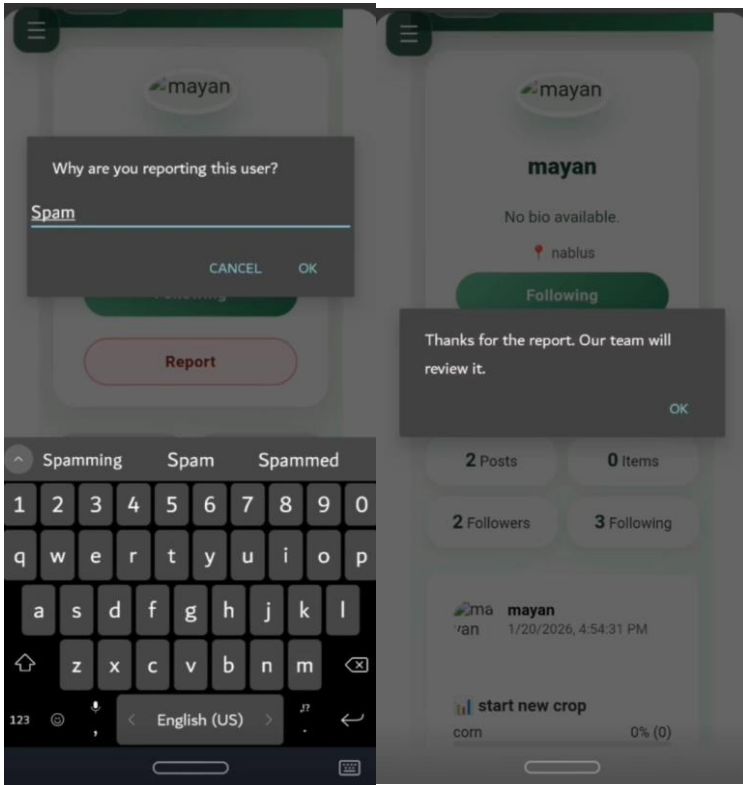
(b). When click on an item, view user's items in the store



(c). Other users profile



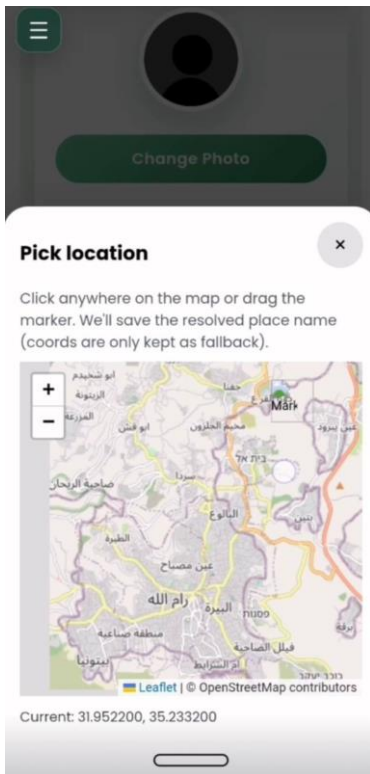
(d). Following other users



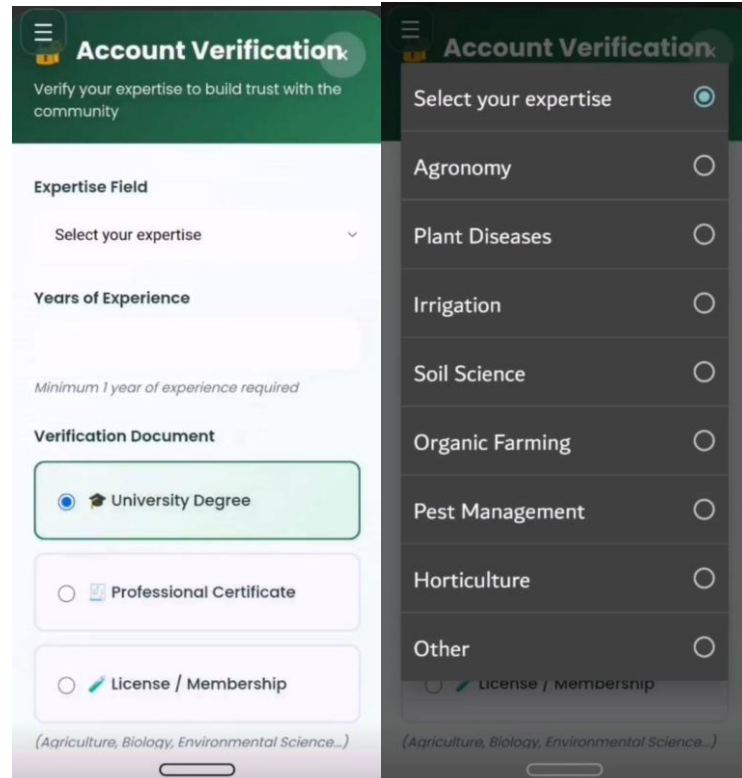
(e). Reporting other users



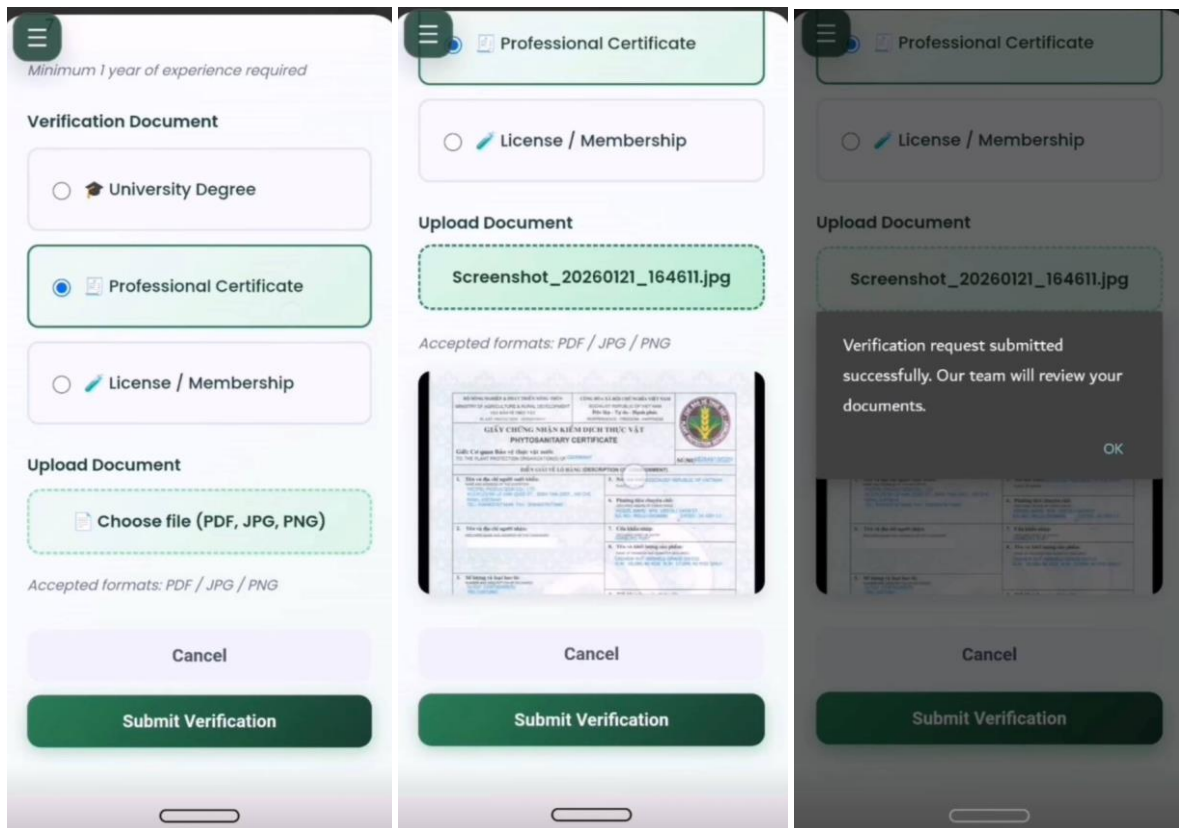
(g). Edit profile



(h). Pick location from map



(i). Profile verification page



(j). Information needed for verification

(k). Request sent to admin side

Figure 3.54: User Profile on the Mobile APP

Chapter 4

Results and Analysis

The Bloom platform was implemented and tested to evaluate its ability to support farmers and users in managing agricultural activities through one integrated system. The testing process focused on checking that the main features work correctly on both web and mobile platforms and that the system is easy to use.

The results show that Bloom successfully combines crop case management, expert communication, community interaction, and marketplace services into a single platform. Users were able to create crop cases, upload images, communicate with experts, and access marketplace features without using multiple systems. This helped simplify the overall farming workflow.

From a usability point of view, the system interface was clear and easy to navigate. Farmers could move between different features such as crop cases, community posts, and marketplace items without difficulty. The reporting feature also helped improve platform safety by allowing users to report inappropriate posts or products, which can then be reviewed by administrators.

In terms of system performance, the messaging feature worked reliably during testing. Communication between users and experts was smooth and allowed faster exchange of information. Marketplace features such as viewing products, asking questions, and reporting items also functioned properly within the system.

Overall, the testing results indicate that Bloom achieved its intended purpose by providing an integrated, simple, and practical smart agriculture platform that supports better organization, communication, and access to agricultural services.

Chapter 5

Discussion

The Bloom platform was designed to support farmers by providing an integrated smart agriculture solution that combines crop management, AI-assisted guidance, expert interaction, and a marketplace for agricultural products and services. During the implementation and testing phase, the system demonstrated its ability to simplify daily farming workflows and improve access to reliable information and services. Bloom achieved this by offering a clear user experience across both web and mobile platforms, while ensuring that core features work together within one connected environment.

5.1 Goal Achievement

The results showed that Bloom successfully helped farmers manage their crops more effectively by organizing their crop information and providing daily recommendations and tasks based on weather conditions, location, and available crops. The AI-generated tasks supported better planning and encouraged users to follow consistent crop-care actions. In addition, the messaging system improved communication by allowing farmers to interact with friends and access expert support through a structured consultation workflow. The marketplace module also contributed to achieving the project goals by enabling users to buy, sell, and rent agricultural items while tracking orders and rental status updates through the platform.

5.2 Actual Contribution

Bloom provides a unified smart agriculture platform that connects multiple services that are usually separated across different systems. The platform includes several key features that strengthen its contribution, such as AI-based task generation that considers the farmer's crops and previous activity, crop life cycle prediction and personalized care tips based on planting date and environment, and a verification process that allows farmers to become experts after admin approval. In addition, Bloom supports real-time communication through WebSocket messaging and includes marketplace services with order and rental tracking that help farmers manage agricultural transactions efficiently within the same platform.

5.3 Strengths and Limitations

One of the main strengths of Bloom is its integration of multiple agricultural features into one system, combining crop health support, AI recommendations, social interaction, and marketplace services in a user-friendly design. The platform also offers flexibility by allowing farmers to act as buyers and sellers, while providing a controlled process for becoming a verified expert. The real-time messaging feature improves user engagement and makes consultation and communication more efficient.

However, several limitations were encountered during development and testing. A major limitation was the difficulty of fully evaluating AI performance in real agricultural environments, as image-based plant health analysis can be affected by lighting conditions, camera quality, and differences in crop varieties. In addition, the accuracy of recommendations and plant life cycle predictions depends on available datasets and environmental assumptions, which may not always match real-world farming conditions. Another limitation relates to marketplace and logistics workflows, as delivery and return processes may vary based on real local conditions and require further field validation. Finally, broader testing with a larger number of farmers and experts is needed to collect more feedback and improve system reliability, usability, and performance under real usage scenarios.

Chapter 6

Conclusions and Recommendations

6.1 General Conclusions

Bloom project demonstrates how modern technology can be effectively used to support farmers and improve agricultural decision-making through a unified digital platform. By integrating crop health monitoring, AI-based recommendations, expert consultation, and marketplace services, Bloom provides farmers with a more organized and practical way to manage daily farming activities.

The results of the project show that combining multiple agricultural services into one system helps reduce reliance on scattered sources and improves access to reliable information. The availability of Bloom as both a web and mobile application also increases usability and allows farmers to benefit from the system in different working environments. Overall, Bloom succeeds in presenting a smart agriculture solution that enhances communication, supports better crop management, and encourages the adoption of technology in real agricultural practices.

6.2 Recommendations for System Improvement

Based on the development and testing experience, several improvements can be recommended to enhance the Bloom platform:

- Improve the accuracy of AI-based crop health analysis by training models on larger and more diverse agricultural datasets.
- Enhance expert consultation features by adding clearer response time indicators and feedback mechanisms for farmers.
- Improve marketplace workflows by adding delivery tracking, seller ratings, and clearer return and dispute handling processes.
- Strengthen mobile application performance and usability through additional testing on different devices and screen sizes.
- Add multi Language support to make the platform accessible to a wider range of farmers in different regions.

6.3 Opportunities for Future Expansion

Bloom has strong potential for future expansion beyond its current features. Possible future directions include:

- Integrating IoT sensors to provide real-time environmental data such as soil moisture, temperature, and humidity.
- Adding location-based services to recommend nearby experts, suppliers, and agricultural services.
- Expanding analytics features to provide farmers with long-term insights into crop performance and productivity trends.
- Collaborating with agricultural organizations and institutions to improve data reliability and expand system adoption.
- Enhancing community features to strengthen interaction and knowledge sharing among farmers.

6.4 Open Work

Although Bloom provides a functional and integrated platform, several tasks remain open for future work:

- Testing the system with a larger number of farmers to evaluate performance in real agricultural environments.
- Further validating AI-based recommendations under different lighting conditions, crop types, and farming practices.
- Improving system scalability to support increased numbers of users and data.
- Collecting more feedback from farmers and experts to refine features and improve overall system reliability.

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