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# Introduction

## Overview of TerraByte

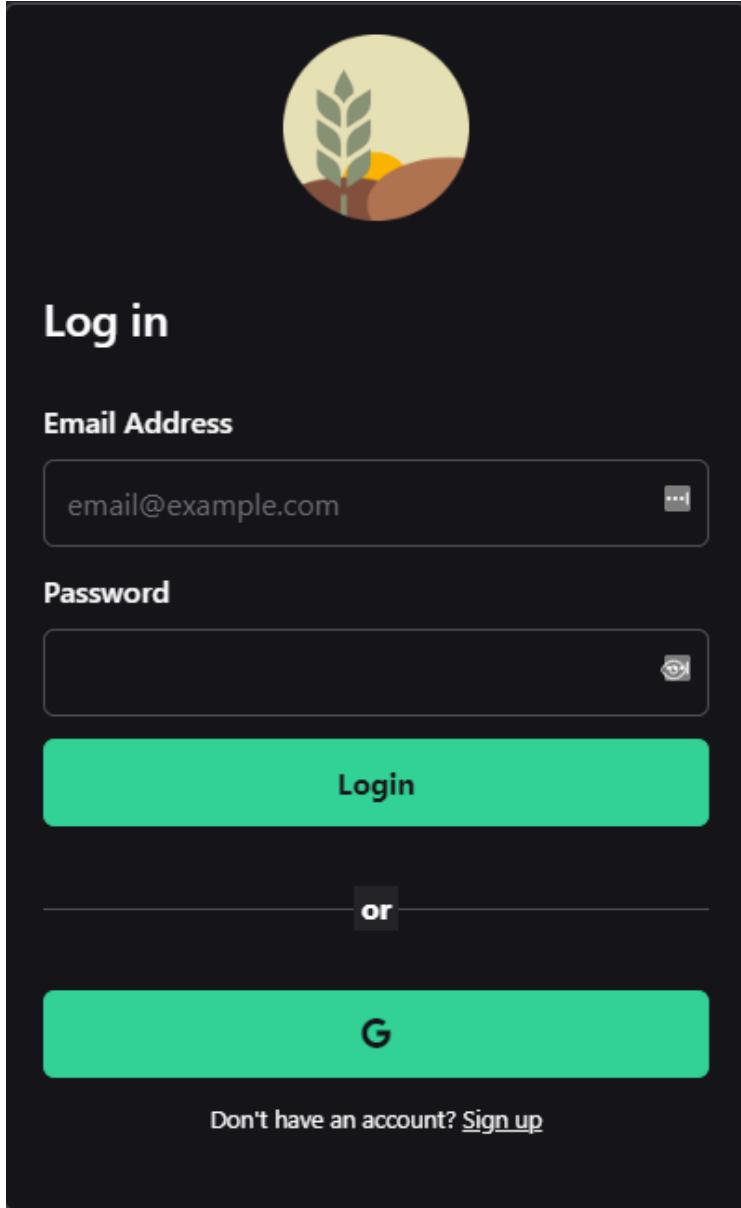
Welcome to TerraByte, the AI-Driven Crop Prediction System designed to revolutionize modern farming. TerraByte leverages advanced Machine Learning and Artificial Intelligence technologies to analyze weather, soil, and crop data, providing farmers with precise predictions about crop health and yield. By integrating multiple data sources, TerraByte empowers farmers to make informed, data-driven decisions that enhance their farming practices and improve overall productivity.

## Key Features

- **AI-Powered Predictions:** Utilize state-of-the-art AI and Machine Learning algorithms to predict crop health and yield accurately.
- **Comprehensive Data Analysis:** Analyze a wide range of data inputs, including weather conditions, soil moisture, pH levels, and more.
- **Interactive Dashboards:** Access user-friendly dashboards that present vital information in an easy-to-understand graphical format.
- **Customizable Fields:** Manage and monitor individual fields through a map-based interface, allowing for tailored data input and analysis.
- **Real-Time Monitoring:** Stay updated with real-time data and notifications about the current status and health of your crops.
- **Data Logging:** Maintain detailed logs of all data entries, which can be exported or printed for further analysis.

## Logging In

Upon launching TerraByte, you will be greeted with the login screen as shown below:



To access your account, you have the following options:

**1. Email Address and Password:**

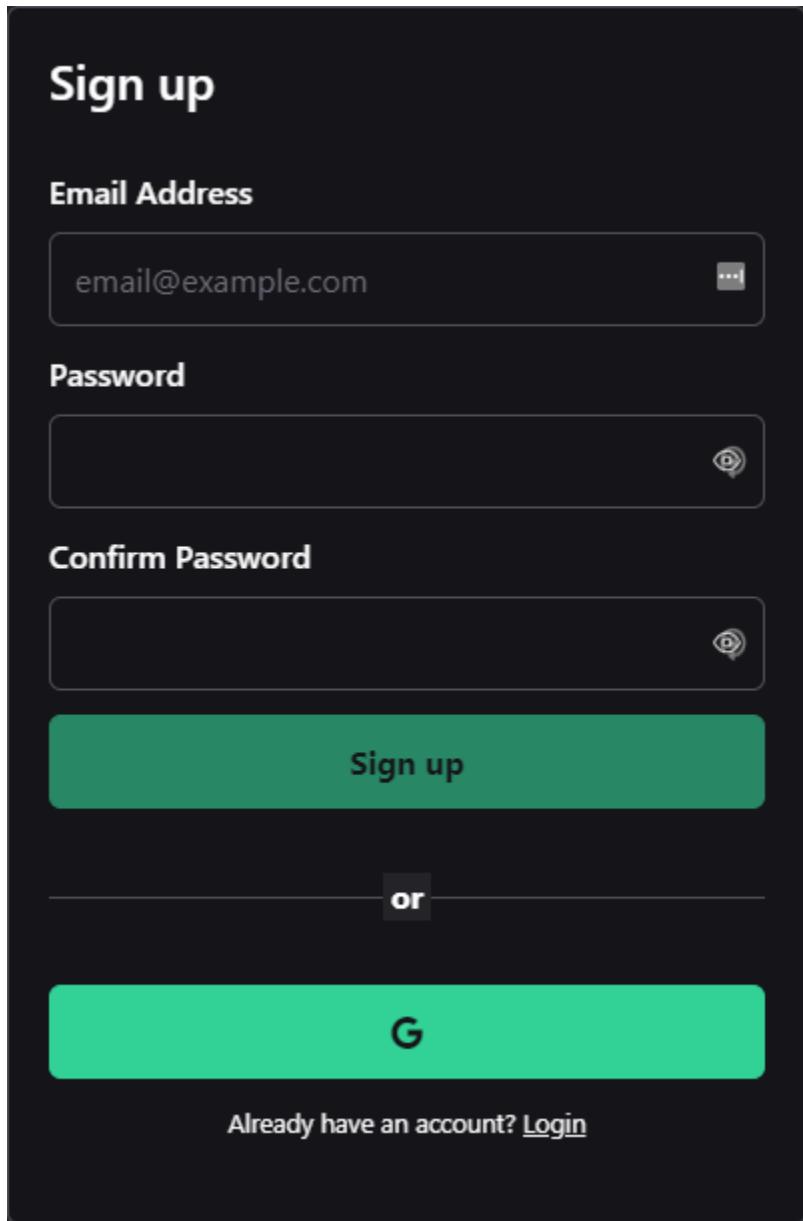
- Enter your registered email address in the "Email Address" field.
- Enter your password in the "Password" field.
- Click the "Login" button to proceed.

## 2. Google OAuth:

- You can sign in using your Google account by clicking the "G" button.

If you do not have an account, click on the "Sign up" link at the bottom to create a new account.

## Signing Up



The image shows a dark-themed sign-up form. At the top, it says "Sign up". Below that is a field labeled "Email Address" containing "email@example.com". To the right of the input field is a small "..." icon. Next is a "Password" field with a visibility icon (eye) to its right. Below that is a "Confirm Password" field with a visibility icon to its right. A large green "Sign up" button is centered below the password fields. Below the button is a horizontal line with the word "or" in the center. At the bottom is a teal-colored button with a white "G" icon. Below the "G" button is the text "Already have an account? [Login](#)".

If you do not have an account, you can create one by following the steps below:

**1. Email Address:**

- Enter the email address you wish to use for your TerraByte account.

**2. Password:**

- Enter a password that meets the following criteria:

- At least 8 characters long
- Contains at least one number
- Contains at least one symbol
- Contains at least one uppercase letter
- Contains at least one lowercase letter

**3. Confirm Password:**

- Re-enter your password to confirm it matches.

**4. Sign Up:**

- Click the "Sign up" button to create your account.

After signing up, an email verification will be sent to the email address you provided. Follow the instructions in the email to verify your account. Once verified, you can log in via the login page.

Alternatively, you can sign up using your Google account by clicking the "G" button.

If you already have an account, click the "Login" link at the bottom to return to the login page.

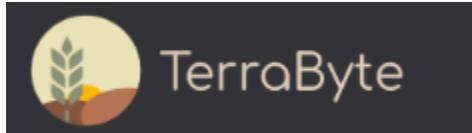
## **Navigation Bar**

The navigation bar is present on the top of all pages within TerraByte, providing quick access to essential functions and settings. The layout of the navigation bar is as follows:



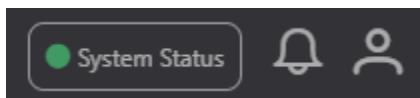
**1. Menu Icon (Left):**

- Clicking this icon opens the sidebar, which you can use to navigate between different pages within the application.



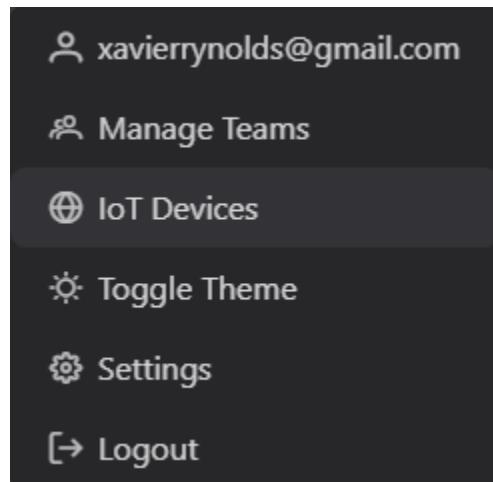
## 2. Application Logo (Center):

- The logo is displayed in the center of the navigation bar.



## 3. User Options (Right):

- **System Status:** Displays the current status of the system (not implemented).
- **Bell Icon:** Shows notifications (not implemented).
- **User Icon:** Clicking on this icon opens a panel with the following options:



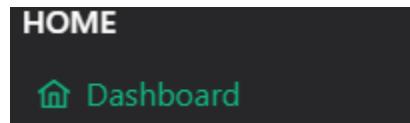
- **Account Display:** Shows your email address. Clicking this takes you to the settings page.
- **Manage Teams:** Takes you to the manage teams page.
- **Toggle Theme:** Allows you to switch between light and dark mode.
- **Settings:** Takes you to the settings page.

- **Logout:** Logs you out of the application.

## Sidebar Navigation

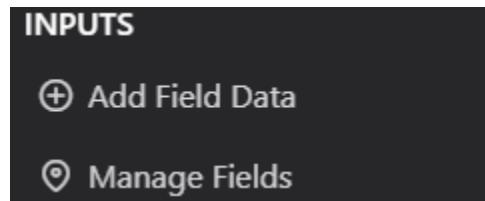
The sidebar provides easy access to all the main sections of TerraByte. An active route is highlighted in green to indicate the current page. Here's a breakdown of the sidebar options:

### 1. Home:



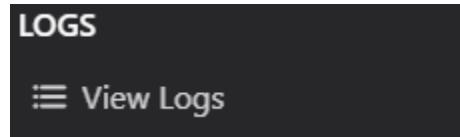
- **Dashboard:** Takes you to the main dashboard.

### 2. Inputs:



- **Add Field Data:** Allows you to enter data for a specific field.
- **Manage Fields:** Opens the maps-based interface where you can add and manage fields on your map.

### 3. Logs:



- **View Logs:** Displays an overview of your logs and data entries.

### 4. Team Management:

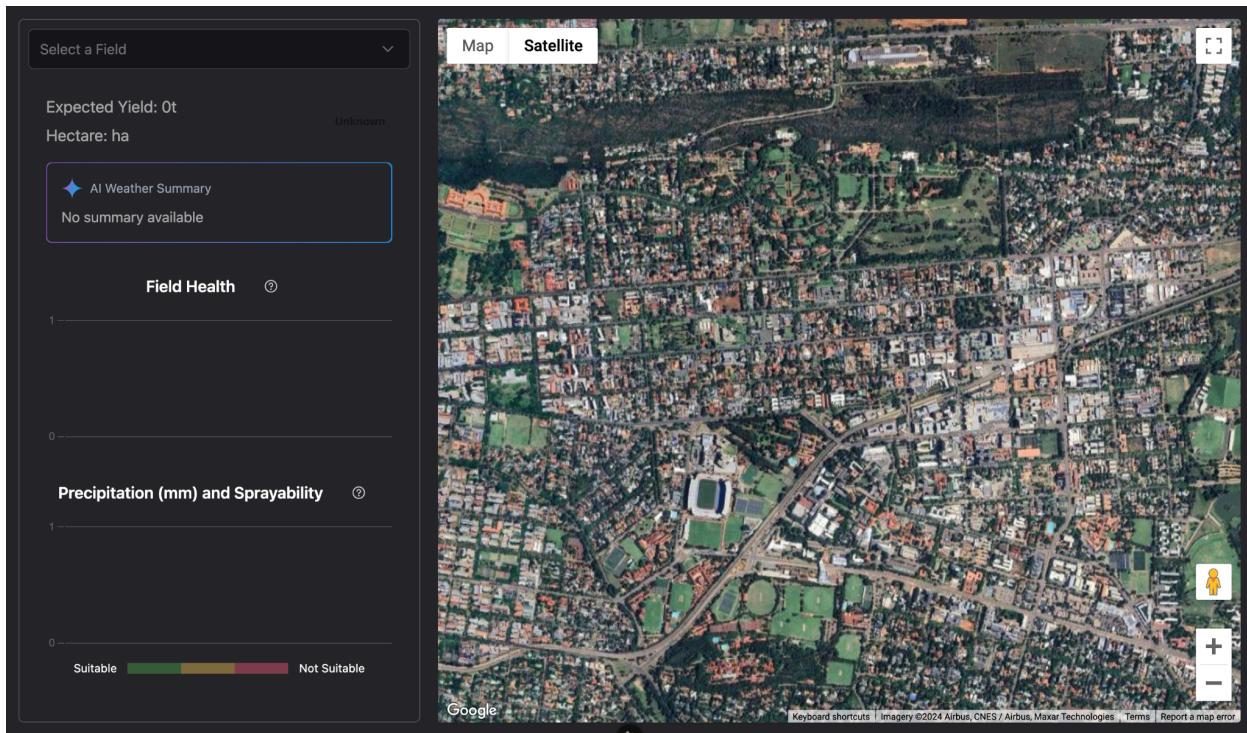
## TEAM MANAGEMENT

 Manage Team

 Join a Team

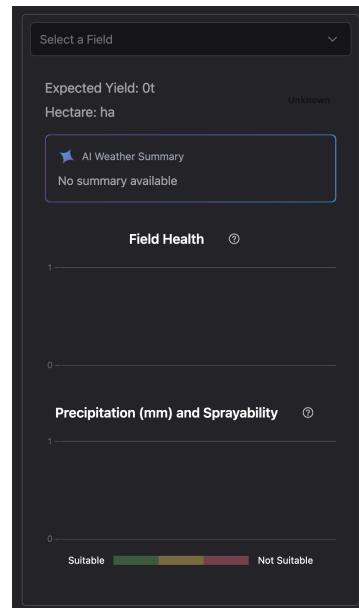
- **Manage Team:** Takes you to the team management page.
- **Join a Team:** Allows you to join a team.

## Home Dashboard



The Home Dashboard provides an overview of key metrics and visual data representations to help you monitor and manage your fields effectively. Below is the layout and functionality of the main dashboard:

### Field Card



The Field Card provides detailed information about a selected field, allowing users to dynamically update the dashboard based on their selection. The main components of the Field Card include:

- **Dropdown:** Located at the top of the card, this dropdown menu allows users to select a specific field. Upon selection, the dashboard dynamically updates to reflect the data related to the chosen field.
- **Field Data:** This section displays critical information about the selected field, including:
  - **Expected Yield:** The anticipated yield per hectare.
  - **Health Status:** A status indicator (e.g., Healthy, Moderate, Severe) that provides an overview of the field's current health.
  - **Field Hectare Size:** The total size of the field in hectares.
- **AI Weather Summary:** An AI-generated weather summary tailored to the specific conditions of the selected field.
- **Health Chart:** A line chart illustrating the health trend of the field over time. This chart helps monitor the field's health status. A help button is available to open a dialog window with more detailed information about the chart.
- **Precipitation and Sprayability Chart:** This section features a combined bar and line chart that displays precipitation levels and sprayability conditions. The chart visually represents how rainfall impacts the suitability for spraying crops. A help button is provided to open a dialog window with more information about interpreting the chart.
  -

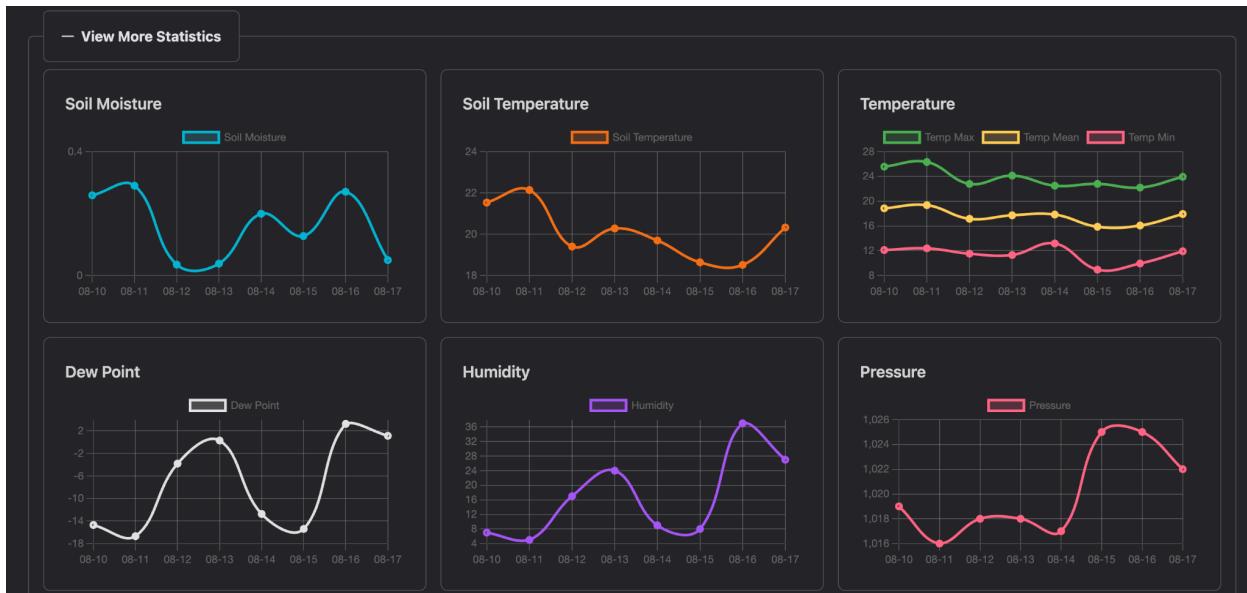
## Field Map



A map-based interface that provides a visual overview of your fields. Features include:

- **Map/Satellite View:** Toggle between map and satellite views.
- **Interactive Map:** The selected field is filled with a green color as shown above. To change between fields, you can select either the field via the Field Card dropdown or select another field on the interactive map.

## Advanced Statistics



## Advanced Statistics Panel

The Advanced Statistics Panel provides in-depth analysis and detailed graphs for various environmental metrics. To toggle this panel, click on the **View More Statistics** button. The following graphs are available in this panel:

- **Soil Moisture:** Displays the soil moisture levels across different fields, helping you monitor water availability and soil health.
- **Soil Temperature:** Shows the soil temperature trends, which are crucial for understanding root zone conditions and crop growth.
- **Temperature:** A comprehensive graph that includes maximum, mean, and minimum temperature readings. This graph provides insights into daily temperature variations and helps in planning field activities.
- **Dew Point:** Visualizes the dew point temperature, which is essential for understanding moisture content in the air and potential for dew formation.
- **Humidity:** Displays the humidity levels over time, helping you monitor atmospheric moisture that affects crop transpiration and disease risk.
- **Pressure:** A graph showing atmospheric pressure trends, which can influence weather patterns and crop stress.

- **UV Index:** Provides a graphical representation of UV radiation levels, important for assessing potential sun damage to crops.

## Add Field Data

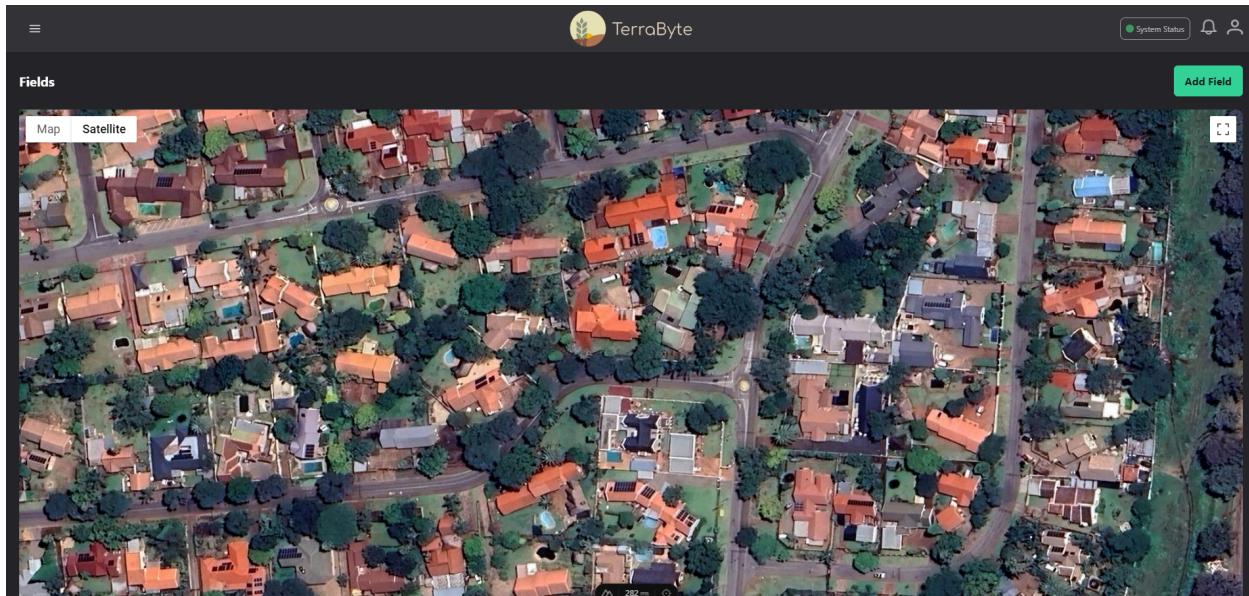
The Add Field Data page allows you to manually input various environmental and soil parameters for a selected field. This is essential for ensuring accurate predictions and analyses. Below is the layout and functionality of this page:

### Manual Field Inputs

To add data, follow these steps:

- 1. Select a Field:**
  - Use the "Add Field Data" dropdown menu to select the specific field you want to input data for.
- 2. Enter Data:**
  - **Temperature:** Input the current temperature for the field in degrees Celsius.
  - **Humidity:** Input the humidity level for the field.
  - **Rainfall:** Input the rainfall amount for the field in millimeters.
  - **UV Index:** Input the UV index for the field.
  - **Soil Moisture:** Input the soil moisture level for the field.
  - **Soil pH:** Input the pH level of the soil for the field.
  - **Soil Conductivity:** Input the soil conductivity for the field.
- 3. Save or Cancel:**
  - Click the "Save" button to store the entered data.
  - Click the "Cancel" button to discard the changes.

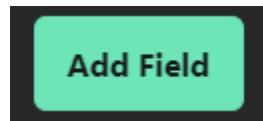
## Manage Fields



The Manage Fields page allows you to view, add, and edit fields on a map-based interface. Below is the layout and functionality of this page:

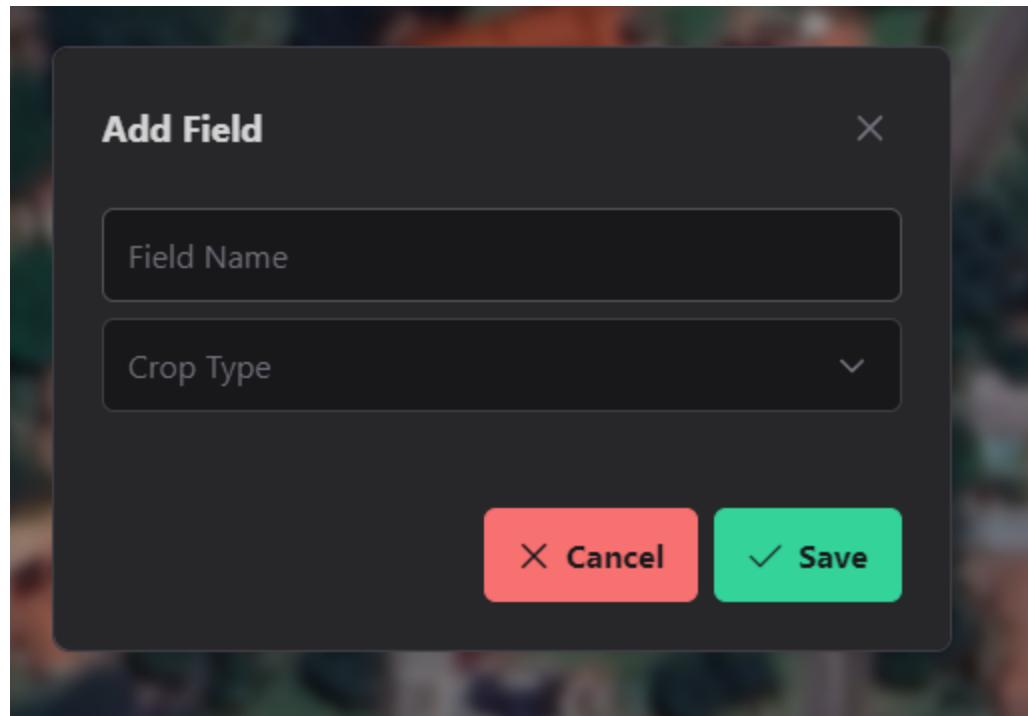
### Adding a Field

#### 1. Add Field Button:



- Click the "Add Field" button at the top right corner of the page. This will open a popup dialog.

#### 2. Popup Dialog:



- **Field Name:** Enter the name of the field.
- **Crop Type:** Select the crop type from the dropdown menu.
- **Cancel Button:** Click to discard changes and close the dialog.
- **Save Button:** Click to proceed to the map interaction.

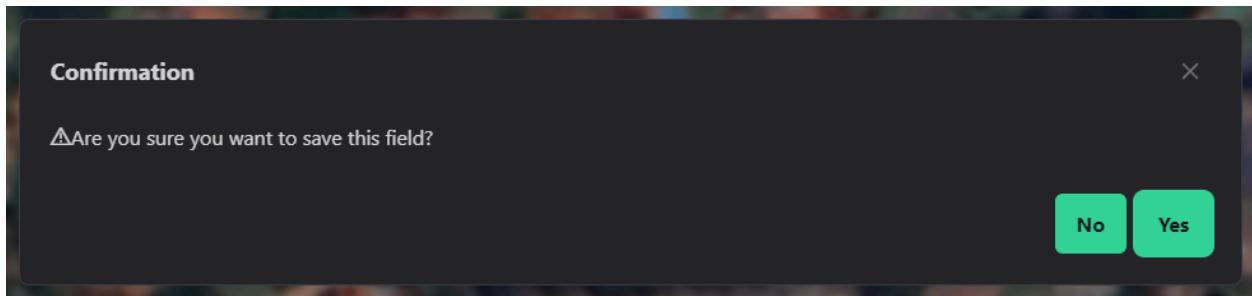
### 3. Interactive Map:



- After clicking "Save," the map becomes interactive, allowing you to draw your field.

- Click on points on the map to define the boundary of your field.
- Continue adding points until you return to the original point to close the field.

#### 4. Confirm Dialog:



- Once the field is drawn, a confirmation dialog will pop up, prompting you to save the field.

## View Logs

The View Logs page provides a detailed table of data entries, allowing you to review and manage all recorded data. Below is the layout and functionality of this page:

### Data Entry Table

Data Entry Logs											
		<input type="checkbox"/> Export <input type="button"/> Print <input type="button"/> Upload <input type="button"/>									
	Entry ID ↑↓	Created At ↑↓	Temperature ↑↓	Humidity ↑↓	UV Index ↑↓	Rainfall ↑↓	Moisture ↑↓	pH ↑↓	Conductivity ↑↓	Field ID ↑↓	Manual Entry ↑↓
<input type="checkbox"/>	0	Fri Jun 21 2024 13:06:19 GMT+0200 (South Africa Standard Time)	50.04	53.1	6.16	46.84	50.06	6.86	52.37	4	<input checked="" type="checkbox"/>
<input type="checkbox"/>	1	Fri Jun 21 2024 13:06:19 GMT+0200 (South Africa Standard Time)	82.79	88.46	8.78	44.34	16.77	0.83	68.36	3	<input checked="" type="checkbox"/>
<input type="checkbox"/>	2	Fri Jun 21 2024 13:06:19 GMT+0200 (South Africa Standard Time)	27.2	70.94	0.52	44.7	6.01	3.21	34.42	3	<input checked="" type="checkbox"/>
<input type="checkbox"/>	3	Fri Jun 21 2024 13:06:19 GMT+0200 (South Africa Standard Time)	34.11	82.36	5.12	75.45	92.97	7.04	31.91	5	<input checked="" type="checkbox"/>
<input type="checkbox"/>	4	Fri Jun 21 2024 13:06:19 GMT+0200 (South Africa Standard Time)	27.34	96.49	1.45	19.07	40.68	4.89	82.24	2	<input checked="" type="checkbox"/>

The table includes the following columns:

1. **Entry ID:** The unique identifier for each entry.
2. **Created At:** The timestamp when the entry was created.
3. **Temperature:** Recorded temperature value.
4. **Humidity:** Recorded humidity level.

5. **UV Index:** Recorded UV index value.
6. **Rainfall:** Recorded rainfall amount.
7. **Moisture:** Recorded soil moisture level.
8. **pH:** Recorded soil pH value.
9. **Conductivity:** Recorded soil conductivity.
10. **Field ID:** The identifier of the field to which the entry belongs.
11. **Manual Entry:** Indicates if the data was entered manually (green tick) or recorded by an IoT sensor (red cross).

## Table Features

- **Search Bar:** Use the keyword search to filter entries.
- **Sorting:** Click on the column headers to sort the data in ascending or descending order.
- **Selection:** Use the radio/check buttons to select specific entries.
- **Pagination:** Navigate through the entries using the paginator at the bottom. You can adjust the number of entries displayed per page via the dropdown menu or navigate pages using the left and right icons.

## Actions

- **Export Button:** Exports the selected entries as a CSV file.
- **Print Button:** Prints the selected entries to a PDF.
- **Upload Button:** (Future implementation, not generated yet)