# User Manual

SmartSoilPH: Soil Nutrient Analysis for Middle-Class Farmers in CALABARZON

**March 2024**

# Table of Contents

# About

The Manual is designed to help users navigate and operate the SmartSoilPH mobile application and Sensor Device, explaining each functionality and use.

# Installation Guide

Installing the APK File from Email sent by the Developers.

**Preparation:**

1. Enable Installation from Unknown Sources: Before installation, your device must be set to allow installs from outside of the Google Play Store.
    - Go to **Settings** on your device.
    - Search and toggle on **Unknown sources** or **Install unknown apps**. You may need to select a browser or email app you'll use to download the APK.

**Installation:**

1. Open the Email: Locate and open the email containing the APK file from the developers.
2. Download the APK File: Click on the APK file attachment or link within the email to download it. You may receive a warning about the risks of installing unknown apps; proceed if you trust the source.
3. Open the Downloaded File: Once the download is complete, open the file. This can usually be done through the notification bar or by navigating to your device's "**Downloads**" folder.
4. Install the App: After opening the file, your device will prompt you to confirm the installation. Click on "**Install**" to begin the process.
5. Open the App: Once installation is complete, you can open the app directly or find it listed among your other apps.

*Note: If you encounter any issues, contact the app developers for further assistance.*

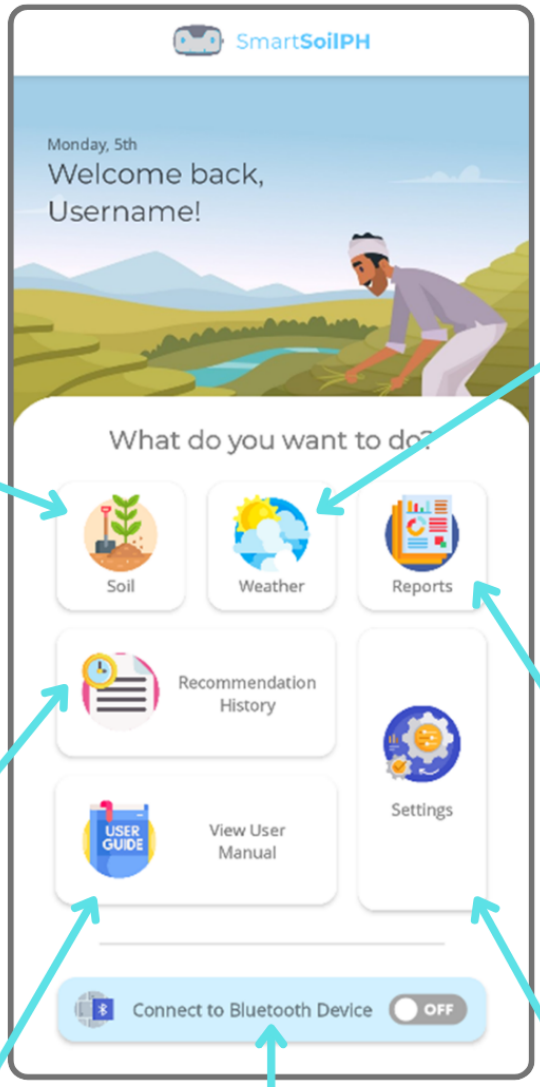
# Main Page

The Main Page contains 6 clickable buttons and 1 switch button. (Soil, Weather, Reports, Recommendation History, View User Manual, Setting and Connect to Bluetooth Device)

**Soil Monitoring Button**
Displays analyzed nutrients and other components to identify deficiencies or imbalances in the soil

**Recommendation History Button**
Contains previous records of recommended fertilizer usage

**View User Manual Button** Contains a detailed guide on how to use the mobile application and Sensor device




**Weather Forecast Button**
Displays current and future weather conditions to help farmers plan their field activities

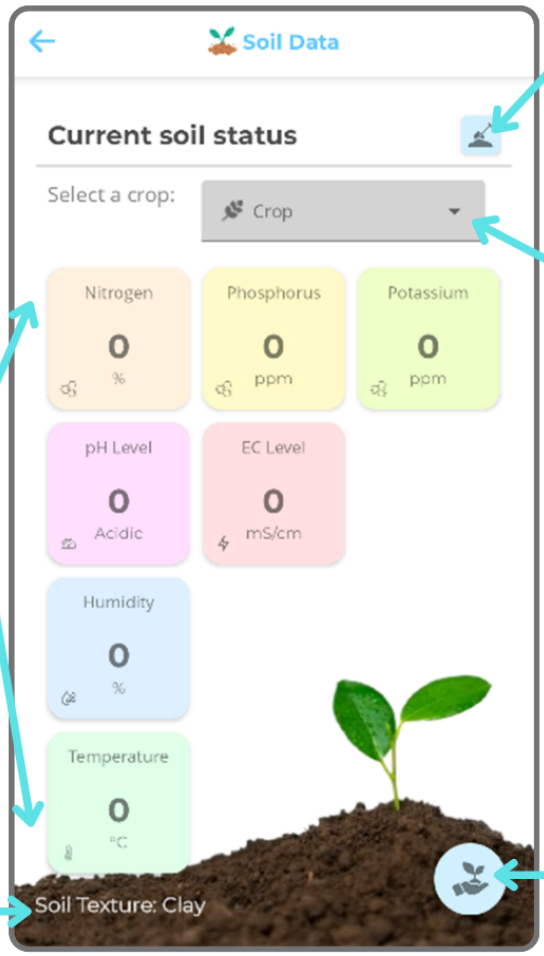
**Reports & Analysis Button**
Contains statistics based on gathered data from the Sensor device to help farmers identify trends and make efficient decisions accordingly

**Settings Button**
Contains miscellaneous options to navigate the application

**Connect to Bluetooth Device Switch Button**
Turns on bluetooth connection to connect to Sensor device

# Soil Page

The Soil Button redirects the user to the Soil Monitoring Page. Its features are as follows.



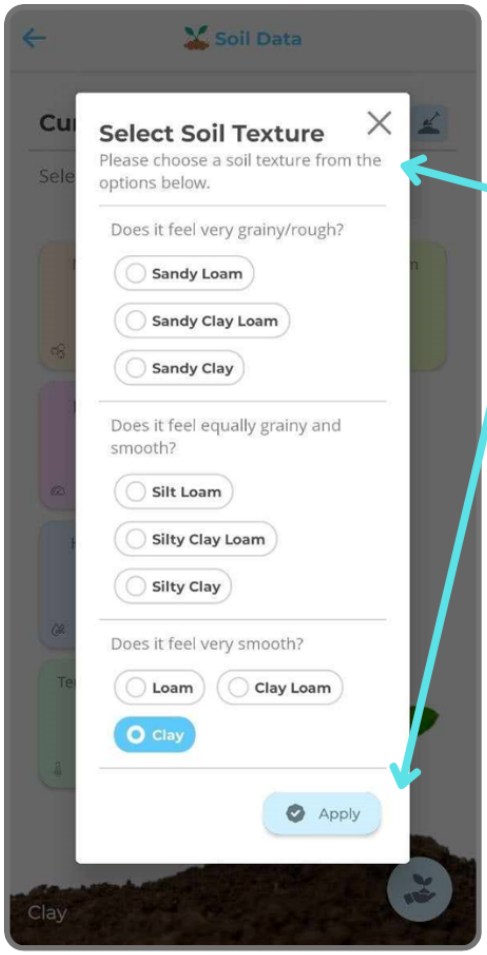

**Soil Texture Selection Button**
Gives options on what type of soil is used

**Crop Selection Dropdown**
Drops down a selection of Available Crops

**Soil Components**
Displays the 7 components present in the soil

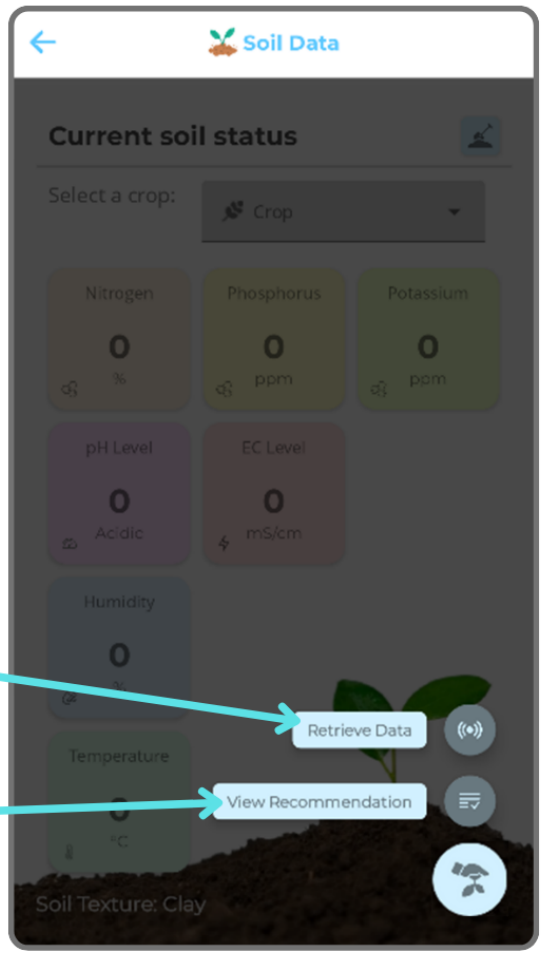
**Soil Texture Display**
Shows selected soil type from soil texture selection

**Soil Button**
Pressing this button will hide/show another set of buttons (*Retrieve Data* and *View Recommendation*)




**Select Soil Texture**
When the *Select Soil Texture Button* is clicked this display will be shown.

- Shows all soil texture options




**Retrieve Data Button**
Gets data from Sensor device

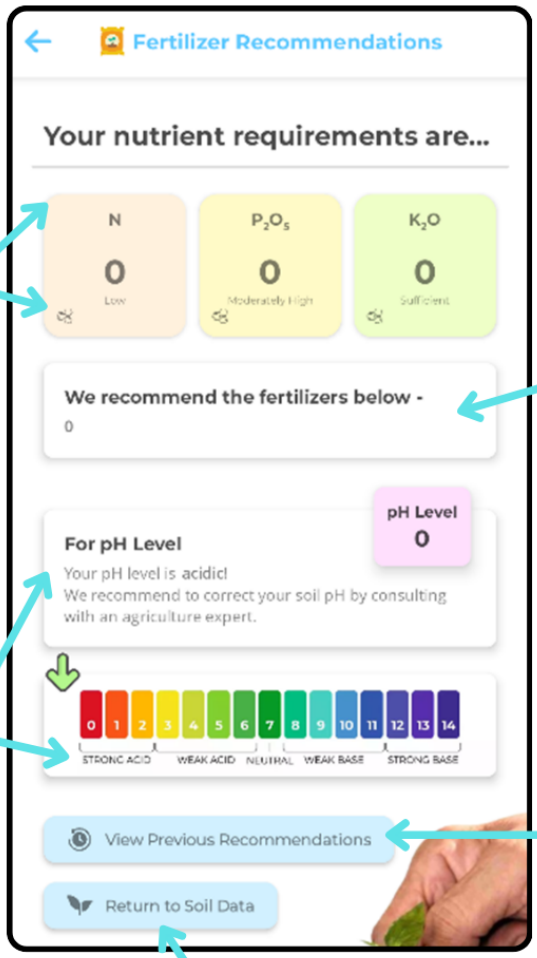
**View Recommendation Button**
Makes a fertilizer recommendation base on the received data

# View Recommendation Page

The View Recommendation Button redirects the user to the Fertilizer Recommendations Page. Its features are as follows.

**NPK Nutrient requirement**
Shows the recommended NPK or Nitrogen, Phosphorus and Potassium requirement of the of soil to improve its overall status

**pH Level Status and pH Level Scale**
Shows the current pH Level of the soil and recommendation as well as a visual representation of the scale




**Fertilizer Recommendation**
Shows a list of recommended fertilizers to use to balance the soil nutrient of the crop

**View Previous Recommendations**
Redirects the user to the Recommendation History Page to see recommendation results of past soil samples

**Return to Soil**
Redirects the user to the Soil Monitoring Page

# Weather Page

The Weather Button redirects the user to the Weather Forecast Page. Its features are as follows.

**Location & Date**
Shows current city and province, along with the month and day

**Humidity, Precipitation & Wind Speed**
Shows the current humidity, precipitation and wind speed of the location


**Temperature & Weather Condition**
Shows the current average temperature of the location

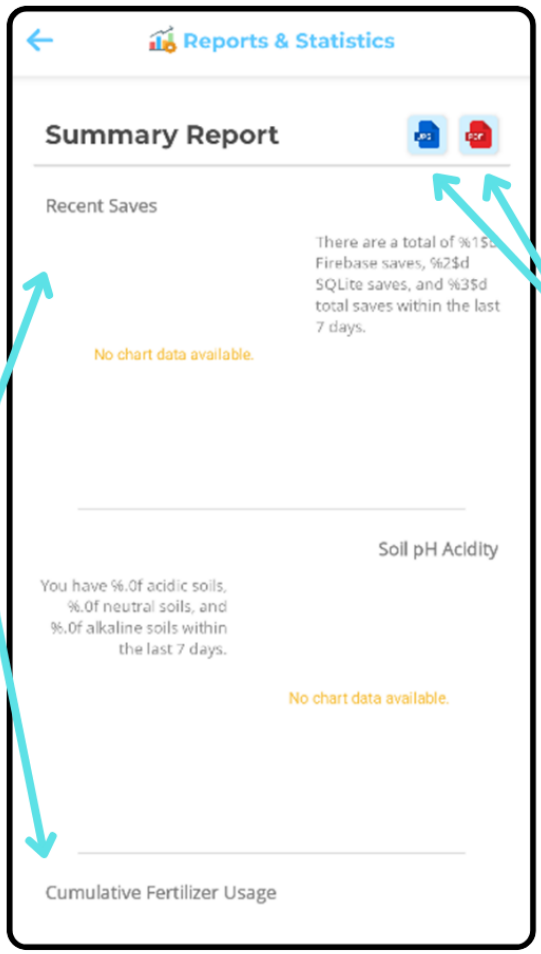
**7 Day Weather Forecast**
Shows the predicted weather condition and temperature of the location in 7 consecutive days

# Reports Page

The Reports Button redirects the user to the Reports and Statistics Page. Its features are as follows.

**Summary Report**
Shows detailed analysis of retrieved data of the following topics:

- Recent Saves
- Soil pH Acidity(weekly)
- Cumulative Fertilizer Usage
- Soil pH Trend
- Monthly Average Soil NPK

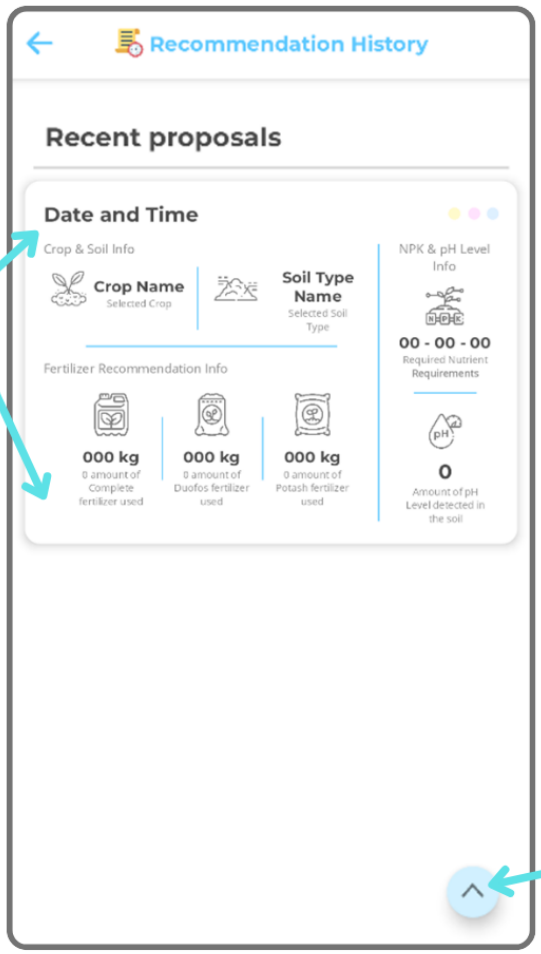



**Download Summary Report as JPG or PDF**
Downloads current summary report in JPG or PDF format

# Recommendation History Page

The Recommendation History Button redirects the user to the Recommendation History Page. Its features are as follows.

**Recommendation History**
Shows previous information and fertilizer recommendations of the selected crop

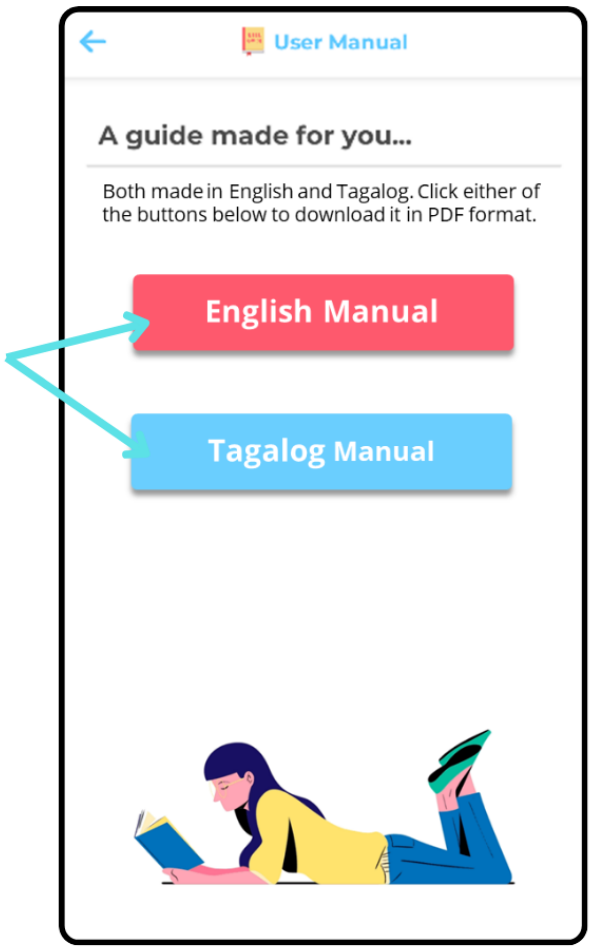



**Scroll to Top Button**
Helps user to scroll up faster; the button is hidden when at the top and shows when the user scrolls down

# View User Manual Page

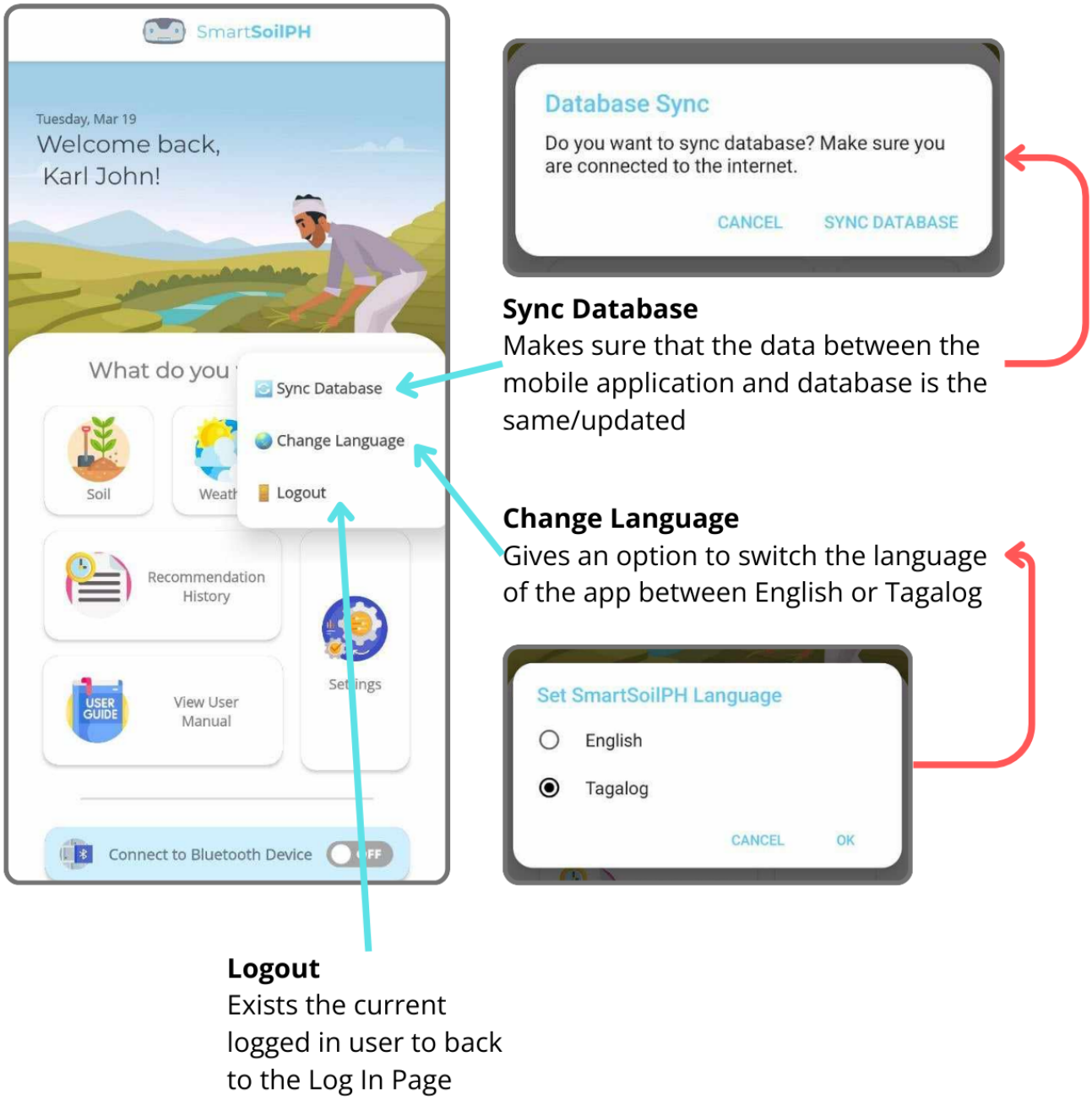
The View User Manual Button redirects the user to the Uer Manual Page. Its features are as follows.

**English and Tagalog Manuals**
Downloads this manual you are reading right now either in English or Tagalog



# Settings Button

The Settings Button shows additional features on the app. Its features are as follows.



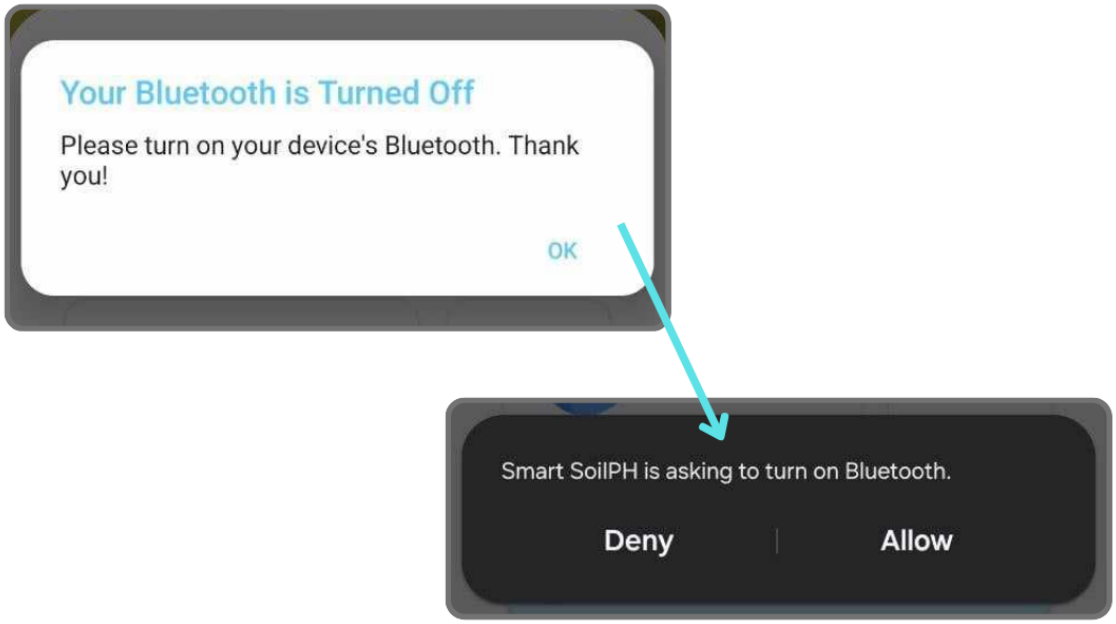

**Sync Database**
Makes sure that the data between the mobile application and database is the same/updated

**Change Language**
Gives an option to switch the language of the app between English or Tagalog

**Logout**
Exists the current logged in user to back to the Log In Page

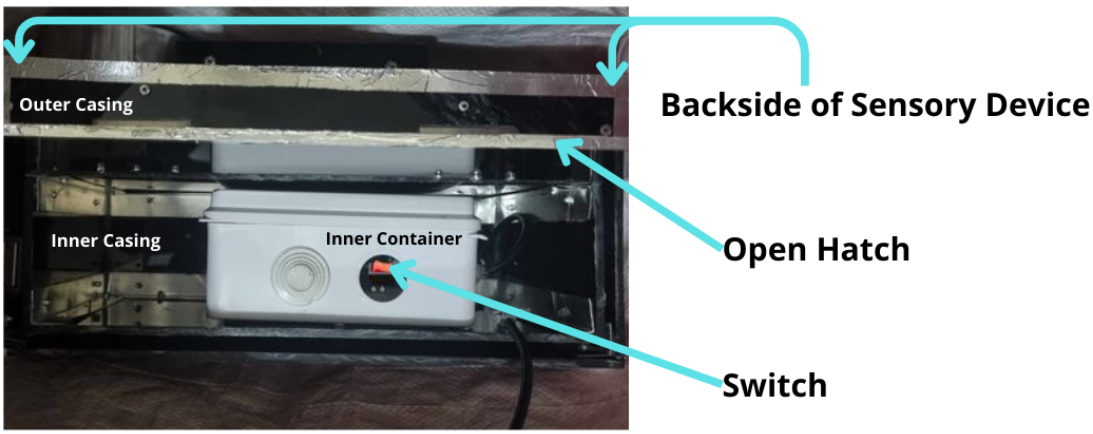
## Connect to Bluetooth Device Switch Button

The Connect to Bluetooth Device Switch Button connects the user to the Sensor device but first asks permission before connecting.




## Sensory Device

To turn on the Sensory Device, the user will have to open the hatch behind and click the switch inside the inner container of the device.



# Soil Sampling Technique

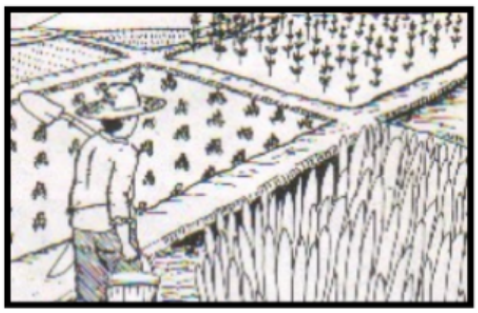
Below are the steps in performing a soil sample to represent a hectare.

General guideline:

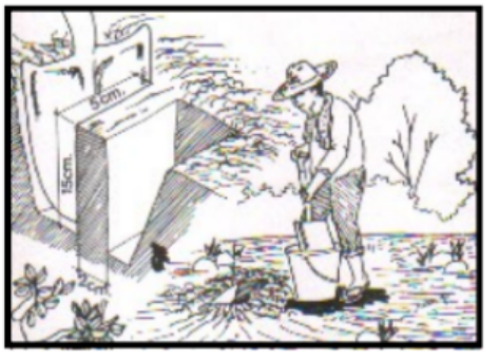
1. **Plan Ahead:** Avoid recent fertilizer/manure areas; aim for diverse crop zones.
2. **Depth & Quantity:** Collect from 15-20 cm depth, aiming for a total of 0.5-1 kg soil.
3. **Pattern:** Use a "W" pattern across fields, adjusting for crop variety areas.
4. **Collection:** Mix cores, remove debris, and bag 0.5-1 kg of soil.
5. **Label & Send:** Mark samples with crop, field, and date; send for comprehensive analysis.

**Key Point:** Target the active root zone depth for relevant crop soil data.

1. *Prepare the following: pail, shovel, bolo, plastic and meter stick.*



2. *Divide your farm according to the kind of crops grown or to be grown, type of soil (sandy, clayey or loamy) and topography (level, flat, sloping or hilly). Collect soil samples separately from the different soil unit areas and place them in separate containers.*
3. *Brush away stone, rubbish, trash or grass on the surface of the land.*
4. *Using the shovel, push it down the surface or topsoil to a depth of approximately 15 cm and get a slice of soil sample 2 cm thick and 5 cm wide. Place this in a container.*



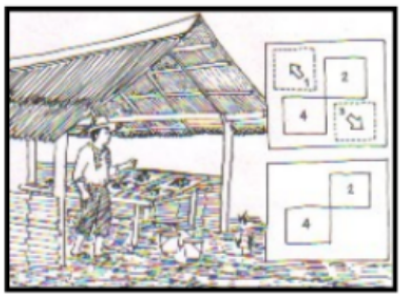

5. *Get similar samples at random from as many as 10 sites and mix them in a container. Get a composite soil sample of about 1 kilo to represent the soil unit area.*

**NOTE:** A soil unit area is any section of the farm where the soil type, its topography and vegetation are more or less similar.

6. *For areas to be devoted to orchard, for instance citrus orchard, get subsoil samples from below the 25 centimeters down from where the topsoil sample was taken. A composite subsoil sample is also required for fruit trees/permanent crops.*

For fruit trees, soil samples should be taken directly below the rim of the crown of the tree as illustrated below.

- 0 to 25 cm depth for shallow rooted plants like rice, corn and vegetables.
- 25 to 30 cm depth for fruit trees/permanent crops like coconut.



7. *Air dry the soil samples by spreading them in plastic sheets or mats under the shade or indoor. Be sure to avoid contaminations among the samples and keep them away from dirt or foreign*