eLandCare User Manual

Version 1.0 Last Updated: October 3, 2025

Kefyalew Sahle Kibret, Amare Haileslassie (PhD)

1 Introduction

Welcome to eLandCare, your mobile guide to smart soil and water conservation (SWC) in Ethiopia. This application is designed to provide farmers, land managers, and agricultural extension workers with tailored recommendations for SWC practices based on specific local conditions. It also features a tool to explore and identify the Agro-Ecological Zones (AEZ) of your current location.

2 Understanding the SWC Criteria

To get the best recommendations from eLandCare, it's important to understand what each selection criterion means. Here is a detailed guide to the options available in the dropdown menus.

- Agro-Ecological ZoneThis refers to the specific climate and altitude zone of your land. The available zones in the app are:

Table 1: Description of agro-ecology zones (MOA, 2016)

GIS value	Name official	Description short (rainfall rand and elevation range)
52	Moist High Dega	3000 - 3200 m. a.s.l. and > 1400mm
53	Wet High Dega	3000 - 3200 m. a.s.l. and 900 - 1400mm
41	Dry Dega	2300 - 3000 m. a.s.l. and > 1400mm
42	Moist Dega	2300 - 3000 m. a.s.l. and 900 - 1400mm
43	Wet Dega	2300 - 3000 m. a.s.l. and <900mm
31	Dry Weyna Dega	1500 - 2300 m. a.s.l. and > 1400mm
32	Moist Weyna Dega	1500 - 2300 m. a.s.l. and 900 - 1400mm
33	Wet Weyna Dega	1500 - 2300 m. a.s.l. and <900mm
21	Dry Kolla	500 - 1500 m. a.s.l. and > 1400mm
22	Moist Kolla	500 - 1500 m. a.s.l. and 900 - 1400mm
23	Wet Kolla	500 - 1500 m. a.s.l. and <900mm
12	Moist Berha	500 m. a.s.l. and 900 - 1400mm

- Land UseSelect how the land is currently being used.
  - Cultivated: Land used for growing crops.
  - Grassland: Land used for animal grazing or left as pasture.
  - Forestland: Land covered with trees and forest.
- Slope (% class): This describes the steepness of your land.

  - below 15%: Gently sloping or nearly flat land.
  - 15-50%: Moderately to steeply sloping land.
  - above 50%: Very steep land, such as hillsides.
- Soil Depth (cm): This is the depth of the topsoil, which is crucial for plant growth.
  - above 50 cm: Deep soil, suitable for a wide range of plants.
  - below 50 cm: Shallow soil, which may limit the types of crops that can be grown.
- Soil Type: This refers to the texture of your soil.
  - Sandy/Silty: Lighter soil with larger particles.
  - Clay: Heavy soil with very fine particles.
  - Silt/loam: A balanced mix of sand, silt, and clay, often considered ideal.
- Limiting Factor This is the primary challenge or problem affecting your land.
  - Multiple Gullies: The land is severely affected by many erosion gullies.
  - No Limiting Factor: There are no significant problems currently affecting the land's productivity.
  - Wind erosion
- Drainage: This describes how well water passes through your soil.
  - Well: Water drains at a moderate pace without pooling.
  - Poor: Water drains very slowly, leading to waterlogging.
  - Excess: Water drains too quickly, leaving the soil dry.
- Gully Status This describes the presence and condition of gullies (channels formed by water erosion).
  - No Gully: The land has no significant erosion channels.
  - Gullies present

3 The Welcome Screen & Quick Guide

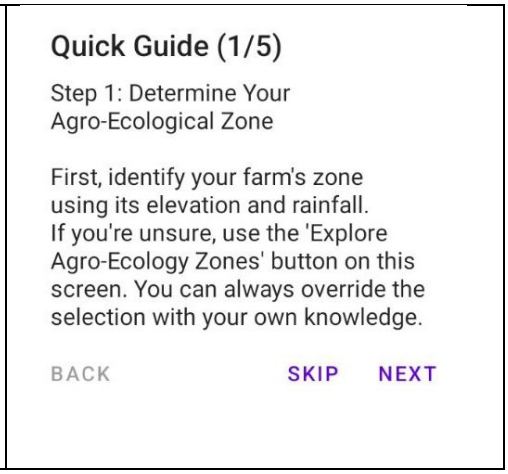
Open the app by clicking the icone  on you mobile. The main screen is your starting point for all features in the e-LandCare application.

3.1 The Quick Guide

The first time you open the app, a "Quick Guide" will automatically appear. This 5-step guide gives you a fast overview of how to use the app effectively.

Navigation:

- Use the NEXT button to move to the next tip.
- Use the BACK button to review the previous tip.
- When you reach the final tip, the NEXT button will change to FINISH.
- You can exit the guide at any time by pressing SKIP.



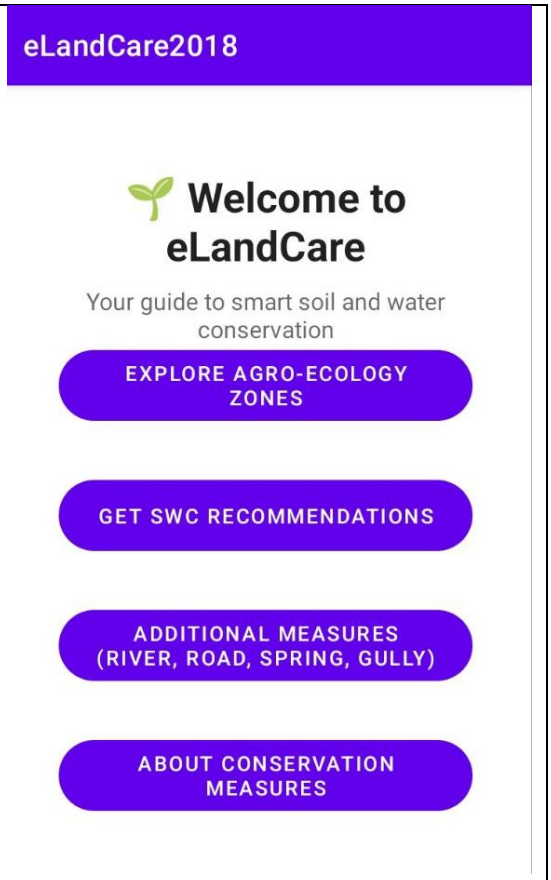
Guide Steps: The guide covers the five core steps for land management planning:

1. Determining your Agro-Ecological Zone.
2. Getting main SWC (Soil and Water Conservation) recommendations.
3. Understanding the recommendation "bundles."
4. Refining and exporting your results.
5. .Using the "Additional Measures" for specific features.

3.2 Main Menu Buttons

The welcome screen contains five main buttons to navigate to the different parts of the app.

1. Get SWC Recommendations: This is the primary feature. Press this to go to the main recommendations screen where you can input your land criteria (slope, soil type, etc.) to generate tailored conservation plans.
2. Additional Conservation Measures: Use this for specific landscape issues. It provides recommendations for river banks, road drainage, springs, and gullies.
3. Explore Agro-Ecology Zones: Press this to open a helper tool that assists you in identifying the correct Agro-Ecological Zone based on elevation and rainfall.
4. Info on Conservation Measures: This button takes you to a reference library explaining the various conservation measures mentioned in the app.
5. About: This button displays information about the e-LandCare application, its purpose, and its developers.



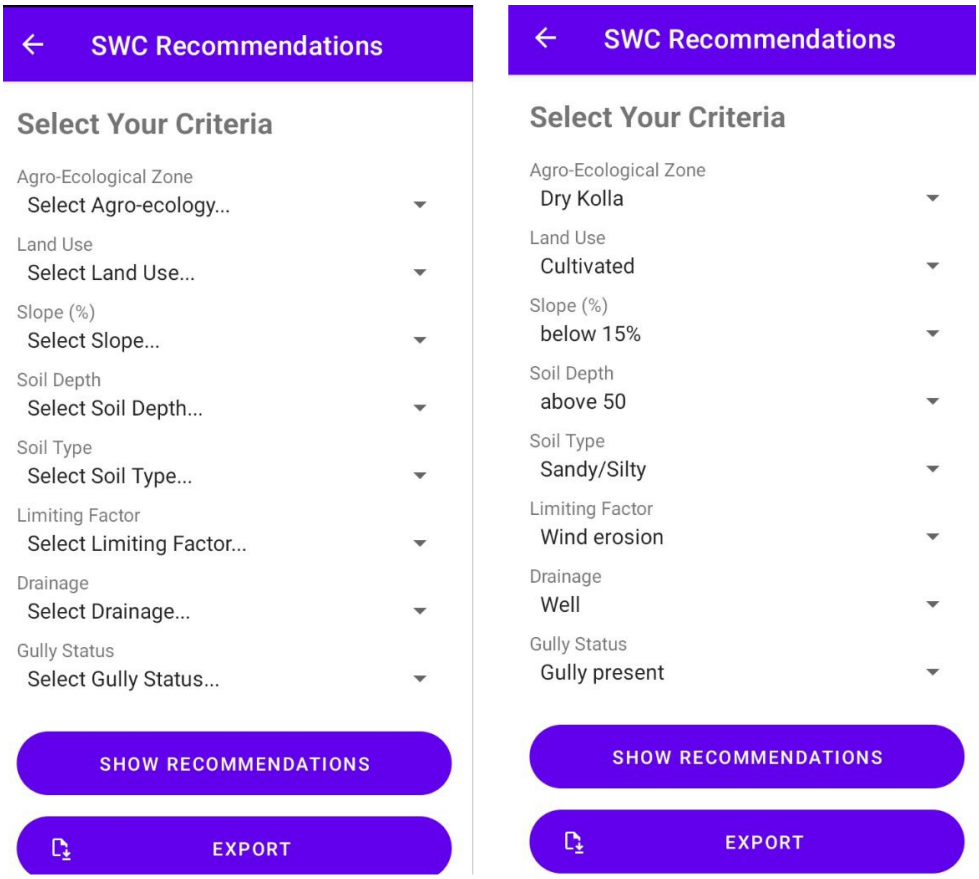
4 How to Get SWC Recommendations

This is the main function of the app. Follow these steps to get your recommendations.

1. Open the Recommendation Form: From the main menu, tap the "Get SWC Recommendations" button.
2. Select Your Criteria: You will see a form with several dropdown menus. For the most accurate results, select the option that best describes your land for each of the following criteria:

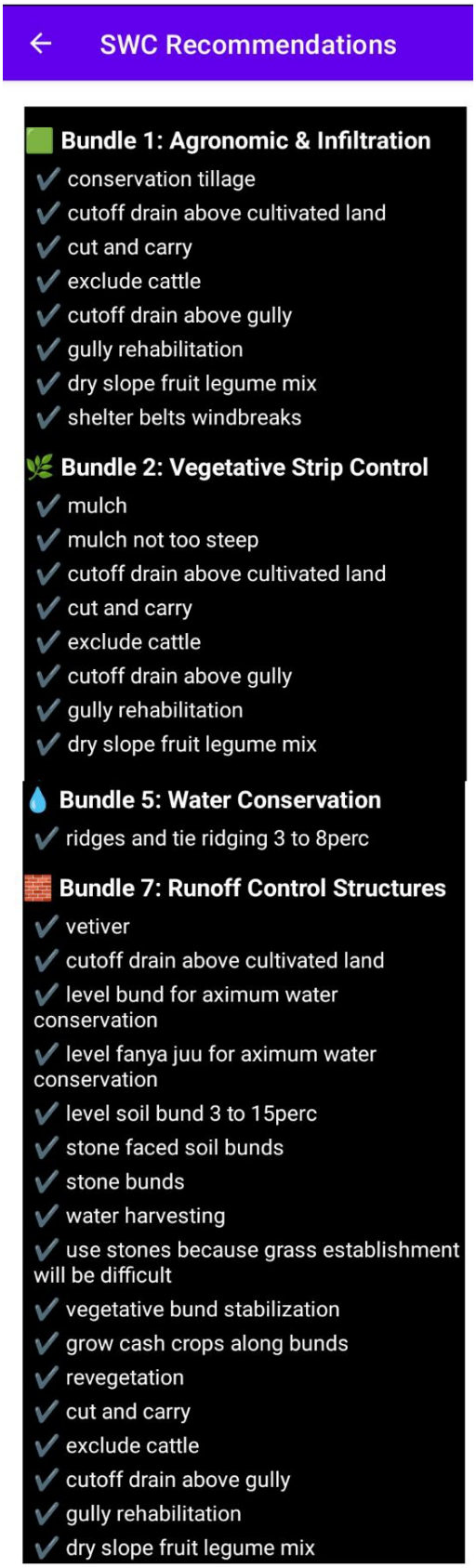
- Agro-Ecological Zone: The specific zone where you are standing.
- Land Use: The current use of the land (e.g., cropland, grazing land, forest land).
- Slope class: The steepness of the land – 0-15%, 15-50%m above 50%
- Soil Depth class: The depth of the topsoil: below 50cm, and above 50cm, below or above 50cm.
- Soil Type: The primary texture of the soil (e.g., clay, loam, sand, all soil type).
- Limiting Factor: The main challenge for the soil (No limiting, Multiple gullies).
- Drainage: How well water drains from the soil: well, poor, excess, all class
    - Gully Status: The presence gullies, no gull present.

3. Generate Recommendations: Once you have made your selections, tap the "Show Recommendations" button.
   The following figures illustrate the site information form (left), where users input relevant land and soil data. The right figure displays a completed form with selected parameters. By clicking the "Show Recommendations" button, users receive tailored bundles of conservation measures for the specified site.



The next figure displays the soil and water conservation (SWC) recommendations generated for a selected site. These are organized into three bundles—foundational, contextual, and strategic—each tailored to the site's specific conditions and designed to guide effective conservation planning.

1. View the Results: The app will display a list of recommended SWC practices organized into different "Bundles." These bundles represent different levels of investment and intervention, from foundational measures to more advanced techniques.(Suggestion: Replace this with a screenshot of the results)
2. Export Your Results (Optional): If you wish to save your selections and recommendations, tap the "Export" button. This will allow you to save the data as a CSV file (a simple spreadsheet) to your device for later reference or sharing.



5 How to Explore Agro-Ecological Zones (AEZ)

5.1 Explore AEZ of your site in the filed

The AEZ Explorer helps you identify which Agro-Ecological Zone you are in.

3. Open the Map: From the main menu, tap the "Explore Agro-Ecology Zones" button.
4. Grant Location Permission: The app will ask for permission to access your device's location. This is necessary to show your current position on the map. Please grant this permission for the feature to work correctly.
5. Find Your Location: Tap the GPS icon to center the map on your current location. The app will display your current coordinates and the name of the AEZ you are in.

5.2 How to Generate the Agro-ecology of a Site Without Visiting the Field:

1. Open the “Explore by Map” Feature

- From the main screen, tap the “Explore by Map” option.
- This will open a ma, either of the world or Ethiopia, depending on your previous activity.

2. Check Map Availability

If you’ve previously opened the Ethiopia map while connected to the internet, the map data will already be saved on your device.

- In this case, no internet connection is needed.

If the map appears low-resolution or incomplete, you’ll need an internet connection to load detailed data.

3. Zoom to Your Area of Interest

- Use your fingers to navigate (zoom in or zoom out) to the approximate location of your site.
- If detailed map layers don’t appear, connect your mobile device to the internet and zoom in further.

4. Select Your Location

- Once you've zoomed in close enough, tap directly on the specific area of interest on the map.
- A pop-up will appear showing:
    - The agroecological zone your site falls within
    - The name of that agroecology

5. Return to the Recommendation Page

After noting the agroecology information, go back to the main Recommendation page.

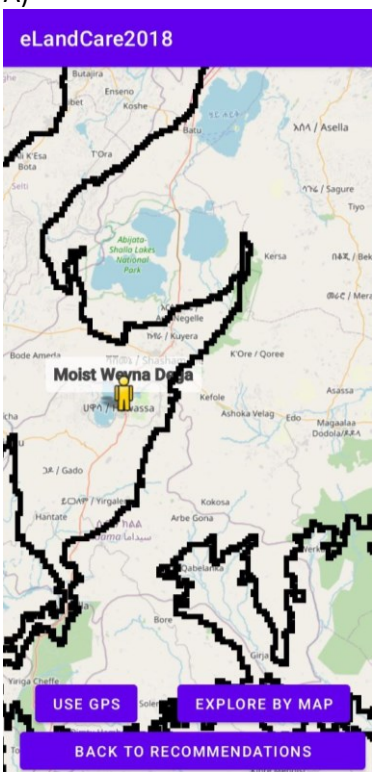
6. Complete the Form and Generate Recommendations

Fill out the required fields in the recommendation form (using the agroecology details you just identified).

Tap "Generate Recommendation" to receive site-specific advice based on recorded data..

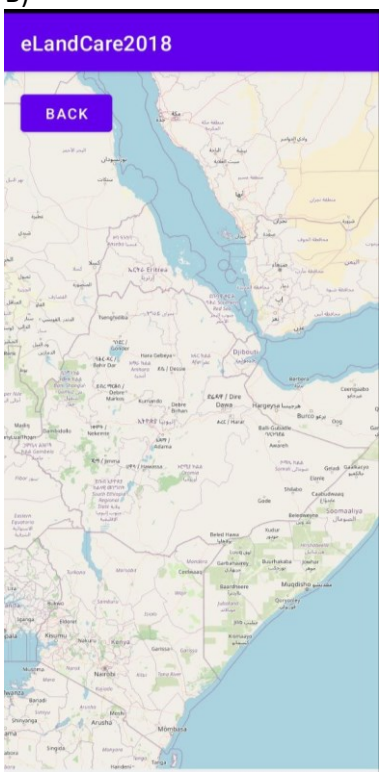
Figure A shows the Agroecological Zone (AEZ) automatically detected when using GPS.

A)



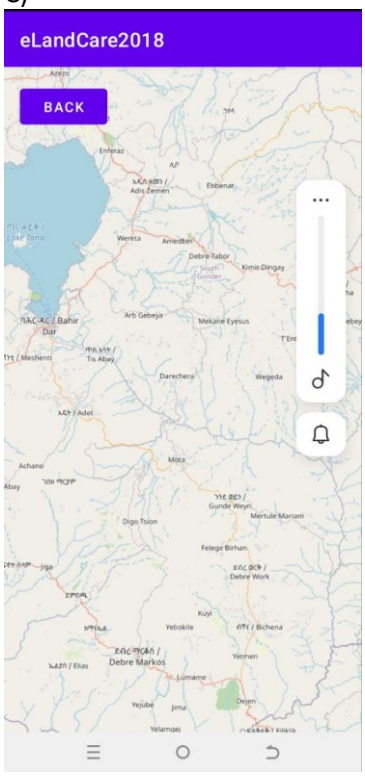
When you instead select the "Explore by Map" option, the app displays a map view as shown in Figure B.

B)



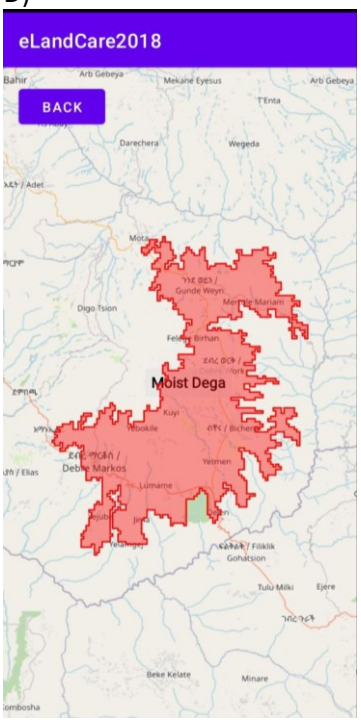
You can then zoom in to your area of interest—Figure C illustrates an example of a user-zoomed location.

C)



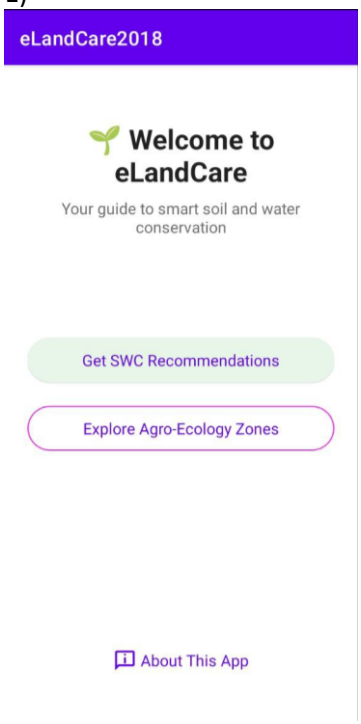
Once you tap on your specific site within the zoomed-in map, a pop-up appears (Figure D) displaying the AEZ boundary and clearly indicating the name of the agroecological zone.

D)

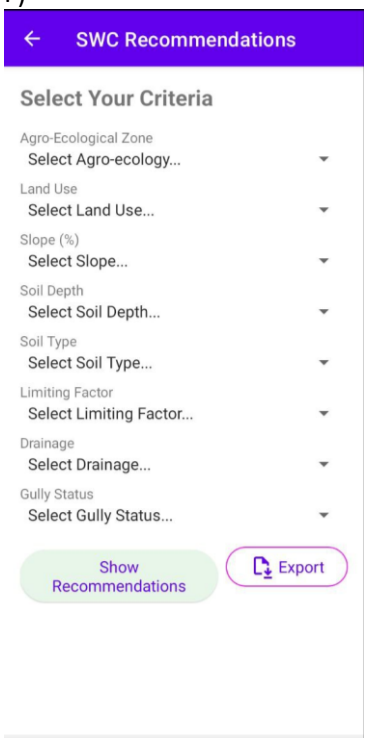


After reviewing this information, tapping the Back button returns you to the main screen (Figure E), from where you can launch the Soil and Water Conservation (SWC) Recommendation page, shown in Figure F, to generate tailored recommendations based on the identified AEZ.

E)



F)



6 Using the Additional Conservation Measures Screen

This screen provides targeted recommendations for specific landscape features like river banks, roads, springs, and gullies.

6.1 Getting Started

When you open the "Additional Conservation Measures" screen, you will see a list of categories:

- River Bank
- Road Drainage
- Spring
- Gully
- Gully Part(s)
- Each category has a dropdown menu next to it.

6.2 How to Get a Recommendation

1. Select a Category: Tap on the dropdown menu for the category you are interested in (e.g., "Select River Bank Status").
2. Choose a Status: From the list that appears, select the option that best describes the current condition you observe in the field.
3. View the Recommendation: As soon as you make a selection, the recommended conservation measures will instantly appear in the space below the dropdown. The text is displayed in white on a black background for easy reading in any light condition.
4. The recommendation text is automatically formatted with bold headings to make it clear and easy to understand.
5. If you select the first option (e.g., "Select River Bank Status"), the recommendation display will be cleared.

6.3 Working with Multiple Categories

You can select a status for one category, multiple categories, or all of them at the same time. Each recommendation will appear independently under its respective dropdown menu.

6.4 Exporting Your Selections

After making your selections, you can export them to a CSV file for your records.

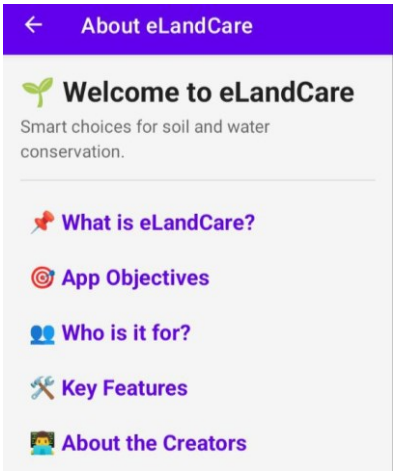
1. Make Selections: Choose a status from one or more of the dropdown menus.
2. Tap the Export Button: Press the EXPORT RECOMMENDATIONS button at the bottom of the screen.
3. Save the File: Your phone's file manager will open. You can choose where to save the file. The app will suggest a name that includes the date and time (e.g., eLandCare_AdditionalMeasures_143000.csv).
4. Confirmation: Once the file is saved, a confirmation message "Export successful!" will appear. The exported CSV file will contain the category, your selection, and the full recommendation text for every category you selected.4

6.5 Returning to the Main Screen

To go back to the main recommendation screen, simply tap the BACK TO MAIN SCREEN button at the bottom.

7 About the App

Tapping the "About This App" button will take you to a screen with details about the project, its purpose, acknowledgments, and contact information for support.



8 Frequently Asked Questions (FAQ)

Q: Do I need an internet connection to use the app?

A: The core recommendation feature works completely offline. An internet connection is only needed for the map in the "Explore Agro-Ecology Zones" feature to download map tiles.

Q: Why do I need to grant location permission?

A: Location permission is only used in the "Explore Agro-Ecology Zones" feature to show your current location on the map. It is not used for any other purpose.

Q: The app crashed. What should I do?

A: Please try restarting the app. If the problem persists, please use the contact information in the "About" section to report the issue.

9 How to Install eLandCare

You can install the **eLandCare** application using one of two methods: from the Google Play Store (recommended for most users) or by downloading the installation file directly from GitHub (for advanced users or testing).

9.1 Method 1: Install from the Google Play Store (Recommended)

This is the simplest and most secure way to install the app.

1. Open the Play Store: On your Android device, open the "Google Play Store" application.

2. Search for **eLandCare**: Tap the search bar at the top and type **eLandCare**.
3. Select the App: Find the **eLandCare** app in the search results and tap on it.
4. Install: Tap the "Install" button. The app will automatically download and install on your device.
5. Open: Once installation is complete, you can find the **eLandCare** icon on your home screen or in your app drawer.

9.2 Method 2: Install from GitHub (Sideloading)

This method involves manually downloading the .apk installation file from the project's GitHub page. This is useful for installing specific versions of the app that may not be on the Play Store yet.

Step 1: Enable "Install from Unknown Sources" on Your Phone

For security, Android blocks the installation of apps from outside the Play Store by default. You need to grant permission first.

1. Go to your phone's Settings.
2. Navigate to "Apps" or "Security". The exact location varies by Android version.
3. Look for an option named "Install unknown apps" or "Special app access".
4. Find your web browser (e.g., Chrome) in the list and enable the permission to "Allow from this source".

Step 2: Download the APK File from GitHub

1. On your phone's web browser, navigate to the eLandCare GitHub repository's "Releases" page. (not yet released: https://github.com/kefgis/eLandcare/releases)
2. Find the latest release and look for the .apk file under the "Assets" section (e.g., eLandCare-v1.0.apk).
3. Tap the .apk file to download it to your device.

Step 3: Install the APK

1. Once the download is complete, open your phone's "Files" or "Downloads" app.
2. Find and tap on the downloaded .apk file (eLandCare-v1.0.apk).
3. A system prompt will appear asking if you want to install the application. Tap "Install".
4. After a few moments, the app will be installed. You can then open it directly or find it on your home screen.

9.3 Method 3: Install from a Computer (via Email or USB Cable)

If you have the eLandCare installation file (eLandCare.apk) on a computer, you can easily transfer it to your phone via email or a USB cable.

9.3.1 How to Install the eLandCare Test Version1.

1. ***Enable Installation***: On your phone, go to **Settings > Security** and find the option for "**Install unknown apps**". Find your browser (e.g., Chrome) or file manager and turn

the permission ON. (You only need to do this once.) [if you have a problem with enable installer refer to the different options given below 9.3.2]

2. ***Download***: Download the **eLandCare-v1.1-test.apk** file I sent you to your phone.
3. ***Install***: Open your "Files" or "Downloads" app, tap on the **eLandCare-v1.1-test.apk** file, and then tap "Install" when prompted.
4. ***Test***: The app will now be on your phone. Please use it and report any bugs or crashes

9.3.2 Options to enable installer

- 📱 **Option 1: Use the Search Bar in Settings**

Most Android phones have a search bar at the top of the Settings screen.

- Open **Settings**
- Tap the **search icon** (🔍) or scroll to the top
- Type: **Install unknown apps** or just **unknown**
- Tap the **Install unknown apps**
- Select your browser (e.g., Chrome) or file manager from the list
- Toggle **Allow from this source** to ON

- 🤔 **Option 2: Navigate Manually (if search isn't available)**

Depending on your phone brand and Android version, try one of these paths:

- **For Android 8.0 and above:**
- **Settings** > **Apps & notifications** > **Advanced** > **Special app access** > **Install unknown apps**
- Choose your browser or file manager
- Toggle **Allow from this source**
- **For older Android versions:**
- **Settings** > **Security** > **Unknown sources**
- Toggle ON (this applies system-wide)

- 🧭 **Option 3: Trigger During Installation**

If you're installing an APK directly:

- Tap the APK file
- Android may show a warning and a shortcut to enable permissions
- Tap **Settings** in the popup
- Toggle **Allow from this source**

- 🛠️ **Option 4: Brand-Specific Paths**

Some manufacturers use custom menus:

- **Samsung**: Settings > Biometrics and security > Install unknown apps
- **Tecno/Infinix**: Settings > Apps > Special app access > Install unknown apps

10 Acknowledgment, Developers and Validators

- **Acknowledgment**: The soil and water conservation decision support tool was developed in collaboration with the expertise from the Ministry of Agriculture (MoA) and used many of their resources available as hard copy (e.g. MOA, 2016 agro-ecological classification, soil and water conservation manuals). We are grateful for this. This tool was developed as part of CGIAR science program Scaling for Impact(S4I)in East and Southern Africa, which is grateful for the support of CGIAR Trust Fund contributors (www.cgiar.org/funders) and Nature-Based Solutions for Inclusive and Sustainable Development (NSSID) funded by Swedish SIDA.

- **Developed**
    - Initiated and conceptualized by Amare Haileslassie, Principal Researcher, Agricultural Water Management and Ecosystem Services, International Water Management Institute (IWMI), and Wolde Mekuria, Senior Researcher, Environment nd Development, IWMI
    - Developed by: *Kefyalew Sahle* – Lecturer at Hawassa University, Wondo Genet College of Forestry and Natural Resources, Department of Geographic Information Science (GISc). GIS and Mobile Application Developer with specialized expertise in forestry, land use planning, and spatial decision support systems.
- **Validated:** Fekede Adane and Abinet Mengistu, soil and water conservation expert, Ministry of Agriculture, and Tarku Temesegen, rural development, Farm Africa