

User Manual

GeoArable Advisor | Version 1.0

GIS-BASED IDENTIFICATION OF ARABLE LAND AND SELECTION OF SOIL AND WATER CONSERVATION MEASURES

GeoArable Advisor is a web-based system that helps users select suitable Soil and Water Conservation (SWC) measures for arable land. The user provides a location (by clicking on a map, searching a place, or using GPS) and a few land details. The system then classifies the land, estimates erosion risk and soil loss using the RUSLE model, and recommends conservation measures based on the official ICAR Table 4.1. A local AI advisor and a full site report (in English, Hindi, or Tamil) are also available.

This tool is designed for farmers, field officers, planners, and researchers. The following sections explain, step by step, how to use the system from login to final report.

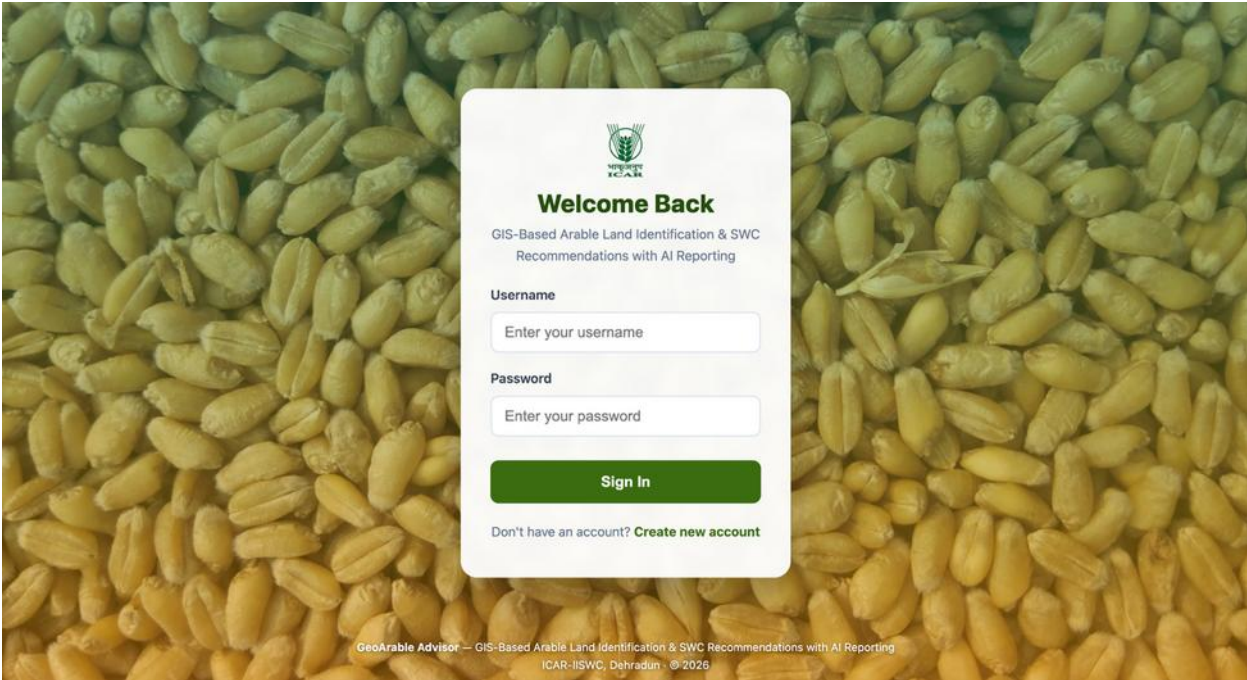
1. Before You Begin

Before using the system, make sure of the following:

- A user account — you need a username and password. New users can create an account from the sign-up link on the login page.
- An internet connection — required so the system can fetch real elevation and rainfall data for your location.
- A location within India — the recommendations are based on Indian (ICAR) standards, so only locations inside India are supported.

2. Logging In

When the user opens GeoArable Advisor, the login page appears. Enter your Username and Password in the boxes provided, then click the Sign In button to enter the system.



Welcome Back
GIS-Based Arable Land Identification & SWC
Recommendations with AI Reporting

Username
Enter your username

Password
Enter your password

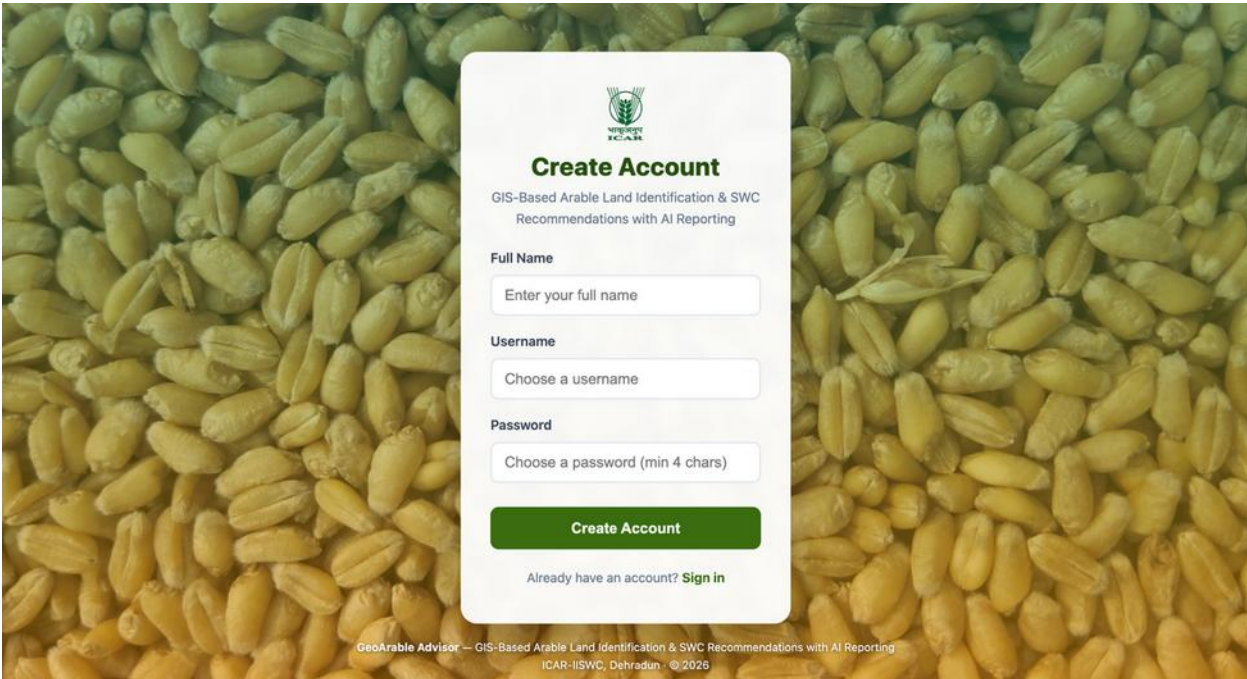
Sign In

Don't have an account? [Create new account](#)

GeoArable Advisor — GIS-Based Arable Land Identification & SWC Recommendations with AI Reporting
ICAR-IISWC, Dehradun · © 2026

The Login page — showing the ICAR logo, the Username and Password boxes, and the 'Sign In' button.

New users do not have an account yet. Click 'Create new account' on the login page to open the sign-up form, then enter your Full Name, choose a Username, and choose a Password (at least 4 characters). Click Create Account to finish, then sign in with those details.



Create Account
GIS-Based Arable Land Identification & SWC
Recommendations with AI Reporting

Full Name
Enter your full name

Username
Choose a username

Password
Choose a password (min 4 chars)

Create Account

Already have an account? [Sign in](#)

GeoArable Advisor — GIS-Based Arable Land Identification & SWC Recommendations with AI Reporting
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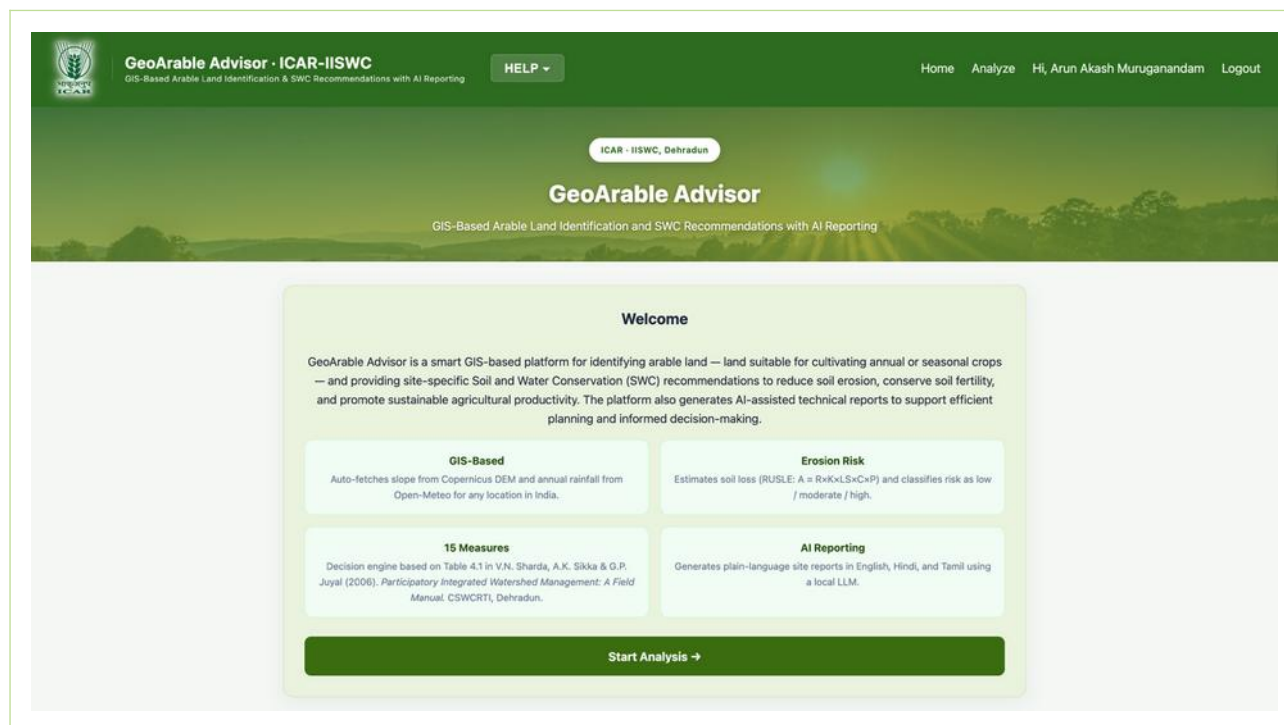
The Create Account page — showing the Full Name, Username, and Password fields and the 'Create Account' button.

3. Home Page

After signing in, the Home page appears. It introduces the tool, lists its main capabilities (GIS-Based, Erosion Risk, 15 Measures, AI Reporting), and gives quick access to every page from the top navigation bar.

- Home — returns to this page.
- Analyze — opens the Field Analysis page to start a new site analysis.
- HELP — opens a dropdown with a link to this User Manual (see Section 12).
- Hi, [your name] / Logout — shown on the right once you are signed in.

Click 'Start Analysis' on the Home page, or 'Analyze' in the navigation bar, to begin.



The Home page — showing the title banner, the top navigation bar, the Welcome card with its four feature tiles, and the 'Start Analysis' button.

4. Field Analysis — Selecting a Location

On the Field Analysis page, the user first selects a location. There are three ways to do this:

- Click on the map — click anywhere on the satellite map to drop a marker at that point.
- Search a place — type a place name (e.g. "Dehradun, Uttarakhand") in the search box and click Search.
- Use my current location — click this link to use your device's GPS location.

Once a location is selected, the system automatically fetches the real elevation and rainfall for that point (from the Open-Meteo service) and fills in the slope and rainfall fields below.

LOCATION SELECTION

Click anywhere on the map. The system fetches real elevation & rainfall and estimates slope, then fills the form below.

Search a place name

e.g. Dehradun, Uttarakhand

Search

☒ Use my current location



No location selected yet.

The Field Analysis page — showing the Location Selection box, the search bar, the 'Use my current location' link, and the map.

LOCATION SELECTION

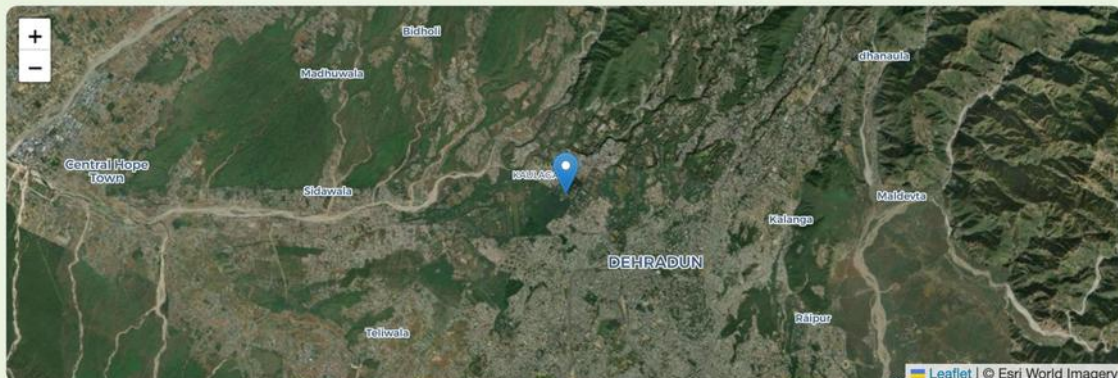
Click anywhere on the map. The system fetches real elevation & rainfall and estimates slope, then fills the form below.

Search a place name

e.g. Dehradun, Uttarakhand

Search

☒ Use my current location



 Your location | 30.3445, 78.0142 | Elevation: 680 m

The map after clicking a location — showing the marker placed and the 'Your location / elevation' line below the map.

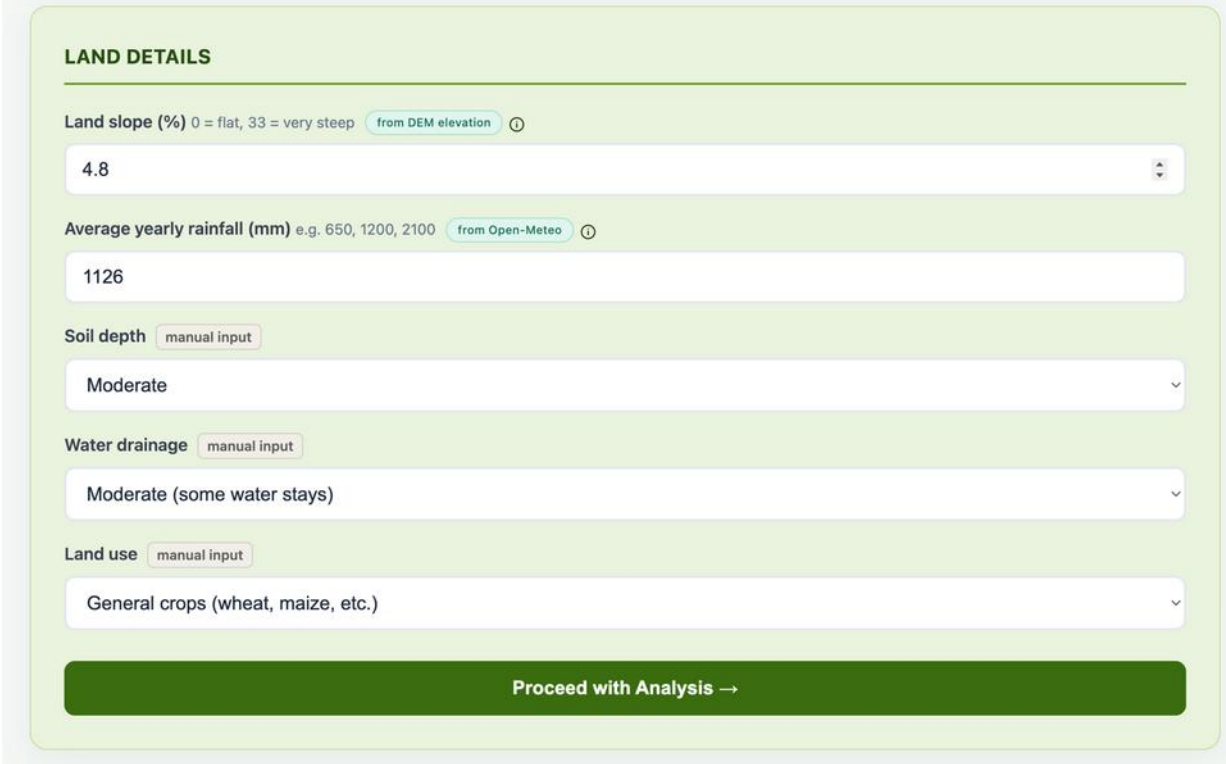
Note: This tool applies to locations within India only. If a location outside India is selected, a message will appear and the form will not be filled.

5. Entering Land Details

Below the map, the Land Details section is shown. Some fields are filled automatically from the selected location; others are entered manually by the user:

- Land slope (%) — filled automatically from the location (can be edited). The ⓘ icon explains the data source.
- Average yearly rainfall (mm) — filled automatically from the location (can be edited).
- Soil depth — select Deep, Moderate, or Shallow from the drop-down.
- Water drainage — select Good, Moderate, or Poor.
- Land use — select the current use (e.g. General crops, Paddy / rice, Plantation, Forest, etc.).

Fields filled from the map carry a small green tag so you can tell them apart from the ones you choose yourself. The grey 'manual input' tag marks the fields you set. You can still edit any auto-filled value before proceeding.



The screenshot shows a form titled "LAND DETAILS" with a light green background. It contains five input fields. The first two, "Land slope (%)" and "Average yearly rainfall (mm)", are auto-filled with values 4.8 and 1126 respectively, and have a green tag that says "from DEM elevation" and "from Open-Meteo" respectively. The next three, "Soil depth", "Water drainage", and "Land use", are manual inputs with a grey tag that says "manual input". The "Soil depth" field is set to "Moderate", "Water drainage" is set to "Moderate (some water stays)", and "Land use" is set to "General crops (wheat, maize, etc.)". At the bottom of the form is a green button labeled "Proceed with Analysis →".

The Land Details section — showing the auto-filled slope and rainfall fields with their green tags, the manual-input fields (Soil depth, Water drainage, Land use), and the 'Proceed with Analysis' button.

6. Filling the Drop-down Fields

Three of the Land Details fields are chosen from drop-down lists. This section shows every option in each list and what it means, so you can pick the value that best matches your land. Click a field to open its list, then click your choice.

Soil depth & Water drainage

Soil depth describes how thick the soil is. Water drainage describes how quickly water leaves the land. Open each drop-down and choose the option closest to your site:

- Soil depth — Deep (thick fertile soil), Moderate, or Shallow (thin / rocky soil).

- Water drainage — Good (water flows away easily), Moderate (some water stays), or Poor (water stays a long time).

Soil depth (left) and Water drainage (right) drop-downs open — showing all options for each.

Land use

Land use is what the land is currently used for. This list has nine options. Choose the one that matches your site — it affects which conservation measures are recommended.

- General crops (wheat, maize, etc.) · Paddy / rice · Small millets
- Plantation / orchard · Fallow (resting, not used now) · Rangeland / grazing
- Forest / trees · Water body · Built-up / urban

The Land use drop-down open — showing all nine options.

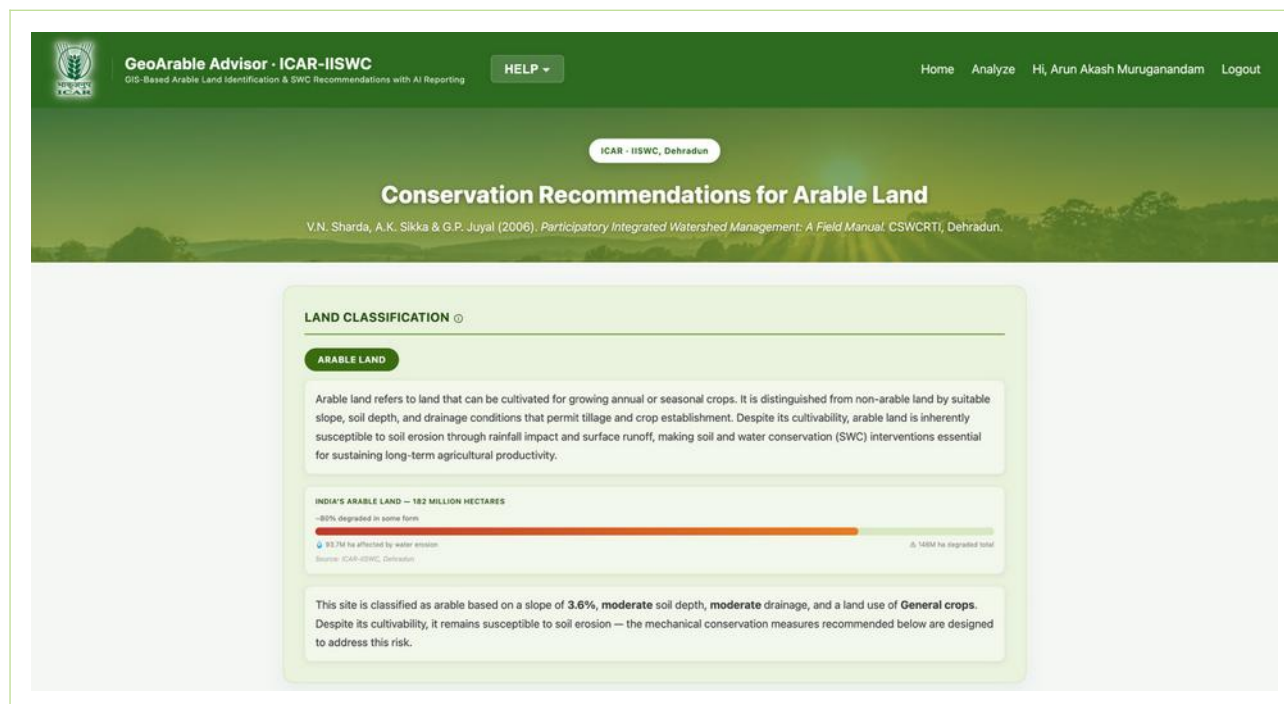
Tip: When every field is set, click the green 'Proceed with Analysis' button at the bottom of the form to see your results.

7. Results — Land Classification & Erosion Risk

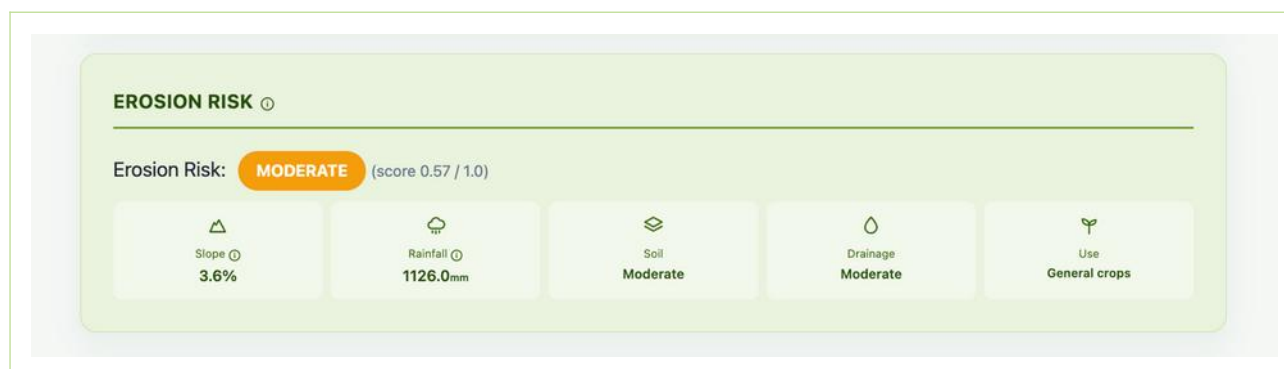
After clicking 'Proceed with Analysis', the Results page appears. At the top, the page shows:

- Land Classification — whether the land is Arable (cultivable) or Non-Arable, with a short explanation, a comparison against India-wide arable-land statistics, and a summary of your specific site.
- Erosion Risk — the risk level (e.g. Moderate) with a numeric score, plus a row of cards showing the site's Slope, Rainfall, Soil, Drainage, and Land use.

The ⓘ icons next to each heading and factor explain the method and data source, based on ICAR Table 4.1.



The top of the Results page — showing the 'Conservation Recommendations for Arable Land' title banner and the Land Classification section, including the 'ARABLE LAND' badge.



The Erosion Risk section — showing the risk badge and score, and the five factor cards (Slope, Rainfall, Soil, Drainage, Use).

Note: These figures are model estimates from standard published factor values, not from site-surveyed soil measurements. They are intended to compare options, not to give an exact field measurement.

8. Results — Estimated Soil Loss (RUSLE)

Next, the Estimated Soil Loss section shows the soil loss calculated using the Revised Universal Soil Loss Equation (RUSLE). It compares:

- Without conservation — the estimated soil loss (tonnes/ha/year) if no measure is taken.
- With recommended measure — the reduced soil loss after applying the recommended measure.

The estimated percentage reduction in soil loss is also shown.



The Estimated Soil Loss (RUSLE) section — showing the ‘Without conservation’ and ‘With recommended measure’ figures and the reduction percentage.

For a full technical breakdown, click ‘How is this calculated?’ to expand a table showing every RUSLE factor (R, K, LS, C, P) used for your site, the equation or method behind each one, and its published scientific reference.

▼ How is this calculated? (A = R × K × LS × C × P)			
A = R × K × LS × C × P — Revised Universal Soil Loss Equation			
Factor	Value	Method / Equation	Reference
R	509.4	81.5 + 0.38 × 1126.0 mm	Singh, G., Ram Babu & Chandra, S. (1981). Soil Loss Prediction Research in India. Bulletin No. T-12/D9, CSWCRTI, Dehradun.
K	0.300	Standard value for moderate soil depth	Wischmeier, W.H. & Smith, D.D. (1978). Predicting Rainfall Erosion Losses: A Guide to Conservation Planning. USDA Agriculture Handbook No. 537, Washington, D.C.
LS	0.37	McCool formula; slope = 3.6%, λ = 30 m	McCool, D.K., Brown, L.C., Foster, G.R., Mutchler, C.K. & Meyer, L.D. (1987). Revised Slope Steepness Factor for the Universal Soil Loss Equation. Transactions of the ASAE, 30(5), 1387–1396.
C	0.30	Standard value for General crops land use	Wischmeier, W.H. & Smith, D.D. (1978). Predicting Rainfall Erosion Losses: A Guide to Conservation Planning. USDA Agriculture Handbook No. 537, Washington, D.C.
P	1.00	Baseline — no conservation measure applied	V.N. Sharda, A.K. Sikka & G.P. Juyal (2006). Participatory Integrated Watershed Management: A Field Manual. CSWCRTI, Dehradun.
A ₁	16.7 t/ha/yr	509.4 × 0.300 × 0.37 × 0.30 × 1.00	Without conservation (P = 1.00, no measure)
A ₂	5.9 t/ha/yr	509.4 × 0.300 × 0.37 × 0.30 × 0.35	With recommended measure (P = 0.35)

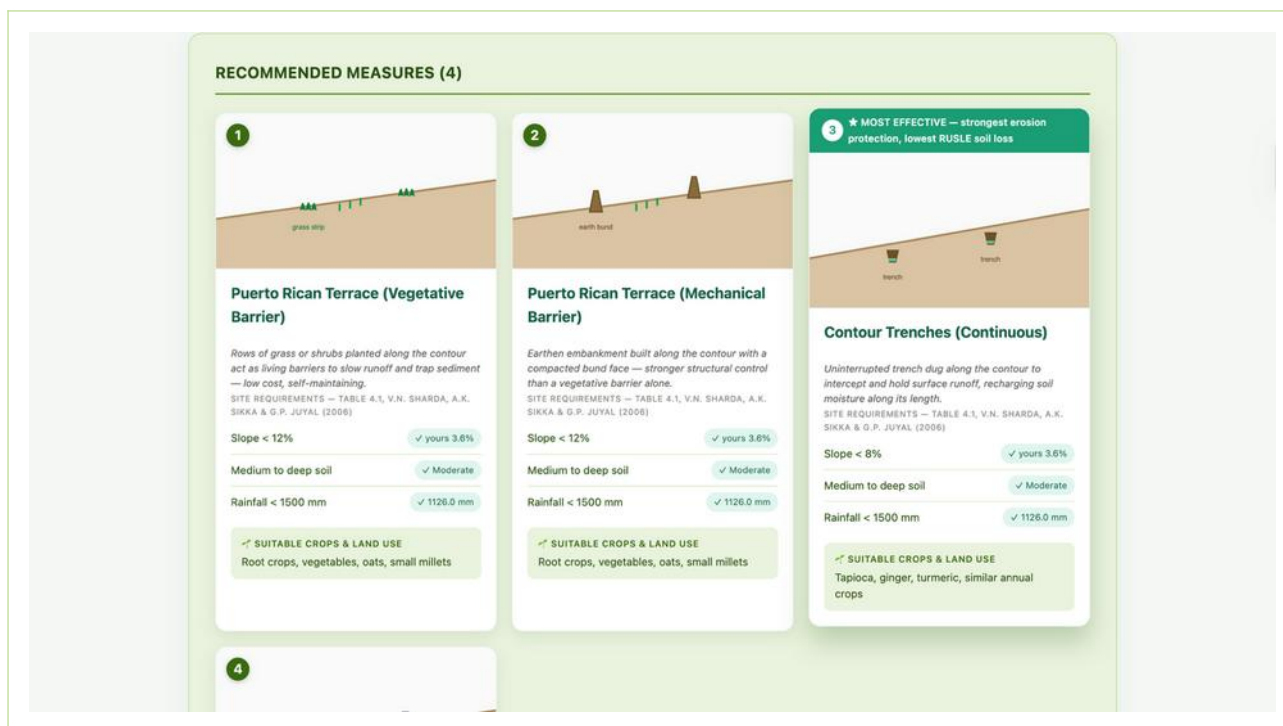
The expanded ‘How is this calculated?’ table — showing the R, K, LS, C, and P factor values, the method used for each, and the reference source.

9. Results — Recommended Measures

The Recommended Measures section lists the conservation measures that match the site, based on ICAR Table 4.1. Each measure is shown as a card containing:

- The measure name and a diagram of the structure.
- Site requirements (slope, soil depth, rainfall) with a green tick showing your site’s matching value.
- Suitable crops & land use for that measure.

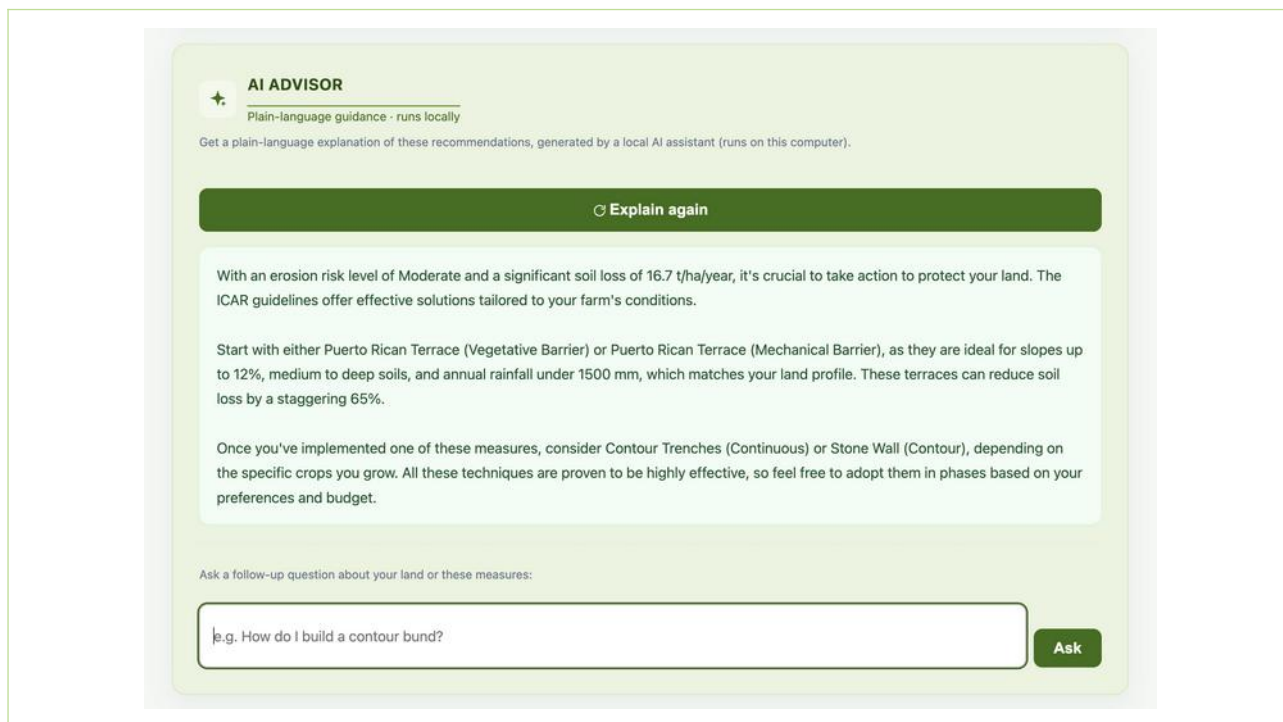
The most effective measure (lowest soil loss) is marked with a green ★ Most Effective banner, as shown below.



A Recommended Measure card — showing the green ‘★ MOST EFFECTIVE’ banner, the diagram, the site requirements with green ticks, and the suitable crops.

10. AI Advisor & Follow-up Questions

The AI Advisor section provides a plain-language explanation of the recommendations, generated by a local AI assistant that runs on the computer. Click ‘Explain these recommendations’ to read the explanation. The user can also type a follow-up question (for example, “How do I build a contour bund?”) in the box and click Ask to get an answer.



Ask a follow-up question about your land or these measures:

how to build contour bund ?

To construct contour bundles, start by identifying the natural contours of your land, which are already mapped out for you. Dig a narrow trench along these contours, about 30-40 cm deep, and fill it with stones or broken bricks to create a stone wall. For best results, maintain a distance of around 2-3 meters between each bundle. This practice will help reduce soil erosion by slowing water runoff and allowing water infiltration, especially during the monsoon season.

e.g. How do I build a contour bund?

Ask

(b)

The AI Advisor section — (a) the generated explanation with the 'Explain again' button, and (b) the follow-up question box with an example answer.

11. Full Site Report

At the bottom of the Results page, the Full Site Report section generates a complete written analysis of the site using the local AI. Select the language (English, Hindi, or Tamil) from the drop-down and click 'Generate full report'. The report covers the site summary, land classification, erosion risk and soil loss, recommended measures, and suggestions for improving the land further.

FULL SITE REPORT

AI-generated · English, Hindi, Tamil

Generate a complete written analysis of this site using local AI.

Note: English & Hindi are well-supported. Tamil is experimental (draft quality).

Report language:

English

Generate full report

(a)

FULL SITE REPORT

AI-generated · English, Hindi, Tamil

Generate a complete written analysis of this site using local AI.

Note: English & Hindi are well-supported. Tamil is experimental (draft quality).

Report language:

✓ English

हिंदी (Hindi)

தமிழ் (Tamil) — experimental

Generate full report

(b)


FULL SITE REPORT
AI-generated · English, Hindi, Tamil

Generate a complete written analysis of this site using local AI.

Note: English & Hindi are well-supported. Tamil is experimental (draft quality).

Report language:

English

Generate full report

Site Report: Soil and Water Conservation on an Indian Farm Plot

Section 1 - Site Summary
 This report details a farm plot with a moderate slope of 3.6% and an annual rainfall of 1126.0 mm in India. The land is classified as arable, meeting ICAR arability criteria, and is currently used for crop cultivation. With a moderate soil depth and drainage, the site presents opportunities for improved soil and water conservation practices.

Section 2 - Land Classification
 The farm plot falls under the category of degradable arable land, with approximately 182 million hectares (ha) of such land across India. Given its suitable soil characteristics, proper management can enhance its productivity while mitigating erosion risks.

Section 3 - Erosion Risk and Estimated Soil Loss
 Assessing the site's erosion risk level as moderate, the current annual soil loss without conservation measures stands at a concerning 16.7 tonnes per hectare (t/ha), indicating high severity. However, implementing best practices can significantly reduce this to 5.9 t/ha, moderating the severity to manageable levels.

Section 4 - Recommended Conservation Measures
 Four effective conservation measures are proposed for this farm plot: Puerto Rican Terrace (Vegetative Barrier), Puerto Rican Terrace (Mechanical Barrier), Contour Trenches (Continuous), and Stone Wall (Contour). These practices have proven successful in similar conditions, with the potential to reduce soil loss by up to 65%. For instance, the Vegetative Barrier is suitable for slopes under 12% and rainfall below 1500 mm, making it ideal for crops like root vegetables and small millets.

Section 5 - Further Recommendations
 To ensure long-term sustainability, regular monitoring of soil health and water quality should be conducted. Additionally, training programs for farmers on the implementation and maintenance of these conservation measures can foster community involvement and knowledge retention.

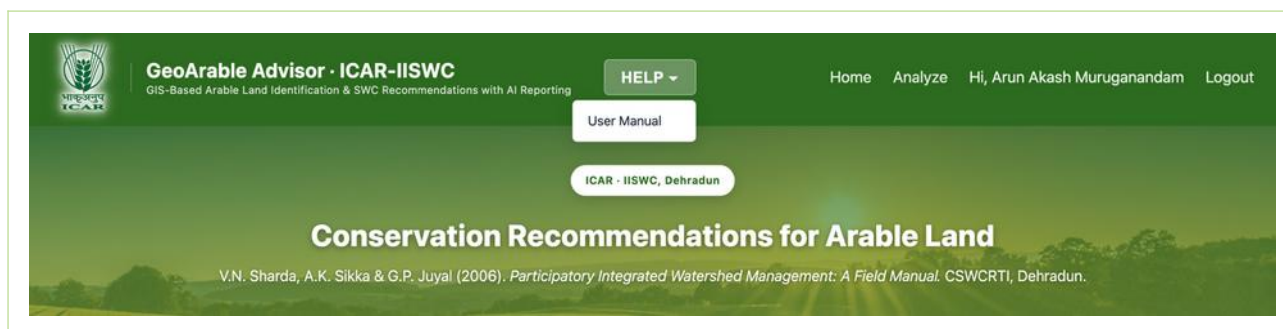
(c)

The Full Site Report panel — (a) the panel with its language drop-down, (b) the drop-down open (English, Hindi, Tamil), and (c) the generated report.

Note: English and Hindi are well-supported. Tamil is experimental (draft quality).

12. Using the HELP Button

Every page of GeoArable Advisor includes a HELP button in the top navigation bar, beside the system name. Click it to open a dropdown and select 'User Manual' to open this guide in a new browser tab without leaving the site. The HELP button is available on every page.



The HELP dropdown open on the Analyze page — click 'User Manual' to open this guide in a new tab.

13. Tips & Troubleshooting

A few common situations and what to do:

- The location won't fill the form — check that the point is inside India and that you have an internet connection. Locations outside India are not supported.
- Slope or rainfall looks wrong — the auto-filled values can be edited by hand before you click 'Proceed with Analysis'.

- No measures are recommended — this can happen when the site values fall outside every measure's requirements in Table 4.1. Re-check the soil depth, slope, and rainfall you entered.
- The AI explanation or report is slow — the AI runs locally, so the first response may take a few seconds. This is normal.
- The report reads roughly in Tamil — Tamil is experimental; use English or Hindi for the most polished output.
- Forgot your password — there is currently no password-reset option; contact the system administrator to reset your account.