
User Manual
ICAR-IISWC | Version 1.0

**ABOVE-GROUND BIOMASS (AGB), CARBON STOCK, CO₂-
EQUIVALENT, AND O₂ PRODUCED CALCULATOR FOR SHRUBS**

Developer Team: Sadikul Islam, Kriti Bisht, Pempa L.Bhutia, Rajesh Kaushal, Sunil Kumar, M Muruganandam, M Madhu, Bankey Bihari, Shellendra Kumar, D.V. Singh, and J.M.S Tomar

The software is a user-friendly, web-based application developed to estimate Above-Ground Biomass (AGB), Carbon Stock, CO₂-Equivalent sequestration, and Oxygen (O₂) production for selected shrub species. By entering key plant attributes such as basal diameter (D₀), plant height (H), and/or crown area (CA) the system automatically applies validated, species-specific predictive equations to generate accurate and scientifically reliable estimates.

The calculator supports both:

- Single-plant estimation, where users manually input individual plant measurements, and
- Bulk estimation, where users can upload an Excel file containing measurements of multiple plants for batch processing.

Designed for students, researchers, foresters, agroforestry planners, and environmental professionals, this tool simplifies biomass and carbon quantification, making ecosystem service assessment and climate mitigation analysis more accessible and efficient.

Getting Started

Step1: Users can begin by accessing the software through the web address:

https://rewardiiswc.in/agb_php/step1.php

ABOVE-GROUND BIOMASS (AGB), CARBON STOCK, CO₂-EQUIVALENT, AND O₂ PRODUCED CALCULATOR FOR SHRUBS

This tool helps estimate Above-Ground Biomass (AGB), Carbon Stock, CO₂-Equivalent, and O₂ Produced for selected shrub species using predictive models.

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Select Species



Murraya koenigii
(Indian Curry Leaf)



Lantana camara
(Lantana)



Justicia adhatoda
(Malabar Nut)



Next →

DISCLAIMER: The online calculator has been developed using data-driven predictive models. The solutions provided are based on the information entered by the user, and their accuracy depends on the accuracy of the input data. The authors shall not be held responsible for any variation in the results.

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Step 2: Accessing and Navigating the Calculator Dashboard:

After opening the web address, the Above-Ground Biomass (AGB), Carbon Stock, CO₂-Equivalent, and O₂ Produced Calculator for Shrubs dashboard will appear on the screen. The main menu serves as the central control panel of the software and provides access to species selection (as shown in the marked screenshot). Users can proceed to the next stage by clicking the “Next” button. Before performing any calculations, users are strongly advised to carefully read the User Manual or click the Help button to understand the input requirements, measurement units, model assumptions, and calculation procedures for accurate use of the software.

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Step 3: Selecting Parameters and Input Type

After selecting a species (e.g., *Lantana camara*) and clicking the “Next” button, the parameter selection page will appear. On this page, the user needs to choose the biometric measurements that will be used for the calculation, either only the ground-level diameter (D_0) or both the ground-level diameter (D_0) and plant height (H). The user must then select the preferred data input method, either entering measurements for an individual plant or uploading an Excel file for multiple plants. Once both options are selected, click the “Next” button (as shown in the marked screenshot) to proceed to the corresponding data entry page.

Step 4:

A. Single Plant Data Entry:

Menu Help

NOTE:
D_o (cm) = Diameter measured at ground level in centimeters
H (m) = Height measured in meters
CA (m²) = Crown spread area measured in meter sq.

INSTRUCTIONS:
Select biometric parameter(s) first, then select data input type.

SELECT BIOMETRIC PARAMETER(S) OF THE SHRUB

Only D_o (cm)
 Both D_o (cm) & H (m)

SELECT INPUT TYPE

Individual Plant Value (AGB for single plant)
 Excel Input (AGB for multiple plants simultaneously)

Next →

Lantana camara
(Lantana)

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OR

B. Multiple Plants Simultaneously (Excel Input):

Menu Help

NOTE:
D_o (cm) = Diameter measured at ground level in centimeters
H (m) = Height measured in meters
CA (m²) = Crown spread area measured in meter sq.

INSTRUCTIONS:
Select biometric parameter(s) first, then select data input type.

SELECT BIOMETRIC PARAMETER(S) OF THE SHRUB

Only D_o (cm)
 Both D_o (cm) & H (m)

SELECT INPUT TYPE

Individual Plant Value (AGB for single plant)
 Excel Input (AGB for multiple plants simultaneously)

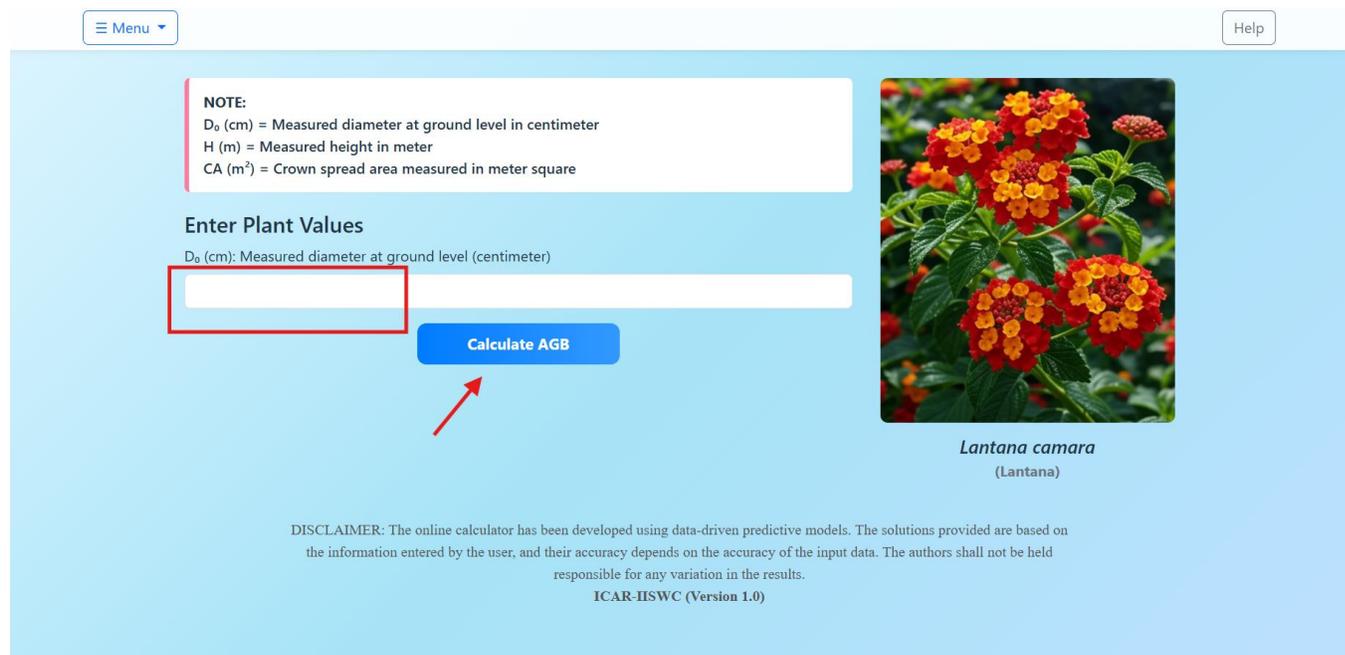
Next →

Lantana camara
(Lantana)

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Step 5

A. Entering Plant Values (Individual Plant Input): If the user selected Individual Plant Value (Step 4 A), the input page will appear as shown. Here, enter the required plant measurement(s) such as D_0 (cm) or D_0 & H, depending on what was chosen in the previous step. After typing the values, click the Calculate AGB button to proceed.



The screenshot shows a web interface for entering plant values. At the top left is a 'Menu' button and at the top right is a 'Help' button. A 'NOTE' box contains the following text: D_0 (cm) = Measured diameter at ground level in centimeter, H (m) = Measured height in meter, and CA (m²) = Crown spread area measured in meter square. Below this is the heading 'Enter Plant Values' and a label ' D_0 (cm): Measured diameter at ground level (centimeter)'. A text input field is present, with a red box highlighting it. To the right of the input field is a blue button labeled 'Calculate AGB', with a red arrow pointing to it. On the right side of the interface is a photograph of a Lantana camara plant with red and yellow flowers. Below the photo is the text '*Lantana camara* (Lantana)'. At the bottom of the interface is a disclaimer: 'DISCLAIMER: The online calculator has been developed using data-driven predictive models. The solutions provided are based on the information entered by the user, and their accuracy depends on the accuracy of the input data. The authors shall not be held responsible for any variation in the results. ICAR-IISWC (Version 1.0)'

B: Uploading Excel File (Multiple Plants Input): If the user selects “Excel Input” (Step 4B), the Excel upload page will appear. First, download the demo/template Excel file and enter the required plant measurements—either D_0 only or D_0 and H, depending on the selected model for multiple plants. After completing the Excel sheet, upload the file using the “Choose File” option. Once the file is successfully uploaded, click the “Calculate AGB” button to generate results for all plants simultaneously.

NOTE:
 D_0 (cm) = Measured diameter at ground level in centimeter
 H (m) = Measured height in meter
 CA (m²) = Crown spread area measured in meter square

Upload Excel File

Choose file (.xlsx)

Choose file No file chosen

Required columns for this option: D0 (cm)

Submit & Process

[Download Demo Excel](#)



Lantana camara
(Lantana)

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Step 6

A. Viewing Results for Individual Plant Input: After manually entering the plant measurements (e.g., $D_0 = 50$ cm) and clicking the “Calculate AGB” button, the calculator will display the results for that individual plant. The results page will present the estimated Above-Ground Biomass (AGB) along with the calculated Carbon Stock, CO₂-Equivalent, and O₂ Produced for the selected shrub species. This enables the user to quickly review and interpret the computed values for a single plant in a clear and organized format.

NOTE:
 D_0 (cm) = Measured diameter at ground level in centimeter
 H (m) = Measured height in meter
 CA (m²) = Crown spread area measured in meter square

Calculation successful!

Results:

- **AGB (kg/plant):** 764.214
- **Carbon (kg/plant):** 359.181
- **CO₂-eq (kg/plant):** 1316.997
- **O₂ produced (kg/plant):** 957.816

Inputs:

- D_0 (cm): Measured diameter at ground level (centimeter) = 50

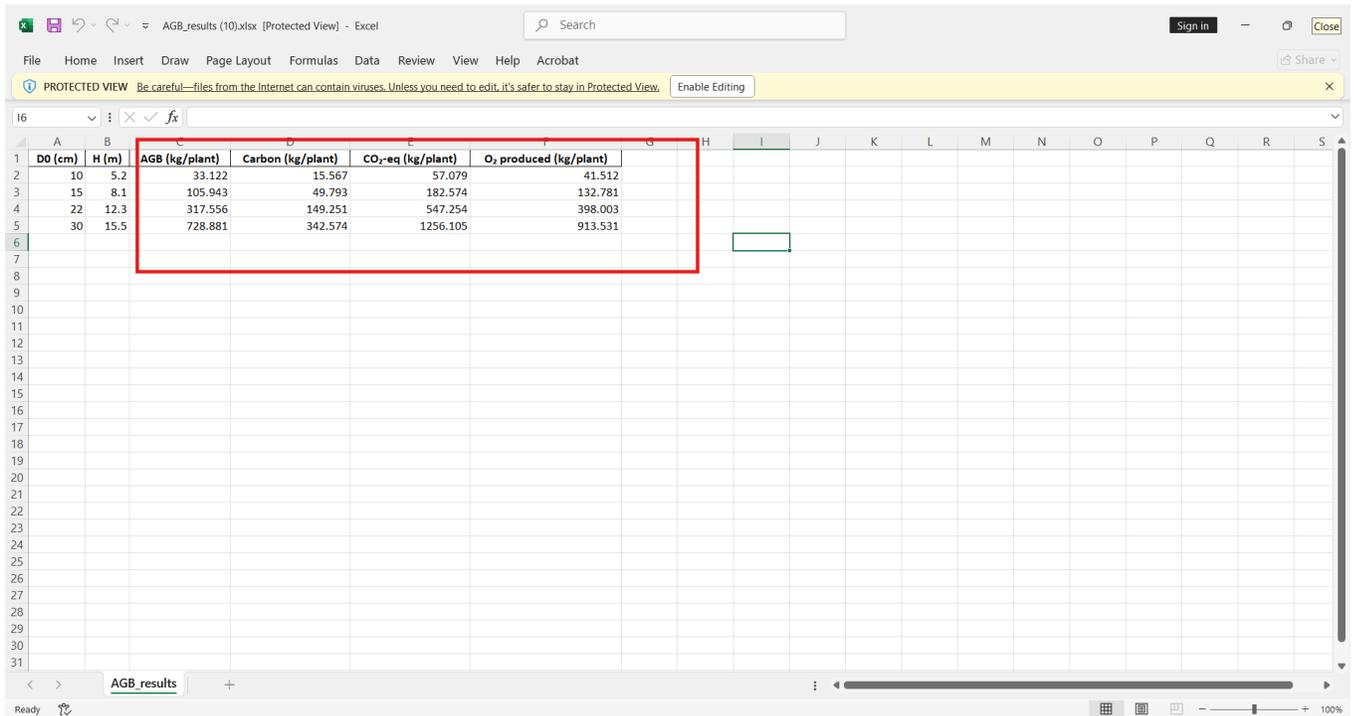
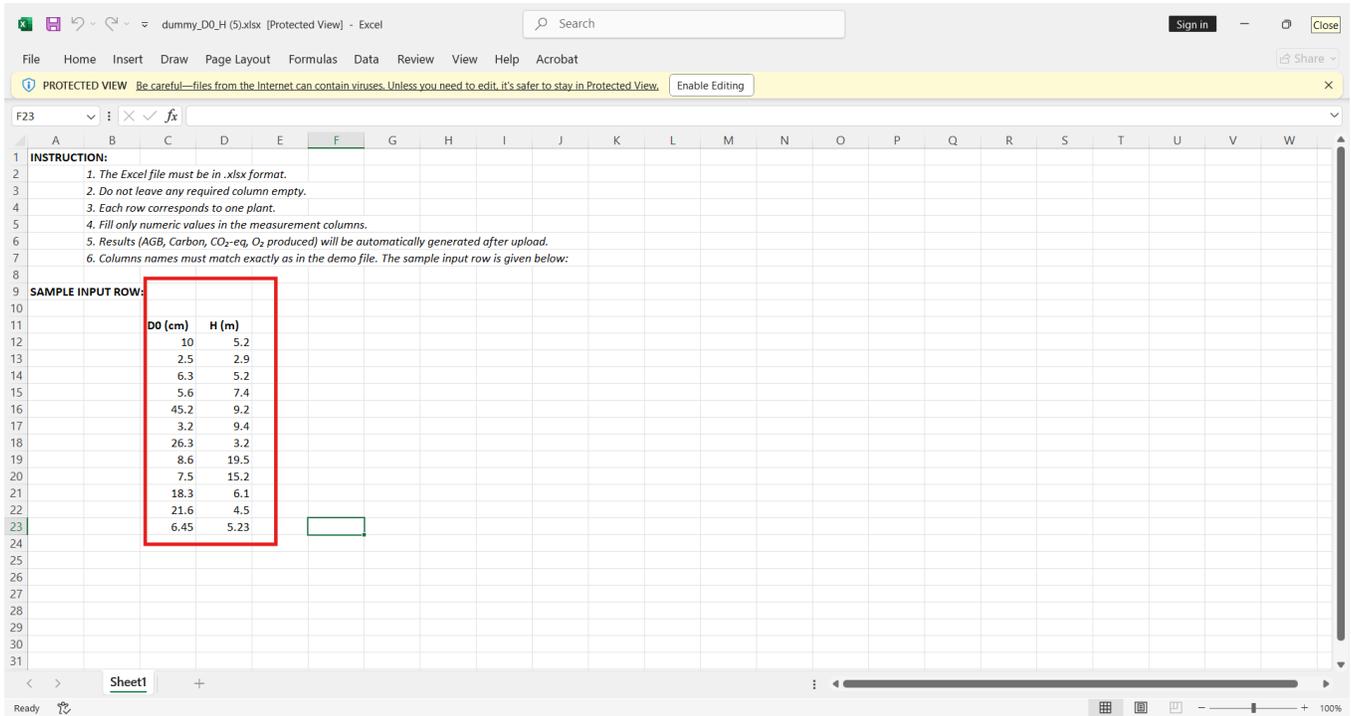
Start Again



Lantana camara
(Lantana)

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B: Excel Input (Multiple Plants Input) Results: When the user uploads an Excel file with the required biometric values, the calculator processes all rows and automatically computes **AGB**, **Carbon Stock**, **CO₂-equivalent**, and **O₂ produced** for each plant. The results appear in a table on the screen, and users can download the processed file. A demo Excel template is provided for reference.



References

Bhutia, P.L., Islam, S., Pal, S., Kaushal, R., Panwar, P., Kumar, M., Kumar, D., Yadav, R.P., Bhutia, K.G., Singh, N.R., Singh, M. and Khola, O.P.S., 2025. Allometric models for estimating above-ground biomass and carbon stock of major shrub species in Northern dry mixed deciduous forest in Shivalik foothills, India. *Environmental and Sustainability Indicators*, 27, p.100795.

<https://doi.org/10.1016/j.indic.2025.100795>

IPCC, 2006. *2006 IPCC Guidelines for National Greenhouse Gas Inventories. Volume 4: Agriculture, Forestry and Other Land Use.* Hayama, Japan: Institute for Global Environmental Strategies (IGES).

IPCC, 2019. *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.* Geneva: Intergovernmental Panel on Climate Change.
