



ICAR-NRM-CCARI-Protocol-2024-073  
CCARI/Certified Technologies/2024-5

## WEATHER BASED SOIL ORGANIC CARBON PREDICTION MODEL FOR DIFFERENT LAND USE SYSTEM OF GOA UNDER FUTURE CLIMATE CHANGE SCENARIOS

Lead Developer : **Dr. Paramesha. V**

Associate Developers : V. Arunachalam, Parveen Kumar

### TECHNOLOGY DETAILS

- Limited understanding of land-use change impact on Soil Organic Carbon (SOC) dynamics in coastal agroecosystems
- Simulation of land-use impact on SOC stock using the RothC model under diverse climate change scenarios was done
- Measured SOC stocks was highest in cashew and forest lands (109.5 and 88.6 t C/ha) and lowest in coconut, arecanut, and pasture lands (64.1-71.0 t C/ha).
- Projected changes in SOC stocks by the end of the century:
  - Cashew: Decrease by 4.3 t C/ha (RCP 4.5) or increase by 2.4 t C/ha (RCP 8.5).
  - Coconut: Negligible change (0.2 t C/ha) in RCP 4.5, increase by 3.2 t C/ha in RCP 8.5.
  - Arecanut, pasture, and forest lands: Marked SOC decrease in RCP 4.5 (5.2 to 5.4 t C/ha), negligible positive (0.6-0.7 t C/ha), or negative changes (0.6 t C/ha) in RCP 8.5.

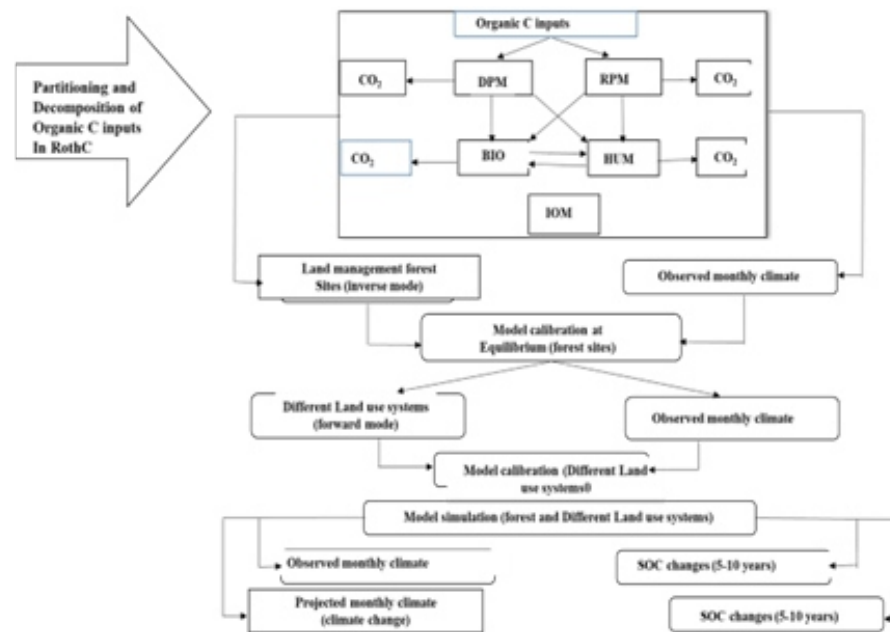
Cashew plantations identified as the primary SOC storage sink; coconut and pasture not viable SOC sinks

### IMPACT

- This study will apply to coastal districts of Indian west coast states such as Kerala, Karnataka, Maharashtra, and Orissa.
- These forecast models enable planners and decision-makers to suggest climate resilient sustainable land use planning to enhance SOC storage and ecosystem services in coastal agroecosystems.

### PUBLICATION

- Paramesh V, Kumar P, Nath AJ, Francaviglia R, Mishra G, Arunachalam V, Toraskar S. 2022a. Simulating soil organic carbon stock under different climate change scenarios: A RothC model application to typical land-use systems of Goa, India. CATENA 213: 106129. (NAAS Rating - 12.2)



INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Certified that

**Paramesha V.**

(Lead Developer)

Associate Developers

**V. Arunachalam**

**Parveen Kumar**

of

**ICAR-CCARI, Goa**

has developed the technology

**Weather based SOC prediction model  
for different land use system of Goa**

16th July, 2024  
New Delhi

(Rajbir Singh)  
Assistant Director General (AAF&CC)

(S.K. Chaudhari)  
Deputy Director General (NRM)