कृषि एवं किसान कल्याण मंत्रालय
MINISTRY OF AGRICULTURE AND FARMERS WELFARE

NATIONAL BANK FOR AGRICULTURE AND RURAL DEVELOPMENT
NABARD

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AGRISURE GREENATHON

Team Details

- Team Name: Eco Warriors
- Team Leader Name: Harini S
- Problem Statement: The disposal of tamarind waste presents an environmental challenge due to its high organic content and potential for methane emissions when left untreated.

Brief about the idea

1. Converts tamarind waste which includes seeds and pods into a valuable biochar resource.
2. This biochar improves soil fertility, structure, and water retention.
3. It acts as a long-term carbon sink, mitigating climate change.
4. It supports beneficial microbes, promoting healthy plant growth.
5. It can be used to remove impurities and contaminants from water.

Opportunities

How different is it from any of the other existing ideas?	How will it be able to solve the problem?	USP of the proposed solution
1. Unique feedstock 2. High carbon content 3. Nutrient-rich 4. Acidic soil amendment 5. Drought tolerance 6. Scalability 7. Low-cost production	1. Carbon sequestration 2. Soil amendment 3. Nutrient cycling 4. Renewable energy 5. Value-added products	1. Scalable and replicable model 2. Drought-tolerant agriculture. 3. Low-cost & locally sourced. 4. Climate-friendly services.

List of features offered by the solution

1. Enhances soil nutrient content, structure, and water-holding capacity.
2. Locks in carbon, reducing greenhouse gas emissions and mitigating climate change.
3. Helps neutralize soil pH, reducing acidity and alkalinity.
4. Boosts plant growth, health, and productivity.
5. Enhances soil's water-holding capacity, reducing irrigation needs.
6. Reduces weed growth and pest infestations.
7. Produces bioenergy during the pyrolysis process.
8. Soil Biota Enhancement: Supports beneficial soil microorganisms, promoting a healthy soil ecosystem.

Process flow diagram or Use-case diagram

Collection and preparation →

- Collect tamarind waste (covers and shells)
- Ensure waste is free from contaminants & debris
- Dry & reduce moisture content

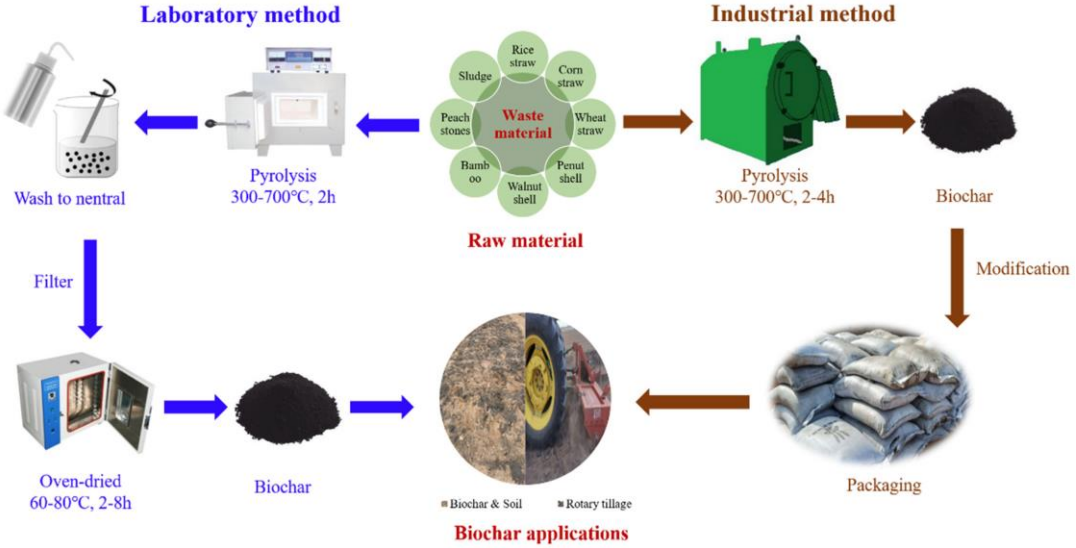
Carbonization process →

- Load dried waste into pyrolysis reactor & heat (absence of oxygen) between 300 to 700 ˚ C
- Initiate pyrolysis to decompose organic matter into biochar.

Cooling and collection →

- Collect and cool down gradually at room temperature.
- Store in dry & ventilated area to maintain quality.

Architecture diagram of the proposed solution



Technologies to be used in the solution

1. **Pyrolysis Technologies** (batch pyrolysis reactors, continuous pyrolysis reactors, rotary kiln pyrolysis)
2. **Thermochemical Conversion Technologies** (gasification systems, carbonization furnaces)
3. **Drying Technologies** (rotary dryers, belt dryers, tunnel dryers)
4. **Size Reduction Technologies** (hammer mills, ball mills, crushers)
5. **Activation Technologies** (chemical activation (e.g., H3PO4, KOH, NaOH), physical activation (e.g., steam, heat treatment))
6. **Material Handling Technologies** (conveyors, screw feeders, pneumatic transport systems)
7. **Monitoring and Control Technologies** (temperature sensors, pressure sensors, gas analyzers, PLC/SCADA systems)
8. **Energy Generation Technologies** (biogas generators, solar power systems, heat recovery systems)

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