

# **ODAM Biochar Project Summary**

**Organisation of Development Action  
and Maintenance (ODAM)**

**Tiruchuli, Tamil Nadu**

# ODAM: A Brief History

- Founded in 1995
- Has assisted in the creation of nearly 900 women's self-help groups
- Focused on sustainable rural development and climate change
  - Biofuels
  - Charcoal Briquettes

# Climate Change and ODAM

- Southern Tamil Nadu is drought-prone
  - Annual rainfall averages 85 cm
  - Monsoon is erratic
- Deforestation and agriculture have eroded topsoils, leading to desertification



# *Prosopis Juliflora*

- Large shrub native to Central and South America
- Introduced to Tamil Nadu in the 1950s as a source of fuel
- Considered an invasive species in India, Australia, and East Africa



# *Prosopis Juliflora*



- Grows extremely quickly and invades agricultural lands during drought years
- Difficult to remove because of extremely deep root penetration and poisonous thorns

# Groundwater and *Juliflora*

- Flourishes in drought conditions because of extensive root system
- Roots are deep enough to reach groundwater inaccessible to other plants
- Widespread growth eventually depletes groundwater supplies for drinking and irrigation
- Also leads to soil depletion

# *Juliflora* as a fuel

- *Juliflora* is primarily used as a source of charcoal
- Charcoal is 50 – 90% carbon
- Currently, primarily sold for use in steel production, restaurants and chemical industries





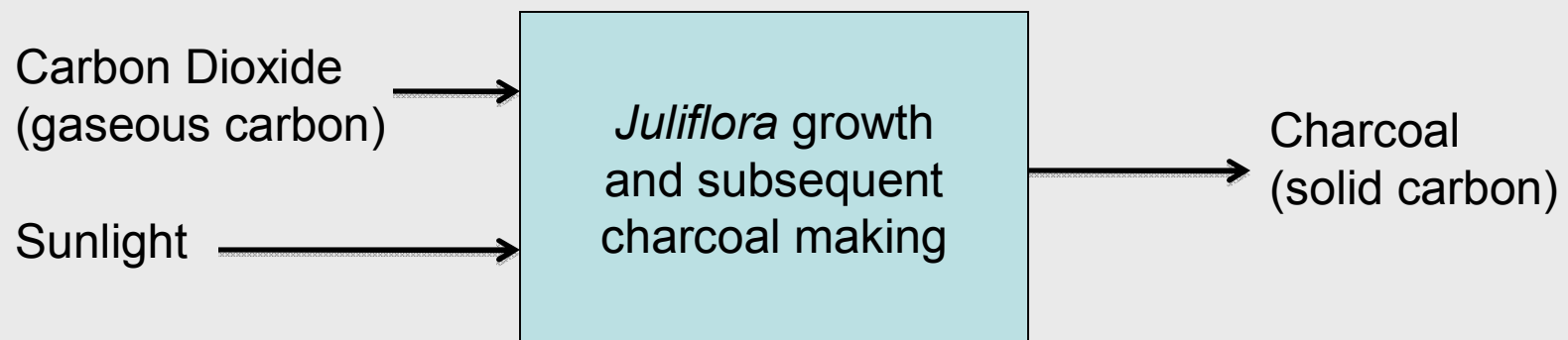
Clockwise from bottom right:  
*Juliflora* sticks stacked in pile  
Pile covered with earth, forming charcoal kiln  
Charcoal produced after burn is finished (~1 week later)





# *Juliflora* as a Carbon Transfer Machine

- We can consider *Juliflora* as a mechanism for taking carbon from the air (carbon dioxide) and turning it into solid (charcoal)
- Burning it turns it back to carbon dioxide
- If we can't burn it, what can we do with it?



# Terra Preta

- Terra Preta (literally, black earth) is a nutrient-rich compost made from charcoal and organic materials
- Previous studies have shown charcoal plus fertilizer improved plant growth and doubled grain production in comparison to the fertilizer without charcoal

# Biochar Experiment: Round 1

- Various de-oiled seed cakes were mixed with charcoal and applied directly to pits dug for vegetable cultivation
- Also tested a *Jatropha* seed cake and charcoal mixture subjected to 60 days water saturation

Clockwise from top right:  
Charcoal powder applied to  
field

Charcoal and seed cake applied  
to field

Crops growing after terra preta  
application



# Experiment 1: Lessons Learned

- Saturated *Jatropha* + charcoal provided best yield for tomato and ladies finger, but only slightly better than control for brinjal
- It is speculated that this combination works as a sponge for nutrients, preventing nutrients leakage
- There was significant variation in yield—further tests needed to verify statistical significance

# Biochar Experiment: Round 2

- Further testing of water-saturated de-oiled seed cakes + charcoal combinations
  - Neem, *Pongamia*, *Jatropha*, *Calophyllum*
  - Goat dung
- Charcoal and amendments mixed and saturated with water for 45 – 60 days in cylindrical cement basins

Clockwise from top right:  
Charcoal and seed cake  
saturated with water  
Terra preta being removed from  
drums  
Terra preta applied to fields



# Summary: Benefits of Terra Preta

- Control of invasive species (*Juliflora*)
  - Restores biodiversity and reduces strain on groundwater supply
- Enrichment of topsoil
  - Provides better crop yields
- Acts as a carbon sink
  - Reverses the effects of climate change



**Burying 273 kg of char  
removes one ton of  
CO<sub>2</sub> from the atmosphere!**

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