

Biochar and Agriculture

Biochar production and application in agroforestry systems

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Outline



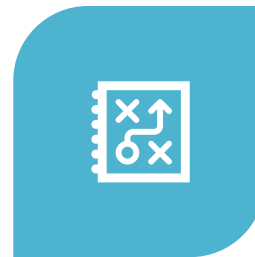
BIOCHAR



PROJECT ACTIVITIES



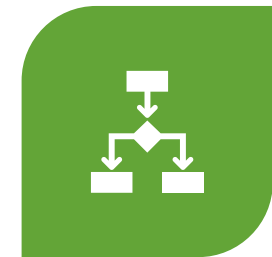
APPLICATION AND PRODUCTION ACTIVITIES



SUSTAINABILITY OF BIOCHAR



SMALL SCALE PRODUCTION



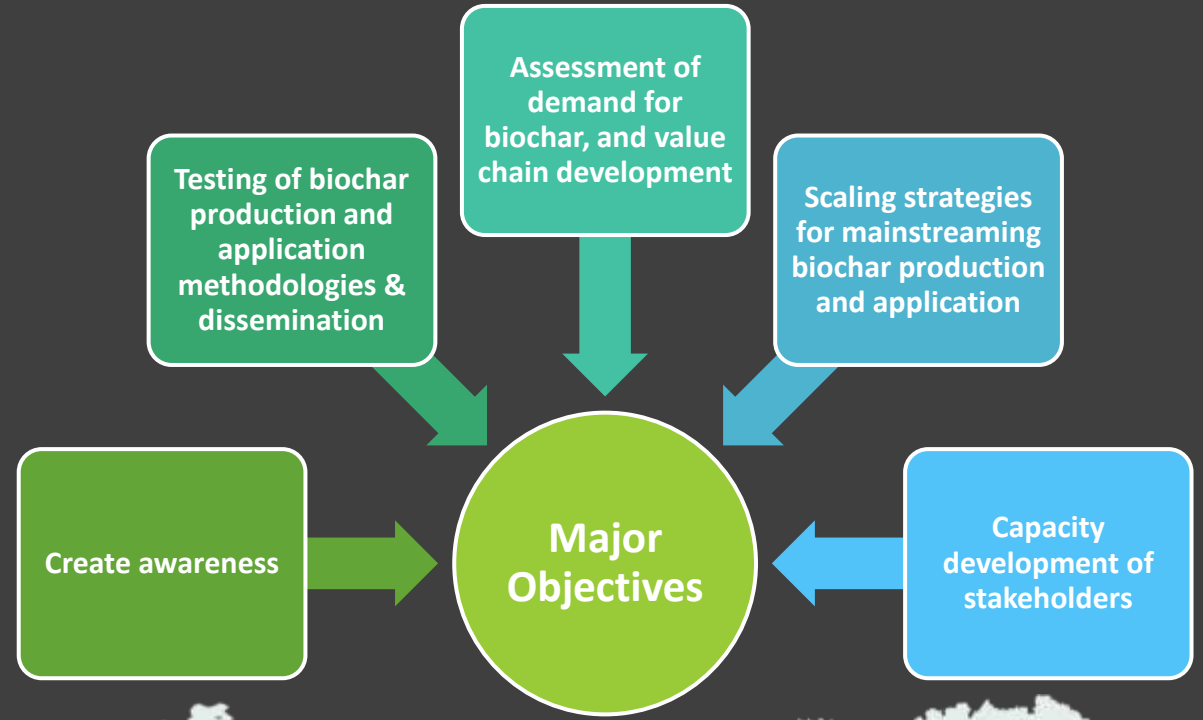
CHALLENGES AND UNDERSTANDING

Why Biochar in India

- An estimated 500 million tonnes
- Surplus crop residues available
- Odisha produces about 20.07 million tonnes
- Annually, 1.34 million tonnes are burned.
- The residue can alternatively be used as biochar feedstock.



Sustainable biochar production through agroforestry system and its application: A climate resilient soil management approach



Biochar experimental model for production and application: an

Kitchen garden (Vegetables)

Types of crops and biochar

CROPS/ VEGETABLES			Biochar types (diverse feedstock)
Bolangir	Nuapada	Bhopal	
Paddy	Paddy	Paddy	Wood
Cotton	Black gram	Wheat	Mixed- wood & coconut husk
Pigeon pea	Grass pea	Okra	Mixed- crop residues
Okra	Cowpea	Brinjal (Egg plant)	
Tomato	Brinjal (Egg plant)		

BAIF- Maharashtra





Activities at IISS, Bhopal

Glimpses of activities in Odisha

Soil sample collection; seed, FYM and biochar distribution; charging and application of biochar



Cowpea seed sowing



Black gram seed sowing in field



Paddy seedling in field (Nursery)



Germination of vegetable



Weeding in Cowpea



Paddy transplantation in field



Earthing in Cowpea



Black gram in farmer's field





Crop performance in
farmers' field

Types of biochar production in Odisha for different scales

Field level biochar production processes started in Odisha project

1. Drum kiln
2. Pit (dug in the field)
3. Pilot Scale reactor for biochar production

- Community level biochar production
- Paddy, pigeon pea and cotton feedstock collected for biochar production using all three processes



Drum kiln



Pit (dug in the field)



Pyrolizer





Biochar produced in reactor



Household level production

Stoves for biochar production

- *Distribution*
- *Demonstration*
- *Trial*



- Field staff and women farmers trained for production of biochar at household level
- Two type of stoves (Sampada Gasifier stove and Top-Lit Updraft Gasifier (TLUD) stove) being used for biochar producing at HH level
- Type of feedstock used wood and mixed crop residue

Sustainability of Biochar

Biochar production and application in agroforestry systems



Sustainable sources



Wood based feedstock?



Solution to sustainable and round the year availability of feedstock



Feedstock availability directly from the field to the biochar unit.



Small scale production and use- opportunity



- Small landholding
- Farming is not sustainable.
- Dependent on government policies and subsidies
- Biochar application- burden?
- What are the options?
- Biochar charging/activating?
- Negligible/low cost
- Adoption in soil
- Application frequency



Constraints/Challenges

1. There is no government policy and scheme.
2. Less Awareness amongst the farmer and public.
3. Seasonal variation, etc.
4. Cost of biochar
5. Low scale,
6. Transportat
7. Not all types of
8. Soil types differ thro
9. Biochar is not an exclusive product. Various applications and a great deal of biomass is already being converted into other uses – especially for fuel.
10. Not All feedstock is available for biochar production/ competition

willingness...

Lack of interest and energy on the part of farmer and small industrial stakeholder



Understanding...

- Capital and operational expenses
 - Portable kilns/pits for low/minimum investments
 - India being a major producer of biochar
 - Monsoon regions are major units
 - Use of diverse feedstocks
 - Over time, farmers are adopting biochar
 - Altogether, biochar is a promising activity
 - Lab studies need to be replicated in the field conditions to study the true impact before making unanimous recommendations.
- Biochar application is at a nascent stage in Indian agriculture.
 - It would require extensive adoption of biochar as an eco-fertiliser to benefit enhanced soil health and crop yields





Thanks

