

WELCOME



BIOCHAR STUDY TOUR



International Biochar Initiative

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Agenda

IBI Overview

Industry Overview

SWOT

What is holding the industry from growth?

Current & Future Markets

Positioning Biochar

IBI's Mission

To provide a platform for fostering stakeholder collaboration, good industry practices, and environmental and ethical standards to support biochar systems that are safe and economically viable.

IBI's Vision

One billion tons of biochar produced per year within 50 years.

IBI Biochar Study Tours

Rationale: To shine a light on the 'bright spots' of biochar production and/or use in order to help replicate such models around the world.

Future potential focus areas include:

- Wastewater treatment
- Mine land reclamation
- Livestock farming
- Specific cropping scenarios
 - vineyards,
 - orchards,
 - coffee

- Increasing number of production technologies at many different scales
- Much more biochar available now for trials
- Many different end uses for biochar
- Enormous amount of underutilized biomass available

Strengths

- Low market awareness
- Lack of comprehensive, unbiased educational materials for specific end uses
- Many producers do not fully understand the nuances of their char
- Standards (IBI & EBC) are not well adapted yet
- Few labs with experience in characterization
- Few ROI examples
- Lack of investment capital
- Price of biochar makes value prop for Ag difficult

Weaknesses

- Developing world economics are more enticing for biochar production & use
- Biochar production provides many co-benefits which can help reduce cost of biochar and attract investment capital
 - Renewable Energy
 - Waste Mitigation
- Increasing regulations restricting
 - Organics to landfills
 - Air Pollution
 - Toxic Soils
 - GHG
- Biochar can be framed in many different ways

Opportunities

- Overselling biochar benefits
 - Not all biochars are the same
- Quality control
- Lessons learned not being communicated well
- Over emphasis on sequestration can be off-putting
- Patents
- Nay-sayers

Threats

Technology is no longer a constraint



Supply is no longer the issue

In fact in some places we have a glut

June 8: I have 21 m lbs of feedstock, we can finance equipment if we have purchase orders. Need to find agricultural users to buy biochar.

June 6: We are currently running every day and producing 2 to 3 tons of biochar a day - ultimately, that production level will be 10 to 12 tons per day.



June 5: We handle 700T of biomass a day and we'd like to find markets for large quantities of biochar.

So what is holding biochar back?

1. Economics



- **Developed vs developing world economics**
- **Price of biochar makes value proposition challenging**
 - **Few concrete examples of ROI in agriculture**
- **Lack of investment capital**
- **Producers that don't take advantage of all by-products**
- **No price on carbon (yet)**
 - **Biochar not an accepted offset/sequestration product (yet)**

So what is holding biochar back?

2. Education



- **Consumer awareness is very low**
- **Lack of comprehensive, unbiased biochar educational materials for producers/sellers and different types of end users**
- **Massive oversimplification/generalization of what biochar is & benefits it can provide**
- **Sellers often don't understand their particular biochar**
- **Framing biochar for end users**
- **Over emphasis on sequestration can turn off some potential consumers**

So what is holding biochar back?

3. MARKETS!!



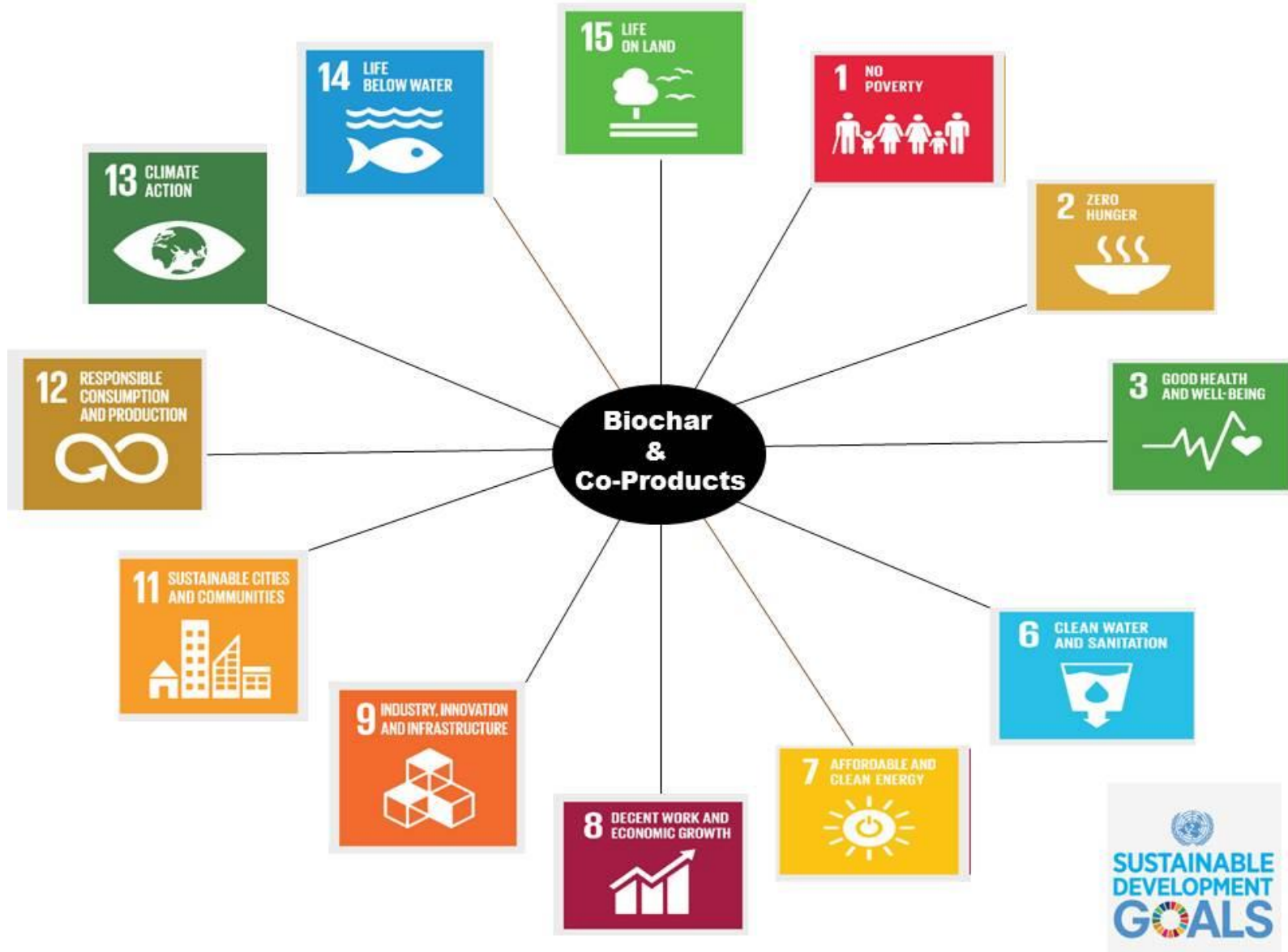
- **Large scale**
- **Repeatable**
- **Non-seasonal**
- **Economically viable**
- **Legal (in some cases)**




Biochar Markets

Positioning Biochar

Beyond Carbon Sequestration



Positioning Biochar

	Charcoal	Biochar	Activated Carbon
Feedstock	Hardwood, sawdust + Binding Agents	Ag, forestry & other organic materials/waste	Coconut shells, peat, coal, petroleum pitch
Common Uses	Fuel (Cooking)	Soil Amendment Remediation Filtration Binding Agent (livestock)	Filtration Odor Control Remediation Binding Agent (humans)
Relevant Qualities	Burnability Low smoke	Adsorption/Porosity CEC Sequestration	Adsorption
Cost	\$ - \$\$	\$\$	\$\$\$
Production	300 – 400C Slow Pyrolysis; Kiln	400 – 800C Slow Pyrolysis; Kiln; Gasification HTC, Microwave	Pyrolyzed at 600 – 900C + activated at 250C OR Chemically impregnated & cooked @ 450 – 900C
Carbon Footprint	Carbon Neutral: May lead to Deforestation	Carbon Negative (in many situations) 	Carbon Positive

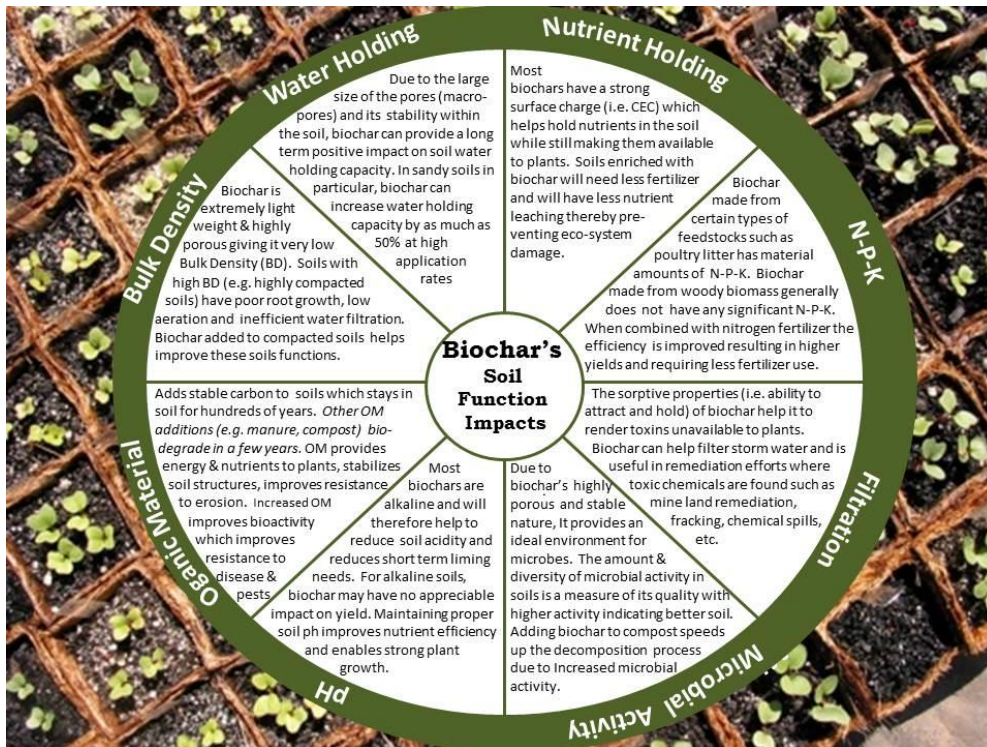


Positioning Biochar

Biochar is not a fertilizer!

Soil
“Condilizer”!

Fertilizer



Improves Yield

POLLUTES

AIR: smog, GHG

WATER: eutrophication, kills aquatic life, increases algae

SOIL: acidification, mineral depletions, kills beneficial soil microbes

Comparison of biochar with other amendments

Impact	Biochar	Peat Moss	Com-post	Coir	Perlite	Vermi-culite
Permeability	M-H	L-M	x	X	H	H
Water Retention	H	VH			L	H
Improves Soil Aeration	x	x	x	x	x	x
Increase Organic Material	x	x	x	x		
Reduces Nutrient Leaching	x	x		x	x	x
Provides Sterile Growing Medium		x		x	x	x
pH	Alkaline	3.6 – 4.2	varies	5.2 – 6.8	7	neutral
Longevity	Decades++	1 yr	1 yr	Several years	Decades++	Decades++
GHG emissions	Decreases	Increases	Neutral	Neutral	Neutral – Increases?	Neutral – Increases?
Nutrient Value	varies	minimal	varies	varies	None	None
Eco-system impact from production	Neutral - Positive	Negative (mined)	Neutral - Positive	Neutral - Positive	Negative (mined)	Negative (mined) May contain asbestos
Source	Waste biomass	Peat bogs	Waste biomass	Waste biomass	Volcanic ash	Mined silica

Questions?

