



IBI Developing Country Biochar Systems Survey: Methodology and Results

Prepared for the World Bank

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Survey and Methodology

- The IBI Network
- How the survey was conducted
- Survey results
- A preliminary typology based on survey results
- Follow up survey on social impacts
- Building a Biochar Project Catalog

The International Biochar Initiative

As the first international NGO formed to advance biochar research and development, IBI has played a critical role in

- Organizing researchers
- Educating policy makers and the public
- Developing biochar standards
- Supporting commercialization
- Promoting biochar demonstration projects around the globe

Growth of the IBI Network

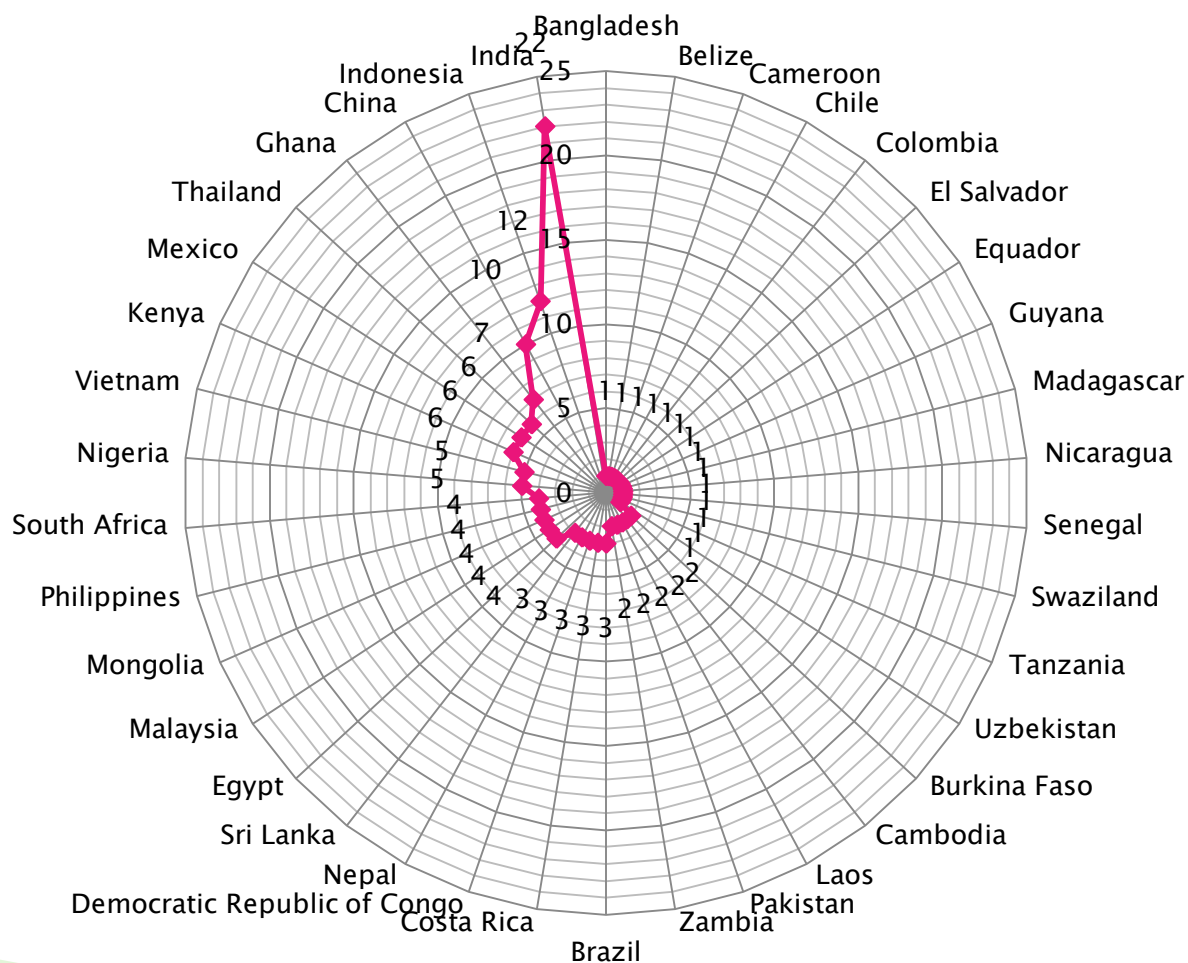
- ▶ 2006 – IBI founded at a side meeting held at the World Soil Science Congress (WSSC) in Philadelphia, PA
- ▶ 2007 – First IBI Conference in New South Wales, Australia – 107 participants from 13 countries
- ▶ 2011 – 3500 subscribers from 113 countries with 670 paid memberships
- ▶ IBI has become the nexus of a growing worldwide multidisciplinary community of interest in biochar
- ▶ This is the network that was surveyed for this report

Survey Methods

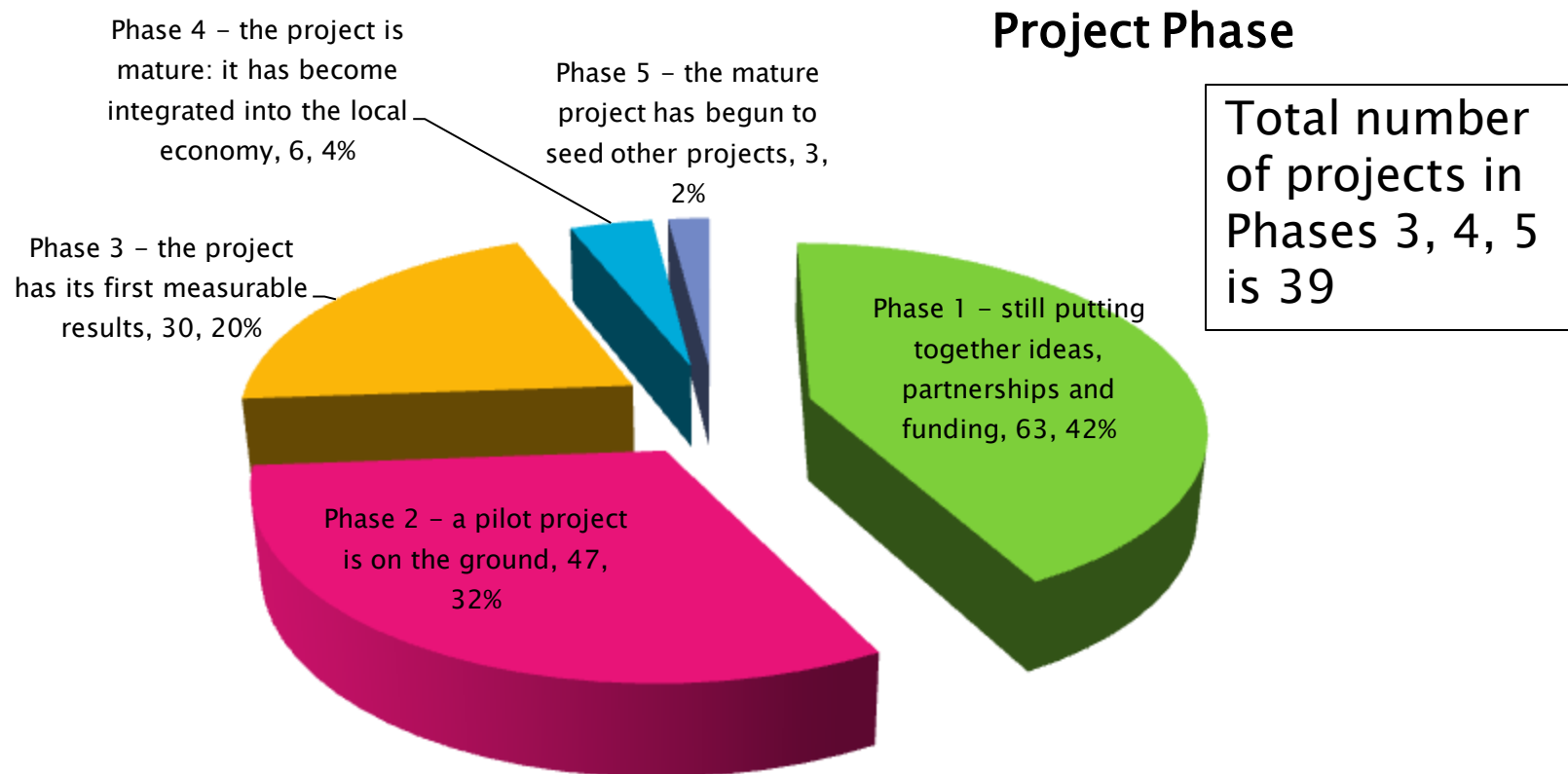
- ▶ December 2010: Survey invitation sent to the IBI network as well as several clean cook stove networks
- ▶ Survey designed to identify the most mature projects likely to have measurable results and data quality sufficient to perform a Life Cycle Assessment
- ▶ 154 responses from 43 countries

Distribution by Country

Developing Country Locations of Biochar Projects – 38 Countries

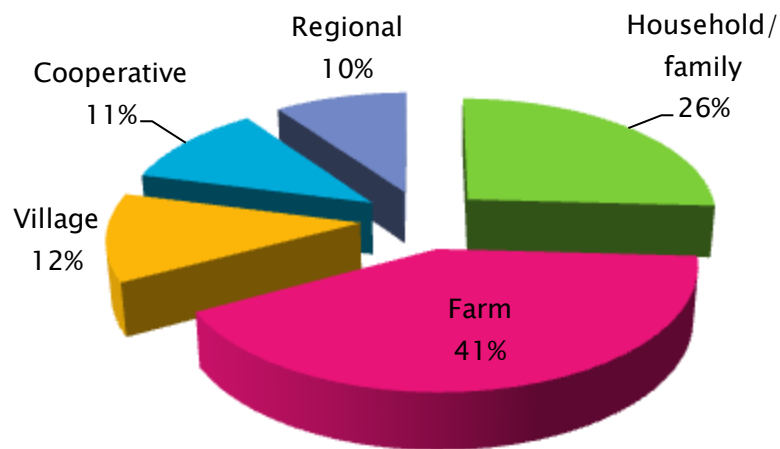


Most projects are in the beginning stages – few are far advanced

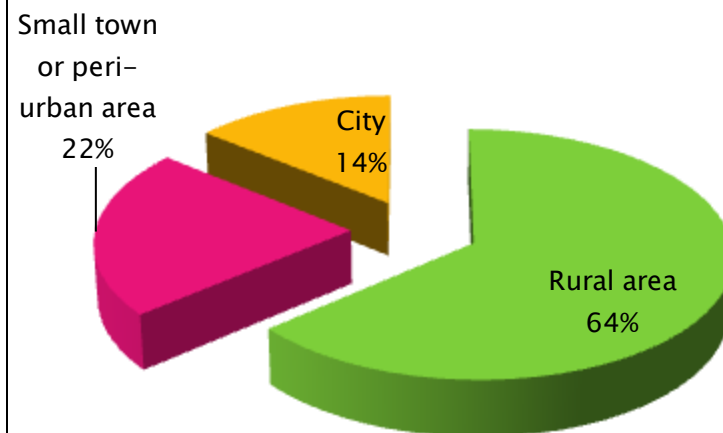


Scale and location of systems

Scale of Biochar Production Systems

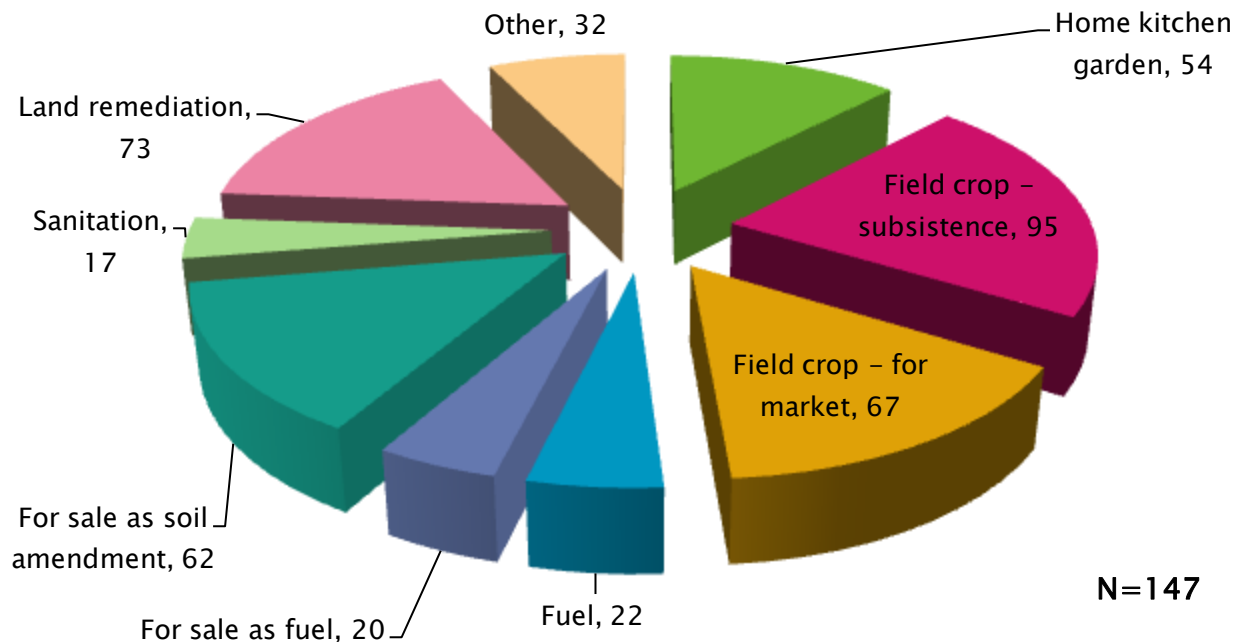


Project Locations



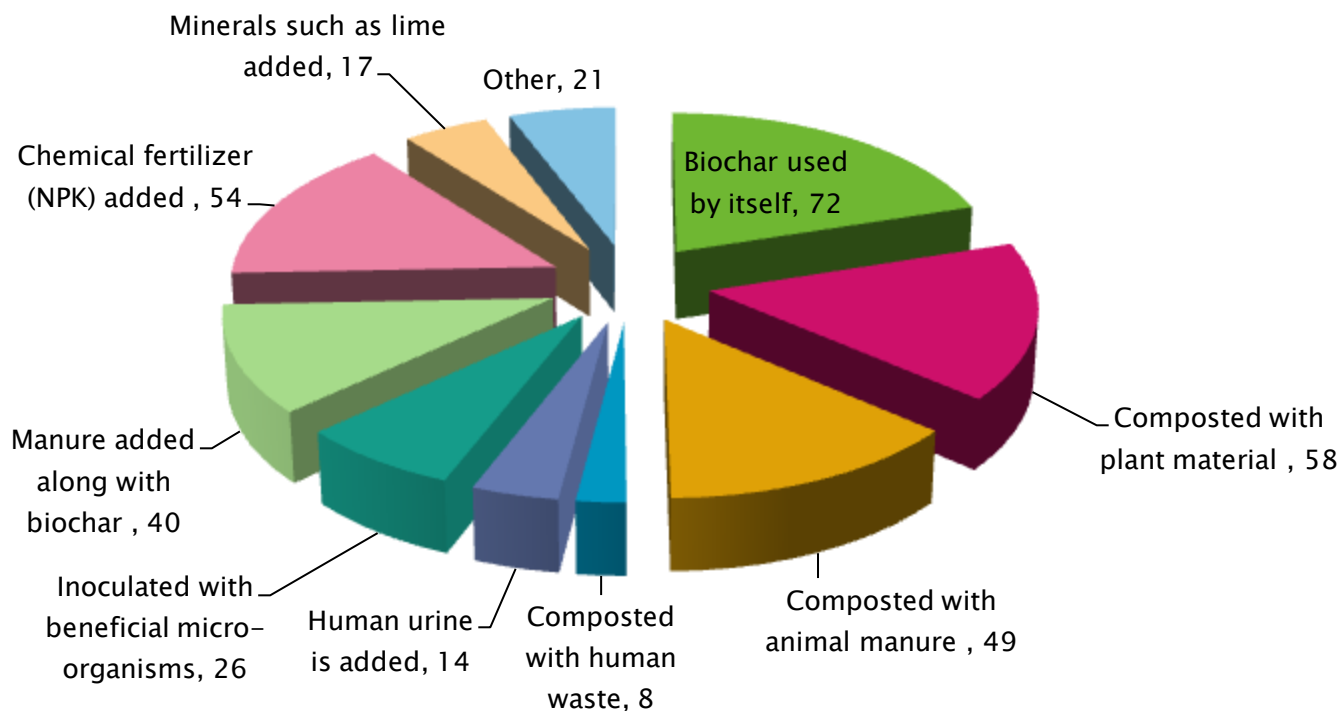
Biochar has multiple uses – even within a single project

How will the biochar product be used in this project?



Projects are experimenting with biochar treatments and mixtures

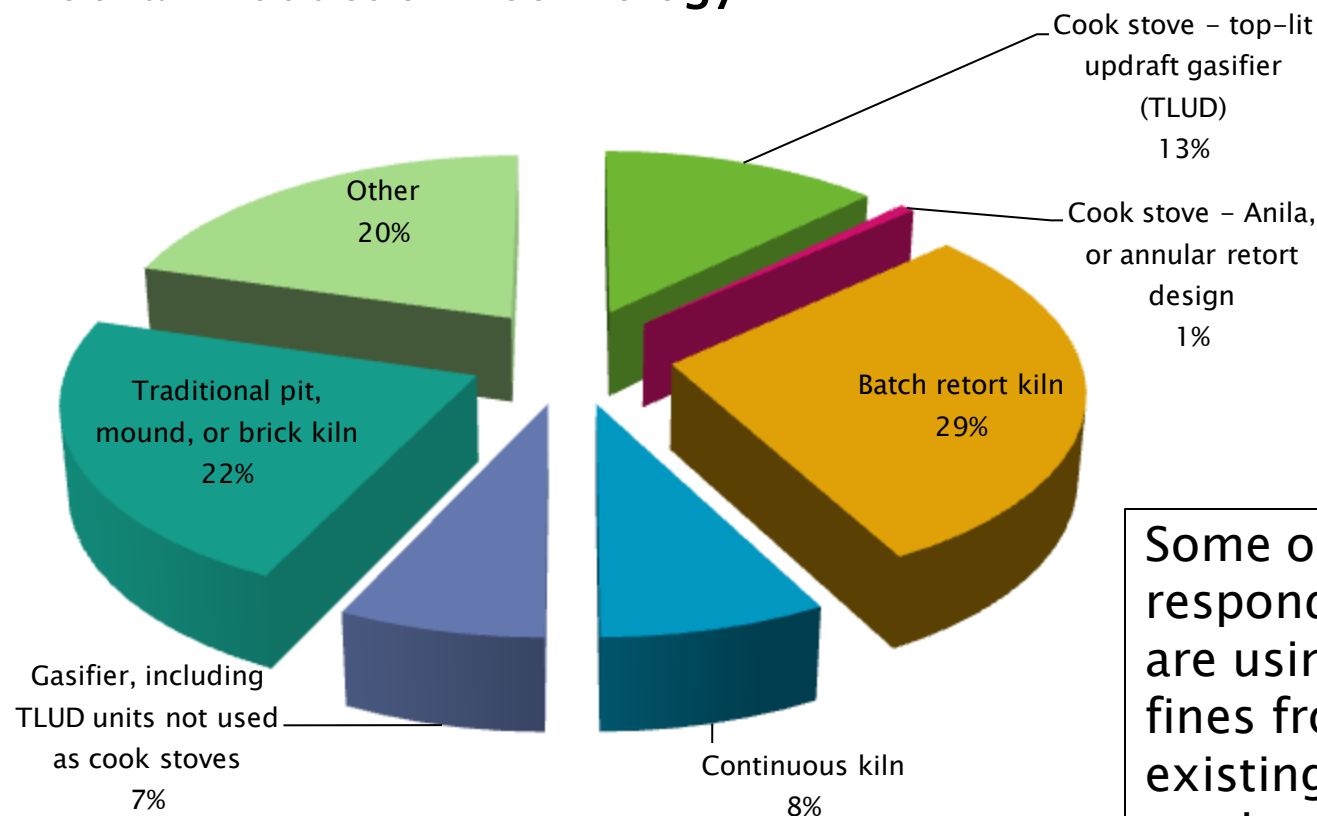
Biochar Pre-treatments and Added Amendments



N = 128

Production technology varies from small to large, batch to continuous

Biochar Production Technology



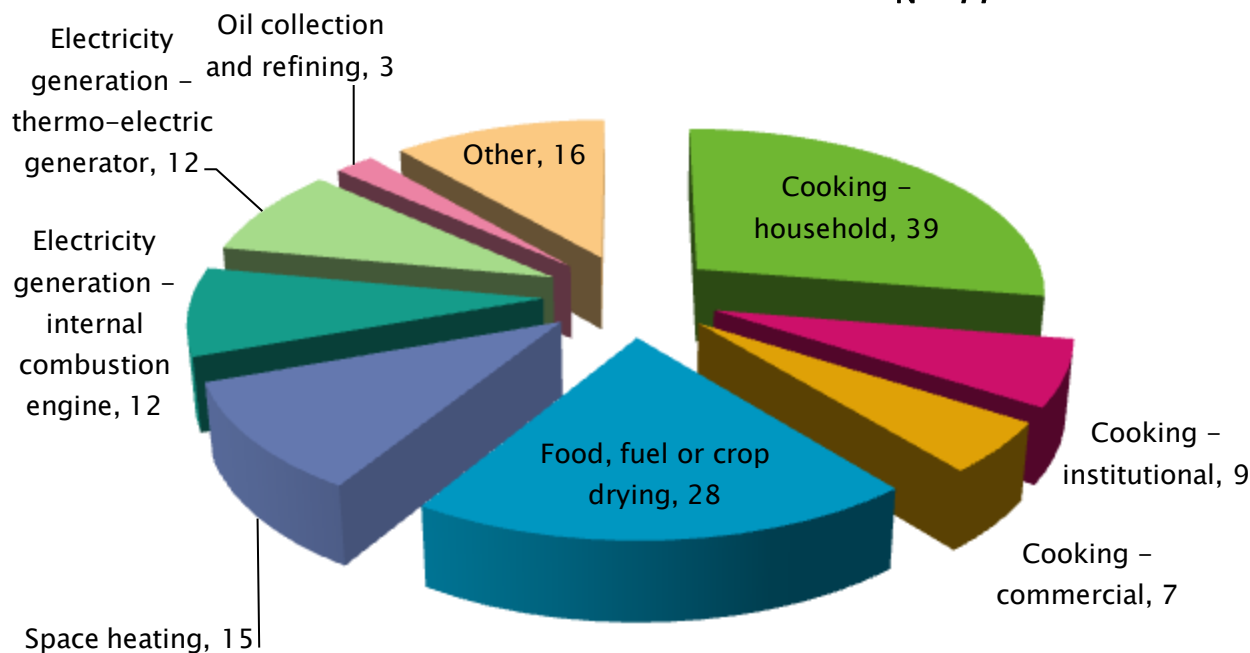
Some of those who responded “other” are using leftover fines from an existing charcoal production process

There are many ways to capture energy – some easier than others

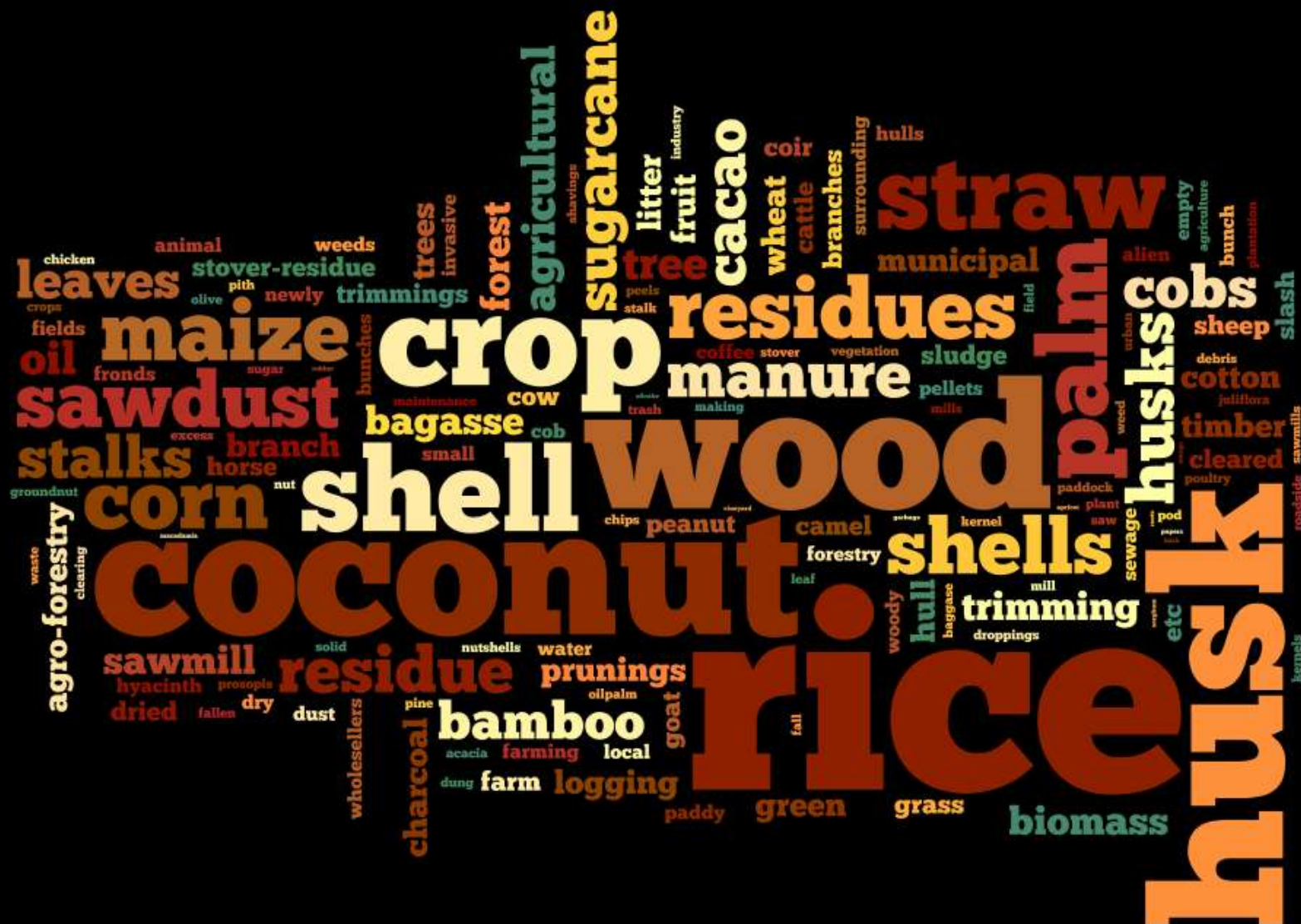
51% of respondents said the project would capture useful energy in some form.

If biochar production energy is captured, how is it utilized?

N = 77



Open-ended question on feedstocks –
a word cloud shows frequency of use



Limitations of the Survey for constructing a Typology of Biochar Systems

- ▶ Many projects are still on the drawing board
- ▶ Many projects still searching for appropriate biochar production technology
- ▶ The survey was a valuable scoping exercise to identify trends
- ▶ The survey was a “snapshot in time” as the biochar industry is just beginning
- ▶ Now that we have a better idea of the universe of feedstocks, for example, a more accurate survey could be conducted

Sorting projects by feedstock and technology used to process them gives a rough typology

Feedstock	Projects	Technologies
timber mill waste	132,159,65, 141, 50	batch retort kiln, cook stove
cacao, coffee, fruit tree prunings	95, 91, 77. 82	batch retort kiln, continuous kiln, cook stove
slash and char	166,36	batch retort kiln, traditional kiln
coconut, other nut waste, oil palm empty fruit bunch (EFB)	42,112,12,62,105	batch retort kiln, traditional kiln, cook stove, gasifier
field stover, leaves	118,22, 125, 155, 131, 144, 167, 128,154, 18	traditional kiln, small mobile drum kiln, cook stove, continuous kiln
invasive species	58, 117	cook stove, continuous kiln
rice husk	35, 158, 13, 99, 160	gasifier, cook stove
manure	73, 78	traditional kiln, continuous kiln
charcoal fines	28	N/A

Replicable Biochar Systems

Several systems appear to be replicable in many contexts as they are based on agricultural systems, industries and feedstocks that are found in similar combinations in many countries:

1. Timber mill waste
2. Plantation pruning waste
3. Slash and char
4. Nut, fruit and oil palm waste
5. Invasive species like water hyacinth
6. Manure
7. Carbonized rice husk
8. Crop residues – large scale
9. Crop residues – small scale plus dried dung and other farm residues
10. Using charcoal fines

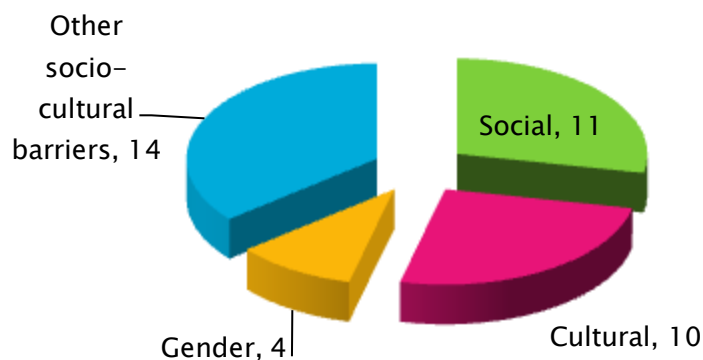
Survey #2– Barriers and Incentives

- ▶ 48 projects responded to the follow-up survey of original respondents to questions about:
 - Socio-cultural barriers
 - Traditional indigenous biochar use
 - How projects cope with limited supplies of biochar
 - The top perceived benefits
 - Project reliance on carbon financing
- ▶ The survey included many open-ended questions which allowed respondents to provide detailed responses.

Barriers and Solutions

In implementing your project with farmers, what barriers have you found?

N = 20



Solutions:

Overwhelmingly, respondents cited the need for education and demonstration projects to show farmers that making and using biochar would be worth their time

The more we look, the more we find biochar as a traditional practice exists in many cultures.

In your project region, does biochar exist as a traditional practice?

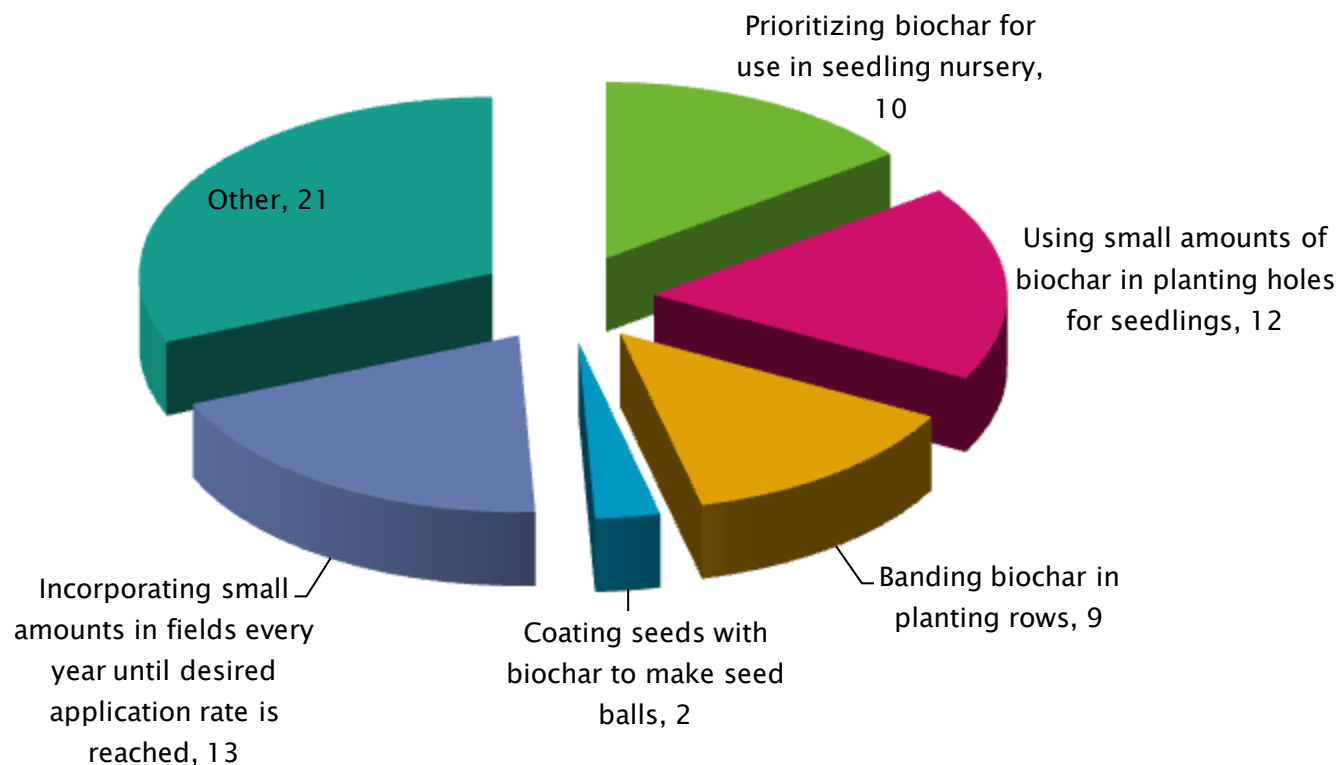


N=31

Many respondents felt that the existence of the traditional practice makes their job of communicating the benefits of biochar much easier

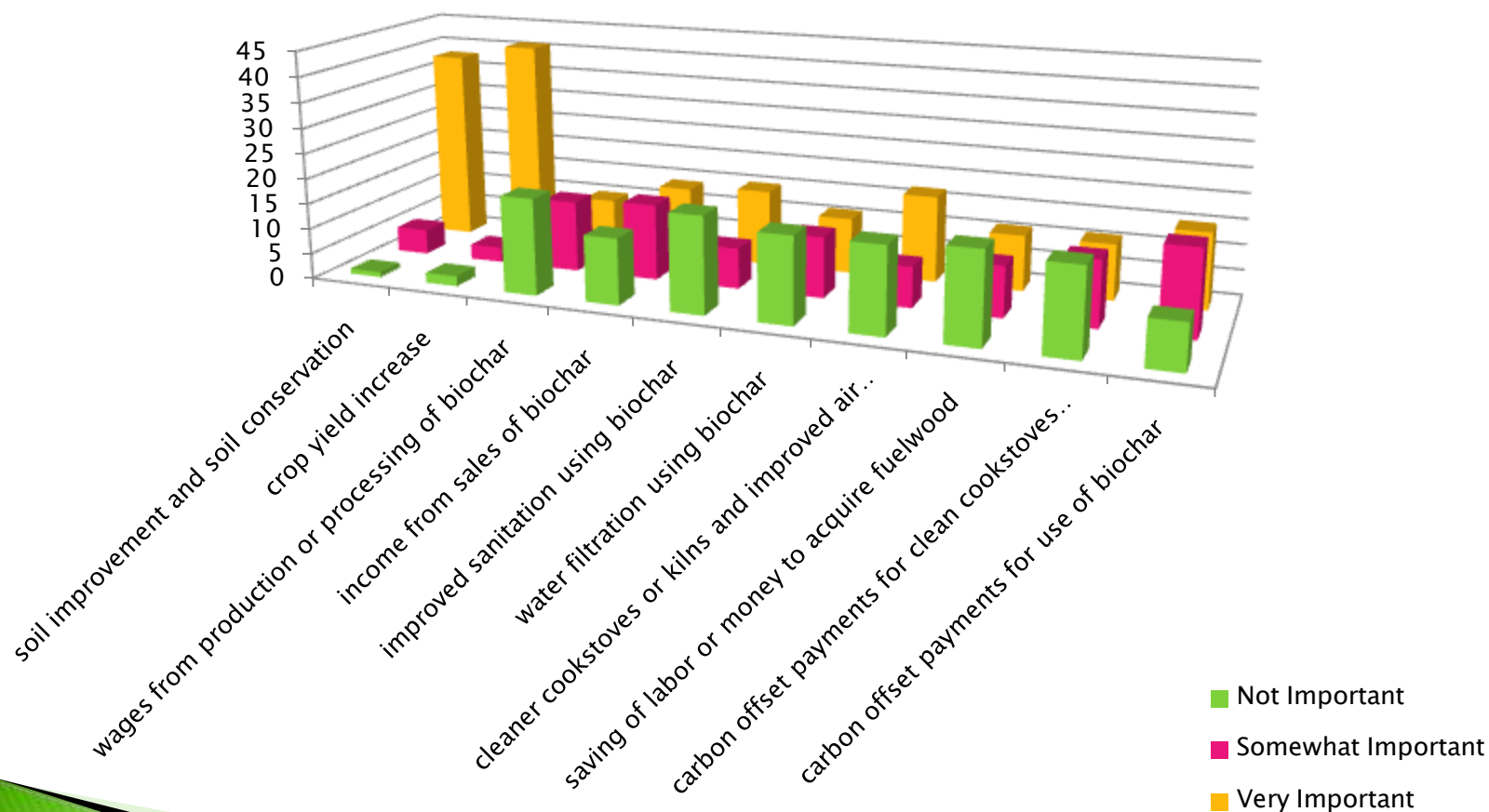
61% said project scope was limited by the available supply of biochar

How is your project coping with limited biochar supplies?



N=29

Projects rank benefits to participants



Carbon payments could make a difference to project viability – but not many are counting on them

How important are carbon offset payments to project viability?

Not important – we have no plans to pursue carbon payments to help support the project., 11

Very important – my project is not economically feasible without carbon payments., 12



Somewhat important – carbon payments would really help, but we can do without them., 23

IBI will continue to track biochar projects in developing countries

- ▶ We continue to feature new project profiles on our website every month
- ▶ Recently, we helped two projects apply for major funding from National Geographic
- ▶ IBI hopes to build the capacity to maintain a comprehensive project catalog

National Geographic finalist for funding Estufa Finca project, Costa Rica

Project name	Estufa Finca
Sponsor	Seattle Biochar Working Group
Partners	National University of Costa Rica, APORTES women's cooperative, APPTA, indigenous growers cooperative, IBI
Country	Costa Rica
Technology	TLUD stoves
Feedstocks	coffee prunings, coffee processing waste
Project description	A group of volunteers from Seattle are working with organic coffee growers in the Santos region of Costa Rica to provide micro-gasifier cookstoves to migrant coffee pickers to reduce exposure of women and children to smoke from open cooking fires and to produce biochar. The project also provides employment to the women's cooperative that manufactures the stoves.



Top left: old stove fills the house with smoke. Bottom left: new stove is clean and makes biochar. Above: biochar goes back into the coffee farm.

National Geographic finalist for funding Biochar Stoves in Western Kenya

Project name	Biochar Stoves in Western Kenya
Sponsor	African Christians Organization Network
Partners	Air Terra, IBI
Country	Kenya
Technology	TLUD stoves
Feedstocks	crop residue, water hyacinth briquettes
Project description	This clean cook stove project is developing several kinds of pyrolytic cook stoves, setting up stove manufacturing hubs and biochar field trials. They have trained 750 farmers in methods for biochar field trials. Goals include reducing deforestation by briquetting water hyacinth as feedstock, and increasing food security as biochar reduces water and fertilizer needs.



Top: biochar test plot.
Bottom left: pyrolytic stove using water hyacinth briquette.
Above: crushing biochar for test plot.

Thank You!

