



Bamboo as substitute feedstock for charcoal production: Sharing Ghana's experiences

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Background

- Biomass is a major source of energy in Sub-Saharan Africa
 - About 80% of Sub-Saharan Africa's population rely on traditional biomass fuels
 - Ghana removes more than 30 million m³ of wood annually for fuelwood and charcoal
 - The associated environmental destruction is a subject of discussion
 - Nevertheless, high biomass energy use expected to remain same into the foreseeable future



Case for bamboo

- Bamboo increasingly attracting attention as a feedstock for biomass energy:
 - Grows fast, renewable and abundant
 - Fastest growing woody species
 - Harvesting can start 3-6 years after planting
 - New shoots can grow to their full size and height in a single year
 - Rhizomes spread, producing new shoots as they spread
 - Extensive and long-living rhizomes ensure continues re-growth after harvests without the need to replant



Case for bamboo

- Bamboo can be renewable source of biomass energy feedstock
- Ghana can substitute bamboo for about 70% of the country's wood consumption for charcoal production



Bamboo suitable for charcoal and briquette

- The practice of producing charcoal from bamboo is not new.
 - China has a long history
- Bamboo charcoal compares favorably with conventional wood charcoal
 - Yield recovery rates of 20% to 30%
 - Comparable calorific value (29136 KJ/Kg, compared to 32573 KJ/Kg for acacia charcoal)
 - Higher absorption capacity
- It is greener to produce charcoal from bamboo than from acacia and teak
 - 200% higher eco-cost for teak and 211% for acacia (Partey *et al.*,2017)



Bamboo suitable for charcoal and briquette

- INBAR introduced bamboo charcoal technology into Ghana between 2009 and 2013
- Some private sector actors in Ghana have taken up the technology
- Bamboo charcoal/briquettes can be made from wastes from other bamboo utilization options
- Large scale adoption of the technology is yet to happen.



Three Ghanaian cases of bamboo charcoal production



Case 1: Ankobra Farms Limited

- a branch of the Ankobra Beach Limited, a resort in Ghana's Western Region
- has initiated a project on the use of bamboo as an alternative source of biomass fuel
- produces bamboo charcoal and bamboo vinegar
- employs a high efficiency and low emission triple retort kiln
- present productions are on pilot scale



Case 1: Ankobra Farms Limited

- intends to sell the bamboo charcoal regionally as solid biofuel and soil conditioner (biochar)
- production target of 330 tons yearly (at a recovery rate of 30%).
- sees good potential for the commercialization of bamboo charcoal in Ghana.
- *'if produced in the right way with high recovery, bamboo charcoal can be competitive with charcoal made from conventional wood and save Ghana from further deforestation'* - Commercial Project Manager
- The challenges to overcome include:
 - market acceptance of bamboo charcoal
 - stable supply of sustainably-produced bamboo feedstock
 - Selling bamboo charcoal at prices comparable to prices of conventional wood charcoal



Case 2: Global Bamboo Products Ltd

- hybrid social enterprise
- focused on cultivation of bamboo and its processing into products
 - planted about 300 hectares over the past 12 years, plans to plant 1000 hectares over the next 5 years
- also involved in skills training
 - trained over 200 youth in craft production and over 2000 farmers in bamboo cultivation and management



Case 2: Global Bamboo Products Ltd

- actively involved in the commercialization of bamboo charcoal
 - produces bamboo charcoal
 - buys bamboo charcoal from small scale producers for onward processing into briquettes.
 - produces briquettes from the residues of conventional charcoal producers and retailers
 - sells the briquettes to restaurants, distributors, households, cook stove producers, and at trade shows and exhibitions
- sees good potential for the commercialization of bamboo charcoal and briquettes in Ghana.
- sees the need for bamboo feedstock depots, affordable mobile kilns and government support



Case 3: Alex Blay at Tandan in the Ellembelle District of Ghana's Western Region

- individual small scale bamboo charcoal producer
- produces bamboo charcoal on small scale, often on demand
- has produced over 200 bags of bamboo charcoal (a bag weighs about 25 Kg)
- sells the bamboo charcoal to a resort in the vicinity and to local charcoal retailers



Case 3: Alex Blay at Tandan in the Ellembelle District of Ghana's Western Region

- sees good potential for the commercialization of bamboo charcoal in Ghana
- the challenge is low recovery, which he explained makes bamboo charcoal more difficult to produce in comparison with conventional wood charcoal
- finds it demotivating that the harder-to-produce bamboo charcoal has to be sold at the same price as the conventional wood charcoal.



Concluding remarks

- Ghana has made significant progress in finding uses for the nation's bamboo resources, including using bamboo as substitute feedstock for charcoal production.
- There is good potential for upscale and commercialization of bamboo charcoal in Ghana.
- However, more needs to be done to fully tap the potential.
 - It is necessary to create further awareness on the possibility to use bamboo as substitute feedstock for charcoal making and the available bamboo charcoal technologies, including recommended kiln options.
 - It is also necessary to encourage private sector uptake of the bamboo charcoal technologies through policy incentives.

Thank you

