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Policy Brief

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Greening The Wood Fuel Sector Of Ghana:
The Role Of Bamboo Charcoal

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Summary:

Despite efforts to discourage the use of charcoal in favour of more environmentally friendly fuel options, it remains one of the most important fuel sources in Ghana, and a key contributor to deforestation. According to a report by Ghana's national forest reference level (FRL) to the UNFCCC the rate of deforestation and forest degradation has been on the rise in recent decades. From 2013 to 2015, the annual deforestation rate in Ghana rose to 794,214 ha per annum (Ghana's National Forest Reference Level, 2017).

As a key driver of deforestation in Ghana, charcoal production negatively impacts climate change, biodiversity and livelihoods, making it an unsustainable option. Despite interventions and policies by government to ban wood fuel/charcoal, the consumption continues to rise, implying increased pressure on forest resources. There is an urgent need to substitute current fuel wood sources like shea and mahogany, with easily regenerative natural wood for household energy provision while conserving forests for effective ecosystem functioning. This policy brief provides a comprehensive analysis of the latest data and empirical evidence to set out a transformational pathway for greening the charcoal value chain and presents policy options for creating a climate-smart charcoal sector to enhance profitability and make the charcoal value chain a specific component of nationally determined contributions to the mitigation of climate change.

Fig 1: Degraded Forest Area

90% More than 90% of the original 8.22 million hectares of natural forest has been lost

Context

More than 90% of the original 8.22 million hectares of natural forest has been lost to logging and fuel wood production (Figure 1). This has led to degradation of the environment through damage to the mineralogy of the soil at the kiln site, loss in soil organic carbon (C), loss of macro-organisms, depletion of plant stock, biodiversity loss and release of carbon dioxide into the atmosphere (FAO, 2010; INBAR, 2014).

Bamboo has been discovered as an excellent, alternative renewable energy source to wood fuel. Bamboo is one of the many natural resources Ghana boasts of; it is fast growing, has better fuel characteristics, is much less polluting, requires less care and hardly competes with food crops for land.

Critique of Policy Options

In response to the wood fuel crises in Ghana, the following policies have been put in place to help reduce the pressure on the natural forest and ensure sustainable use of wood fuel:

(a) Promotion of tree planting/wood lots
(b) Nationwide campaign for the use of LPG
(c) Introduction of stumpage royalties on fuel wood trade
(d) Ban on the felling of some tree species even when they are on farmlands
(e) Introduction of clean cook stoves
(f) Introduction of modern charcoal production techniques (metal kilns) (Obiri et al., 2014).

Despite all these measures, fuel wood consumption continues to be high and estimated to rise to 25 million tons per year (Sustainable Energy for All, 2012).

Approach

This research was done through desk review, field survey and key informant interviews. Some literature about bamboo uses, distribution and application was obtained from Bamboo and Rattan Development Programme (BARADEP) and the International Network for Bamboo and Rattan in Ghana. Questions for expert interviews included: bamboo life cycle, types of bamboo (indigenous and foreign species) cultivation and use across Ghana, bamboo charcoal production, marketing and consumption, bamboo biomass energy projects, value chain and financial viability.

A perception study was also performed to elicit information about bamboo charcoal uptake, uses and benefits of bamboo charcoal use compared to wood charcoal.

Key Findings

Bamboo Charcoal, A Sustainable Wood Fuel

The lack of alternative energy sources has made the dependence on fuel wood and charcoal inevitable. Ghana has a strong potential to produce 0.9 million tons of bamboo charcoal on a sustainable basis. With a 30 % yielding rate, bamboo could potentially replace 64 % of the country's wood felled for charcoal production. The by-products of bamboo charcoal processing, including vinegar and tar, provide incentives for the bamboo biomass energy enterprise. In addition, bamboo charcoal is used to make other products like soap, and even bread which is a great delicacy at the Ankobra beach resort (Figure 2).

Fig 2:
Bamboo Products: Tar (Top), Bread (Middle), Soap (Bottom) – Picture taken at Ankobra Beach Hotel, Western Region (April 2018). Source: Authors

Lonb.B=Longer burning
Chp=Cheap
LgtE=Lights Easily
Sm.Ls=Smokeless
D.n.Sp=Does not Sparkle
Health.B=Health Benefits
Burn=Burns Well with Clean Cook Stoves

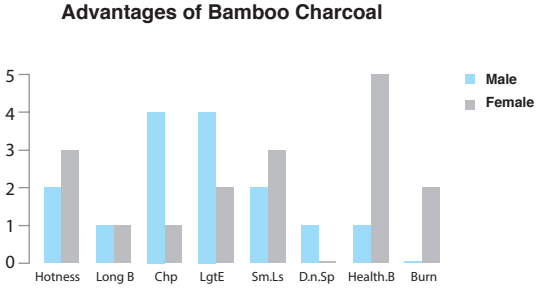


Fig 3: Gender-based perceptions about bamboo charcoal advantages to traditional wood charcoal.
Source: Authors

Bamboo Charcoal Market Feasibility and Consumer Perception

There is a general lack of awareness about the potential of bamboo usage in Ghana although there is some significant increase in its use in the construction industry for scaffolding, due to scarcity of wood. INBAR Ghana has done a lot of work to promote bamboo and create awareness about bamboo's multifunctional use, including its excellent fuel characteristics. The perception study revealed a lack of preference for bamboo charcoal due to its fragile nature and high ash content (Figure 3).

Although bamboo charcoal has desirable characteristics – hotness, longer burning, cheaper, lights easily with little sparkle – its soft nature makes it an un-preferred option for many (Figure 4).

Soft.Frag=Soft and Fragile
Smoke.Culms=Smoking From Immature
CulmsAsh.Ease=Turns to Ash Easily

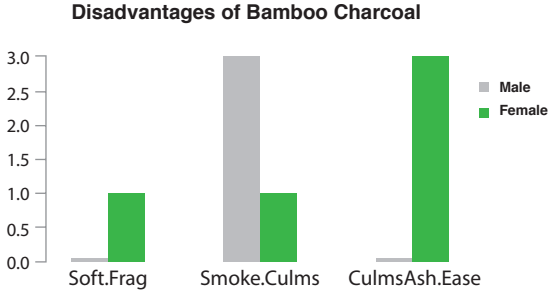


Fig 4: Gender-based perceptions about bamboo charcoal disadvantages compared to traditional wood charcoal.
Source: Authors

Policy Considerations

To improve the bamboo sector in Ghana and ensure its competitiveness as an alternative source of energy, wood and a sustainable enterprise, some key actions are imperative.

Environmental Awareness/Public Education

There should be increased public education about the dangers of degrading forests for charcoal, and increased awareness about the multifunctional uses of bamboo including its potential use as charcoal.

Sustainable Bamboo Woodlot Plantation Programme

Government is encouraged to include bamboo cultivation as part of the ongoing woodlot management program.

Linking Bamboo Charcoal Producers with Industrial Consumers of Wood Fuel

Industries that consume wood fuel should be encouraged to go green by patronizing fuel from bamboo charcoal producers.

Eco-labelling

Eco-labelling of green fuels like bamboo charcoal should be encouraged and made mandatory especially for exported charcoal.

Establishment of Bamboo Processing Factories Nationwide

Government is encouraged to set up bamboo processing factories as part of its One District One Factory Initiative. This will create ready market for bamboo charcoal producers and create employment for the youth.

Incentives for Bamboo Charcoal Producers

Significant subsidies are required to encourage sustainable behavior among charcoal producers. Government should develop an implementation strategy for the Payment for Environmental Services (PES) scheme and provide farmers with improved seeds and improved lines of credit.

Promotion of Bamboo for Ecosystem Restoration and Carbon Emissions Capture

Bamboo's fast regrowth rate and ability to survive in harsh environments makes it an excellent tree source for reclamation of degraded mine sites. Bamboo is therefore recommended to be used to restore degraded lands (e.g. galamsey sites). The mature bamboo can be sustainably managed for charcoal, vinegar and tar production, serving as an alternative livelihood for displaced galamsey workers. Bamboo plantations also have a huge potential to sequester valuable amounts of carbon and as such must be considered as good options in contributing to achieving Ghana's green economy objectives.

Further Research into Bamboo Charcoal, Vinegar and Tar Production

Government should support/fund research into the development of bamboo fuel with enhanced fuel characteristics. Further research is also needed to improve the yield and properties of the by-products of bamboo charcoal production (namely vinegar and tar).

Strengthening Partnership Efforts in the Sector /High Political Commitment

Interdepartmental or interdisciplinary collaboration as well as a good deal of political commitment are required to help develop strong and sustained interest in the use of bamboo and other local materials.

Increased Investment in Technology

It is critical for government and other key stakeholders (including private sector, donor community) to increase investments in modern and standardized technology for the bamboo sector to boost competitiveness globally.

Advancing Standardization Actions

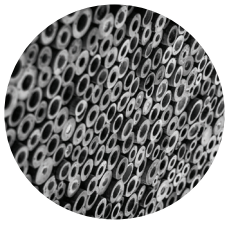
Regulatory bodies in the bamboo sector must ensure provision of stronger support for the implementation of various standardization actions among industry players.

Bamboo Inventory Development

Deliberate Bamboo resource inventory should be conducted to provide the basis for planning.

64%

With a 30% yielding rate, bamboo could potentially replace 64% of the country's wood felled for charcoal production.



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The institute's programme areas focus on the development, management and governance of Africa's renewable and non-renewable natural resources as well as green economy promotion. UNU-INRA's goal is to be a catalyst for knowledge creation and delivery for efficient use of Africa's natural resources in order to improve livelihoods.

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