



Bamboo biofuel technology enhancing Ghana's green energy sector

Technology transfer from China to Ghana in 'Bamboo as Sustainable Biomass Energy' initiative helping to produce sustainable green biofuels

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The International Network for Bamboo and Rattan (INBAR) is promoting the production of bamboo charcoal and briquette as an alternative source of energy in Ghana.

The 'Bamboo as Sustainable Biomass Energy' initiative involves the transfer of technologies from China to Ghana to produce sustainable green biofuels, using locally available bamboo resources.

"Bamboo, the perfect biomass grass, grows naturally across Africa and presents a viable, cleaner and sustainable alternative to wood fuel," said Michael Kwaku, Country Director for INBAR Ghana. "Without such an alternative, wood charcoal will remain the primary household energy source for decades to come—with disastrous consequences".

Trees are cut usually for livestock pasture, farming and industrial purposes and burnt for charcoal. Lack of modern and affordable fuels and energy, such as LPG, electricity and solar power makes firewood and wood charcoal the preferred and most important source of household energy.

Scientists predict that the burning of wood fuel by African households will release the equivalent of 6.7 billion tonnes of greenhouse gasses into the atmosphere by 2050, resulting in further climate change through clearing of tropical forests.

In Ghana, about 65 per cent of the rural population depends on the forest for fuel needs. Driven by growing concerns about energy, health and food security, the bamboo plant may be the key to combating soil degradation, massive deforestation and climate change mitigation.

"Ensuring food security in a changing climate is one of the major challenges of our era. It is well known that the destruction of Ghana's forests has negative repercussions on livelihoods and sustainable agriculture as it feeds into a cycle of climate change, drought and poverty," states Gloria Asare Adu, Executive Director of Global Bamboo Product Limited.

According to researchers from the Consultative Group on International Agricultural Research (CGIAR), years of tree-clearing for charcoal in some parts of Ghana's Northern regions, particularly in the Upper West and Upper East Regions, have eliminated fragile forests that stood at the last line of defence against the conversion of sparsely forested dry lands and pastures into useless desert.

The International Energy Agency (IEA) also predicts that if business continues as usual, by 2030 biomass energy in sub-Saharan Africa including Ghana will still account for about three-quarters of total residential energy, underscoring the urgency of coming up with a sustainable alternative biomass to replace wood.

"Rural communities need access to sustainable approaches that will keep trees in the ground and the environment safe," stated Professor Karanja M. Njoroge, Executive Director of Green Belt Movement.

The entire bamboo plant, including the stem, branch and its rhizome, can be used to produce charcoal and briquette, making it highly resource-efficient, with limited wastage.

Its high heating value also makes it an efficient fuel – charcoal is made through the controlled burning of bamboo in kilns, whether traditional, metal or brick.

INBAR is adapting the bamboo charcoal technology in Ghana to produce larger quantities of charcoal to serve a larger number of rural and urban communities as well as to produce bamboo charcoal briquettes that are ideal for cooking – they burn longer and produce less smoke and air pollution than 'natural' or traditional wood charcoal.

"Feeding people in decades to come will require ingenuity and innovation to produce more food on less land in more sustainable ways", Gloria observed.

Communities in the Western Region are under a pilot of the bamboo charcoal project – a partnership among the Forestry Research Institute of Ghana (FORIG), the Bamboo and Rattan Development Programme (BARADEP) at the Ministry of Lands and Natural Resources Africa and INBAR.

Chinese partners, including the Nanjing Forestry University and WENZHAO Bamboo Charcoal Co., are helping to adapt equipment like brick kilns, grinders and briquette machines for bamboo charcoal and briquette production using local materials.

The initiative has the funding support of the European Union and the Common Fund for Commodities (CFC).

Tropical bamboos such as the species found in Ghana can be harvested after just three years, rather than the two to six decades needed to generate a timber forest.

INBAR Ghana therefore wants the government and the business community to invest in the country's emerging bamboo charcoal and briquette market.

"With further investment and policy reform, community kiln technologies could be upscaled to reach thousands of communities in Ghana," says Michael.

China is a global leader in the production and use of bamboo charcoal, with a sector worth an annual estimate of \$1 billion and employs over 60,000 people in more than 1,000 businesses.

In addition to charcoal, bamboo offers many new opportunities for income generation – it can be processed into a vast range of wood products, from floorboards to furniture and edible shoots.

The world bamboo export was estimated at \$1.6 billion in 2009.

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