

New bamboo charcoal tech to jumpstart African bioenergy sector, slow deforestation and climate change

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Bamboo, a plant not often associated with Africa, may be the key to combating soil degradation and massive deforestation on the continent as an alternative source of energy.

A partnership among African nations and communities, the International Network for Bamboo and Rattan (INBAR) and China are working to substitute bamboo charcoal and [firewood](#) for forest wood on which 80 percent of the rural population in sub-Saharan Africa depends for its fuel needs.

Initial successes with bamboo charcoal in Ethiopia and Ghana, which have put bamboo biomass at the center of renewable energy policies, are spurring interest in countries across the continent and prompting calls for greater investment in bamboo-based charcoal production as a 'green biofuel' that can fight deforestation and mitigate climate change.

"Bamboo, the perfect biomass grass, grows naturally across Africa and presents a viable, cleaner and sustainable alternative to [wood fuel](#)," said Dr. J. Coosje Hoogendoorn, Director General of INBAR at a side event at UNFCCC COP17 in Durban today. "Without such an alternative, wood charcoal will remain the primary household energy source for decades to come—with disastrous consequences."

Burning wood also has a significant impact on the climate. 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 terms of health, the burning of fuel wood claims the lives of an estimated 2 million people every year—mostly women and children—who inhale the smoke. Continued widespread indoor use of forest wood charcoal as a household fuel could cause 10 million premature deaths by 2030.

INBAR's Bamboo as Sustainable Biomass Energy initiative is the first to transfer bamboo charcoal technologies from China to sub-Saharan Africa to produce sustainable 'green biofuels' using locally available bamboo resources. Driven by growing concerns about energy, health and food security, and climate change, the initiative is funded by the European Union (EU) and the Common Fund for Commodities (CFC).

Saving Forests, Mitigating Climate Change

It takes seven to ten tons of raw wood to produce one ton of wood charcoal, making wood fuel collection an important driver of deforestation on a continent of nearly one billion people who have few alternative fuel sources.

"Ensuring food security in a changing climate is one of the major challenges of our era. It is well known that the destruction of forests has negative repercussions on livelihoods and sustainable agriculture as it feeds into a cycle of climate change, drought and poverty." said Dr. Patrick Verkooijen, Head Agriculture and Climate Change of the World Bank. "Feeding people in decades to come will require ingenuity and innovation to produce more food on less land in more sustainable ways".

Indeed, scientists believe that deforestation across the Horn of Africa has contributed to pervasive drought in the region. Years of tree-clearing, particularly in hard-hit Somalia, have eliminated fragile forests that stood as the last line of defense against the conversion of sparsely forested dry lands and pastures into useless desert, according to researchers from the Consultative Group on International Agricultural Research (CGIAR).

The International Energy Agency (IEA) predicts that if business continues as usual, by 2030 biomass energy in sub-Saharan Africa 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.

"Sub-Saharan Africa has over 2.75 million hectares of bamboo forest, equivalent to roughly 4 percent of the continent's total forest cover.

Rural communities need access to sustainable approaches that will keep trees in the ground and the environment safe," said Professor Karanja M. Njoroge, Executive Director, Green Belt Movement. "Bamboo grows naturally across Africa's diverse landscapes, but unlike trees, it regrows after harvest and lends itself very well for energy plantations on degraded lands. We should put it to good use to provide clean energy for the continent."

"With further investment and policy reform, community kiln technologies could be up-scaled to reach thousands of communities in Ethiopia," said Melaku Tadesse, National Coordinator for [Climate Change](#) Unit at Ethiopia's Ministry of Agriculture. A number of African countries are pressing for development of their own bamboo charcoal industries to provide sustainable, affordable energy for growing populations.

Harnessing the Perfect Biomass Grass

Bamboo is one of the fastest-growing plants on the planet and produces large amounts of biomass, making it an ideal energy source. Tropical bamboos can be harvested after just three years, rather than the two to six decades needed to generate a timber forest.

The entire bamboo plant, including the stem, branch and its rhizome, can be used to produce charcoal, 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. The technology is being adapted 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 because they burn longer and produce less smoke and air pollution than 'natural' charcoal.

China is a global leader in the production and use of bamboo charcoal. The sector is worth an estimated 1 USD billion a year and employs over 60,000 people in more than 1,000 businesses. Chinese partners, including the Nanjing Forestry University and WENZHAO Bamboo Charcoal Co., are helping to adapt equipment like brick kilns, grinders and briquette machines, and hand tools, for bamboo charcoal and briquette production using local materials. Building on this momentum, the INBAR initiative is now transferring China's advanced bamboo charcoal technologies to sub-Saharan Africa.

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 from [charcoal](#) to edible shoots. The world bamboo export was estimated at 1.6 USD billion in 2009, a decline of about 659 USD million from 2.2 USD billion 2008.

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