

Bamboo as a source of bioenergy

Bamboo can be processed in various ways to become an important source of biomass energy for cooking, heating and electricity, and has important co-benefits for farmers.

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A LOCAL, FAST-GROWING RESOURCE



A number of features make bamboo useful as a source of renewable energy. Bamboo is one of the fastest growing plants in the world, and grows back naturally after harvesting, without the need to replant. If managed well, a stand of bamboo can provide a long-term, secure source of energy security.

Bamboo can grow on degraded and marginal soils, or in combination with other crops in forestry and agroforestry systems. This means that it can avoid direct competition for productive land and water: a common argument used against growing feedstock for bioenergy.

Finally, bamboo matures quickly. Many species can be selectively harvested for bioenergy production after 3 to 5 years, meaning it can be used for energy and income generation within a short period. Bamboo also requires less agricultural input compared to other bioenergy crops, making it a cost-effective option for farmers.

BAMBOO FOR COOKING AND HEATING

Charcoal and briquettes from solid biomass are an important source of household energy for billions of people around the world.

Bamboo charcoal and briquettes have a smaller environmental impact than several other common forms of biomass feedstock. They can be created easily, without the need for large investment, and boast a similar calorific value and fuel efficiency to commonly used forms of bioenergy.

Through INBAR's network, briquetting technology has spread across countries including China, Ethiopia, Ghana, India, Madagascar, Mozambique, the Philippines, and Vietnam.

BAMBOO ELECTRICITY

Bamboo gas and pellets can be used for electricity generation. 1.2 kg of bamboo could produce one kilowatt hour of electricity - this is similar to the



biomass requirement for wood or timber, and better than other types of powdered biomass such as sawdust or peanut, coffee and rice husk. A community of 250 households would require only 180 kg of dry bamboo to generate sufficient electricity for 6 hours.

There is huge potential for bamboo to play a role as biomass in country's renewable energy portfolios.

A SOURCE OF INCOME



Bamboo energy and its byproducts can be a lucrative source of income, particularly for smallholder farmers who grow it for household use. USD 56 million-worth of bamboo charcoal and briquettes are already exported worldwide every year; once local and domestic trade is taken into account, this figure becomes much larger.

Bamboo energy creation by-products, which can include tar, vinegar and alcohol, can also be processed into value-added products for sale. And bamboo offers many other income opportunities aside from energy,

as a material to create thousands of products including furniture, handicrafts and housing.

A MEANS TO REDUCE DEFORESTATION

Because of its fast growth and annual regeneration, using bamboo as a source of bioenergy can take pressure off other forest resources, reducing deforestation. This could be critical in areas such as sub-Saharan Africa, where deforestation for wood fuel remains a primary driver of deforestation. One study estimates that sub-Saharan Africa has strong potential to produce about 9 million tons of bamboo charcoal on a sustainable basis, which could potentially replace 64% of the region's wood consumption for charcoal production.

IN ACTION...

Bamboo gasification could become an important way to electrify rural communities who live outside the grid. In Madagascar, INBAR is building a 25kW bamboo gasifier, which aims to power a training facility and around 250 local households (pictured). In Indonesia, one company is promoting the use of bamboo biomass for decentralised energy production, to 'turn on the lights' for some of the 10 million citizens living without electricity. And in Japan, an electricity company recently announced their plans to build the country's first bamboo-fired power plant.

ABOUT THE INTERNATIONAL BAMBOO AND RATTAN ORGANISATION

The International Bamboo and Rattan Organisation (INBAR) is an intergovernmental organisation which promotes the use of bamboo and rattan for sustainable development.