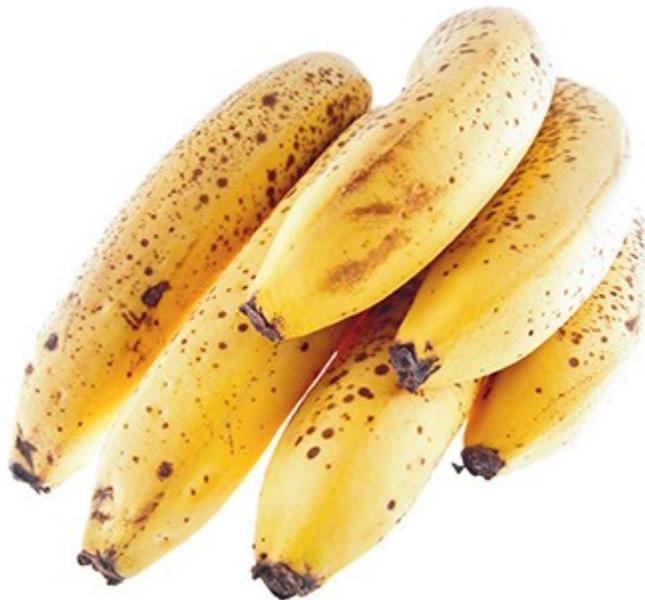


Sustainability News – 5th November, 2016.

Making the most of Africa's bio-waste

Cassava peel, sugar cane vinasse and overripe bananas - residues such as these may be known as bio-waste, but that doesn't mean they're necessarily wasted. An EU-funded project identified sources and current uses of such materials in five African countries and proposed quick, simple ways of processing them into products with higher added value.



The Biowaste4SP project focused on bio-waste in Egypt, Ghana, Kenya, Morocco and South Africa, identifying streams that could be put to better use. It produced a catalogue of residues from agriculture and food production, and considered ways of transforming these materials into bioethanol, biogas, chemicals, biofertilizer, or food and feed ingredients.

In addition to partners from the five participating African countries, the project involved teams from Denmark, Italy, Malaysia, Sweden and Turkey. It provided training opportunities for half a dozen young researchers from Africa and Italy, helping to hone skills that they, in turn, will be able to transmit to others to add to the momentum, says project coordinator Anne-Belinda Bjerre of the Danish Technological Institute.

An abundant resource

Most of the bio-waste produced in the countries under consideration turned out to be starchy, Bjerre notes. This type of residue is far easier to process than the straw and woody (or lignocellulosic) materials that make up most of the bio-waste generated in Europe, she adds. Affordable, well-understood technologies are available to do so sustainably.

To provide an example of particularly abundant residues, Bjerre described the case of cassava, a tuber produced worldwide in vast amounts. Referring more specifically to Ghana, where it is a staple, she noted that about a third of the cassava handled in processing plants tends to end up as bio-waste. Ethanol made from this biomass could replace the equivalent of 30 % of the fuel used for transport in Denmark, she adds.

Cassava peel and stalks thus rank prominently among the agricultural residues produced in Ghana. Potential feedstocks generated in Egypt include sugar cane vinasse, a by-product of the fermentation of molasses notably to produce bioethanol, whereas the unused portion of banana crops offers promise in Morocco.

Bananas also feature on the short list of candidate feedstocks identified for South Africa, and the top five for Kenya include waste from coffee processing. The project produced a catalogue of such residues in the five countries, which includes detailed datasheets on every one of these resources.

From residue to revenue

The listed materials are already used for various purposes. However, Biowaste4SP argued, it might be possible to derive even more benefit from them – by using such residues to produce bioethanol, for example, thereby helping to reduce the world's reliance on fossil fuels. Simple, affordable and sustainable technologies to do so could also open new revenue streams for the local economy.

Even compost, a time-honoured way of turning waste into an asset, can benefit from a sprinkling of research. Many residues that are harder to process sustainably and cost-effectively are nonetheless suitable for this purpose, Bjerre notes. "Biowaste4SP has considered ways of enriching compost with bacteria that take nitrogen from the air and release phosphorous from the soil," Bjerre explains. These bacteria, she adds, can also be cultivated with sugars extracted from residues.

Biowaste4SP was funded for a period of three years, which ended in September 2015. Bjerre is hoping for a follow-on project that could take the most promising applications forward, ideally with the help of private sector partners.

In the meantime, what was it like to coordinate a consortium that combined expertise from several continents? “It was one of the greatest experiences of my entire career,” Bjerre notes, adding that she enjoyed the opportunity to work with so many excellent researchers from so many different backgrounds. “We are very focused on ourselves, here in Europe — and, to some extent, on the United States and parts of Asia,” she notes. But there is a whole world out there, with lots of insight and inspiration to share.

News from Ghana

Managing food waste is both a challenge and an opportunity for developing countries. Every month, the St. Baasa factory in west Ghana transforms around 400 tons of cassava into by-products. Previously, the resulting waste, around 120 tons of peel and stalks, was lost. Now the factory is testing a way to create value out of this loss."



The cassava waste is grounded and mixed with sawdust. The resulting compost is dried, bagged and injected with mushroom spawn. Around 5 days later, edible mushrooms start to sprout at cropping houses.

Expanding production capacity

“We have increased our overall income by around 15 per cent with this mushroom production, said Constance Frimpong a food technologist at the factory. “This is monthly. We intend to increase our production even further. Because there is so much peel from the cassava, we will build more cropping houses for mushrooms. We are planning to increase our current production of 5 tons of mushrooms per month to 20 tons per month.”

Cassava can decompose quickly so the rate of the whole mushroom production becomes shorter. Cassava also has the basic nutrients mushrooms need to grow.

“The temperature range for good mushroom production is between 25 and 27 degrees celsius, according to Juanita Prempeh, a Ghana Food Institute biologist. ‘Not too much moisture, probably between 60 and 70 per cent. And relative humidity of around 60 per cent. These conditions are ideal for mushrooms.’”

Complementary research on this European-backed project on both cassava and yam was done in laboratories in Kent, England. Food scientist Keith Tomlins explained how the product was sterilized: “With the cassava, what we could do was have a fermentation step. The natural heat produced by this natural fermentation in fact sterilises the product. So, in the end we could develop a more environmentally friendly use of cassava waste.”

Closer to the people

Back in the Ghana food factory managers are already working on ways to bring this scientific innovation closer to the local population.

“The waste that we are generating can bring income and wealth to other people, said Baah Dapaah, the General Director of the St. Baasa factory. “We are now going to train our local farmers to carry out the whole process. We are going to provide them with the bags so that they can produce mushrooms themselves and earn extra income.”

A new challenge

Local farmer Stephen Adutwum said he was ready to take up the challenge and added: “It's an interesting project for us farmers. We will be able to earn extra income in between our harvesting seasons. We are ready to follow the scientists' instructions and knowhow on how to use this cassava waste.”

Farmers and scientists hope that a country like Ghana could soon be able to produce around 650 tons of edible mushrooms per year from cassava waste.