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Producing sustainable packaging from agricultural waste

Researchers from Bangor University are creating sustainable food packaging from maize to reduce post harvest losses.

Post harvest losses are caused by fresh produce spoilage during transportation from the farm to the market, which typically results from the use of sub-optimal packaging materials. These losses have a significant impact on food security, as well as farmer incomes, in East Africa. In Uganda's fruit and vegetable sector, it is estimated that 30-40 per cent of fresh produce is wasted through post harvest losses, rising to 60 per cent for tomatoes.

The Stoverpack project involves researchers from Bangor University's Biocomposites Centre collaborating with UK company NER Ltd, as well as Ugandan partners Makerere University, Musa Body Machinery and Oribags Innovations. The project seeks to address issues around post harvest losses of fresh produce in Uganda by manufacturing sustainable packaging from maize stover residues, creating a new value chain for this waste material.

Among the population of Uganda, 84 per cent of people live in rural areas of the country and 82 per cent of the workforce are employed in agriculture. However, around 41 per cent of the population is undernourished. Women are highlighted as being especially food insecure, despite the fact that they comprise a majority of the agricultural workforce.

Maize is the country's most important cereal crop, providing a significant portion of the calories consumed in both rural and urban areas. This crop is grown in every part of the country and provides a direct source of income for many households, traders and millers. Increasingly, maize has become a major non-traditional export cash crop, particularly benefitting smallholdings (small farms). It is therefore extremely important to many households for both food security and income.



Once maize has been harvested for its grain, residues such as stalks and leaves are left behind, and this is known as maize stover. It is typically ploughed back or left in the fields as crop mulch, or used as fuel and livestock feed. There are currently no higher value outlets for maize stover, but a proportion of this material could be diverted from more traditional uses without affecting soil fertility.

The Stoverpack project is exploring the feasibility of a commercial facility in Uganda that will use maize stover to produce pulp moulded packaging for eggs, tomatoes, and other fruit and vegetables. By establishing novel pulping and packaging



technologies, the project aims to reduce waste, boost farmer incomes and create new jobs in the biobased packaging sector.

The resultant sustainable packaging is expected to reduce post harvest losses during transportation, thereby improving food security. It will also offer consumers the opportunity to purchase produce in packaging that is made from an alternative to conventional plastics. There will be an additional focus on integrating female-led smallholdings into the new supply chains (harvesting, storing, processing and converting maize stover into packaging) and on providing training and new job opportunities for female agricultural workers in partnership with the Ugandan industry and academic partners.

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