



Cassava planted on ridges to aid mechanisation



MOFA Min Hon Kofi Humado commissioned harvesters



Mechanically harvested cassava in a windrow



Farmers' day on cassava harvesting in South Africa

THE TEK MECHANICAL CASSAVA HARVESTER (TEK-MCH)

DEVELOPED @ KNUST FOR THE WORLD



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Emmanuel Bobobee is an Associate Professor of Agricultural Machinery Engineering, and a Specialist Researcher in Agricultural Mechanisation at the Agricultural Research Council Institute for Agricultural Engineering (ARC-IAE) in Pretoria, South Africa.

Emmanuel holds PhD in Agricultural Machinery Engineering (Sweden), MSc in Agricultural Machinery Engineering (UK), and BSc in Agricultural Engineering, KNUST, Kumasi Ghana.

Prof. Bobobee has vast experience in Agricultural Equipment development and mechanization. He has invented the TEK Mechanical Cassava Harvester (OAPI patent No. 17219) that is ideal for harvesting all tropical root and tuber crops, for which he was shortlisted among 12 finalists on the continent by the Royal Academy of Engineering (RAEng), UK for the Africa Prize in Engineering Innovation (APEI) 2015-2016 and he also received the 1st Engineering Excellence Award 2014 (Individual) in the category of Public Sector (State Owned Enterprises) from the Ghana Institution of Engineers in December 2014, and 3rd prize in a pitch presentation at the Royal Academy of Engineering, London in March 2015.

Emmanuel has also developed the "Tek Groundnut Cracker Winnower" that cracks and winnows groundnut in a single operation, a 120-140 egg capacity ostrich incubator, a motorised maize sheller, rice thresher, table-top forage chopper, abrasive wear testing equipment and wear resistant ploughshares suitable for all soil engaging implements. Emmanuel has authored and co-authored over 43 scientific and technical publications in Agricultural Engineering and related disciplines.

THE CHALLENGES

The low level of engineering technology inputs into agriculture is one main constraint hindering the modernization of agriculture and food production in many parts of the developing world.

Cassava (*Manihot esculenta* Crantz) is an important food security, industrial and energy crop in the world. Its roots provide dietary carbohydrates for over 800 million people. Global cassava production in 2012 was 282 million tonnes, with 56% by Africa, 30% by Asia, and 14% produced in South America.

Harvesting is a major constraint to commercialise cassava production in sub-Saharan Africa. Manual cassava harvesting is a painful, stressful and time consuming activity full of drudgery especially, during the dry season.

Until recently, there are no commercial mechanical cassava harvesters in use by cassava growers in Africa. This makes cassava production to be full of drudgery, unattractive to the youth and dependent on aging farmers, who produce limited outputs with little export potential.



Slow and painful manual cassava harvesting

THE OPPORTUNITY

The development and use of a device to harvest cassava mechanically is one solution proposed to unlock the huge potential of cassava as an industrial and export crop.

A prototype mechanical cassava harvester of 300 kg mass and one metre wide with slatted conical mouldboard has been developed at KNUST and evaluated in Ghana and South Africa for large-scale cassava production.

Cassava as climate-smart and resilient crop provides an excellent insurance against famine for farmers. Cassava is a bio-fuel source that can replace fossil fuel.

The TEK Mechanical Cassava Harvester (TEK MCH) is lighter and does not require any dedicated high powered tractors. The harvester harvests one plant/second compared to 5-10 mins/plant by manual harvesting. The device can be pulled by existing tractors owned by small-scale farmers on the continent.

The harvester has no moving parts, is robust, durable and easy to maintain. The only replaceable part of is the digging blade that wears after harvesting several hectares.



Efficient TEK Mechanical Cassava Harvester in operation

THE FUTURE?

Support is needed to train farmers and operators to acquire the skills for mechanised cassava production, carry out awareness creation, advertise and promote the device among the youth, cassava growers and starch producers in Africa.

Continuous scientific and technical backstopping by research team will develop soil specific durable blades to prolong lifespan and reliability of the device for users to sustain and improve the technology.

To create more awareness about the harvester innovation, field demonstration, training of farmers and tractor operators to adopt best practice to comply with mechanised cassava production must be stepped up. This is to introduce and popularise the harvester to farmers, tractor owners, scientists, entrepreneurs, donors, policy makers and other stakeholders in the cassava value chain on the continent.

Funds are needed to undertake more market research, develop durable blades, train manufacturers and tractor operators in the proper production, operation, repairs & maintenance of the implement during this initial introductory phase.



Some industrial products from cassava