Restoring Cassava Production in Uganda

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Mike Crawley

[Photo: Cassava is the main staple food of Uganda.]

A virus that destroyed nearly all of Uganda's cassava crop — the country's main staple food — has been brought under control as a result of research supported by the International Development Research Centre (IDRC) and other donors, such as the Gatsby Charitable Foundation.

Since 1990, scientists at the Namulonge Agricultural and Animal Production Research Institute have developed nine varieties of cassava that are both resistant to the cassava mosaic virus and produce much higher yields than older varieties. Cassava is a tuber. Its carbohydrate-rich roots grow like sweet potatoes, and have the consistency of a carrot. The roots are boiled until soft enough to eat, or dried and grated to produce a flour.

Virulent strain

In the early 1990's, a new and virulent strain of the mosaic virus — named the Uganda variant of African Cassava Mosaic Germinivirus (ACMV) — attacked 80% of the country's 500,000 hectares under cassava cultivation. Before the epidemic, Uganda produced 3.5 million metric tonnes (MT) of cassava annually. After the virus spread, the harvest shrunk to as low as 0.5 million MT, costing the Ugandan economy US$60 million a year.

In 1994, an estimated 3,000 people died of famine-related illnesses, which were blamed directly on the cassava mosaic disease. "It was a huge political problem because people were starving and there was nothing immediately available to solve the problem," says George W. Otim-Nape, Head of the Cassava Research Programme at Namulonge, Uganda.

Epidemic

The casava mosaic epidemic was first noticed in 1989 about 100 kilometres north of Kampala. Soon it was cutting a 600-kilometre (km) wide swath across the country, at a speed of 25 km per year. "When I first saw the problem, I knew we were in trouble," says Dr Otim-Nape. "Eventually the disease spread and covered the whole country," peaking from 1993 to 1995. It has since gone to Kenya, Tanzania, and the Democratic Republic of Congo.

The mosaic disease is spread by the whitefly, which carries the virus from an infected plant to other plants when feeding on the leaves. As the virus reproduces, it destroys the plant's chlorophyll and hence its ability to feed itself. The roots shrivel up, leaving almost nothing edible for the farmer.

The Namulonge scientists had to move quickly — not an easy task given the slow pace of plant reproduction. Normally, it takes eight to ten years to develop a new variety, but Uganda couldn't wait that long. With funding from the People, Land and Water program of IDRC, and other donors, the researchers planted tissue-culture-multiplied cassava planting materials as well as hundreds of thousands of true cassava seeds in fields infested with the virus, and selected the most promising lines. By 1994, just four years after starting the research, they had developed three new varieties.

Participatory research

Farmers participated in the research process, planting the test varieties, evaluating their characteristics, and giving feedback to the scientists. This was important to determine whether the new varieties met farmer's needs in terms of taste, colour and texture, in addition to disease resistance.

Distributing the new varieties to Uganda's hundreds of thousands of cassava growers was the next challenge. The government's agricultural extension service was fraught with problems, so the Namulonge team created a network of cassava farmers. They trained officers at the district level, who in turn identified farmer representatives in each sub-county, the next administrative level. Those representatives were in turn trained and passed on knowledge to individual farmers via women's groups — women do most of the work of cultivating and harvesting cassava. The network continues to this day as a proven method of technology transfer.

New varieties

"By 1996 we had distributed substantial amounts of planting materials," says Dr Otim-Nape. That year, 70,000 hectares were planted with the new cassava varieties, producing a harvest of 1.1 million MT. The researchers estimate that by 1998, the new varieties had been planted on 150,000 hectares of land and they expect that Uganda will soon surpass its pre-epidemic level of cassava production. The $2.5 million invested in researching the new varieties has already resulted in production worth $40 million, says Dr Bua Anton, a socio-economist at Namulonge.

People in Pallisa district, northeast of Kampala, attest to the benefit of the new varieties. As she takes a break from digging in her field, Mary Magino says through an interpreter: "When mosaic came, you'd uproot one stem and find nothing, another stem, nothing. With these new varieties, there is a lot of cassava, there is plenty."

Higher yields

Moreover, the new varieties — named Nase 1 through 9 for the two main locations of Uganda's cassava research, Namulonge and Serere — produce three to four times more cassava per hectare than the old varieties. "This has amounted to a green revolution in cassava," says Dr Otim-Nape.

The change is dramatic compared with just a few years ago when parts of Uganda were gripped by famine. In some districts where the new varieties dominate, the farmers are now complaining of over-production. As a result, Ugandan farmers and entrepreneurs are being encouraged to invest in cassava processing. The tuber can be turned into such useful products as starch, glucose and fructose. One company produces a gin-like alcohol, called Uganda Waragi.

Production potential

"The scope for production is very high," says Dr Anton. "It's just tapping that potential that remains a challenge."

The cassava varieties developed at Namulonge are now being shared with neighbouring Kenya and Tanzania, which have each been hit with the mosaic disease.

Mike Crawley is a Canadian journalist who visited Uganda for the Gemini News Service on a fellowship funded by IDRC. (Photo: G. Mpango, Makerere University)

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