DROUGHT PRONE MALAWI AND ZAMBIA TURN TO CASSAVA

Location: Malawi and Zambia

Governments and specialized international agencies have successfully promoted cassava production in Malawi and Zambia in order to reduce drought vulnerability and dependency on maize monocropping.

CHALLENGE

For decades, Zambia and Malawi's governments have promoted maize cultivation through massive subsidies and price support to farmers. Mining and industrial development were national priorities, and agricultural policy focused on ensuring cheap maize to the miners and urban centers. As a result, maize cultivation spread over the two countries, replacing traditional crops like millet and sorghum. Maize also supplanted cassava, a drought-resistant tuber that protects against famine. Maize is very vulnerable to the region's recurrent droughts and requires improved seeds and a significant amount of chemical fertilizers. In the early 1980s, a series of droughts seriously affected maize crops. In subsequent years, financial constraints forced governments to reduce maize subsidies and support systems, making the crop even more vulnerable to droughts. Meanwhile, cassava also received negative impacts from two exotic South American pests: the cassava mealybug (CM) and the cassava green mite (CGM). In 1981/82, yield losses under CM infestation rose between 60 and 100 percent in Zambia, while the CGM infestation resulted in 10 to 30 percent losses in root production.

RESPONSE

Following the 1980s droughts, both Zambia and Malawi's governments decided to promote cassava, a drought-tolerant crop that can be harvested throughout the year, demands little labor, and doesn't require chemical inputs (fertilizers, pesticides). They turned to the International Institute of Tropical Agriculture (IITA), which began developing effective biological control of CM and CGM through trial releases of predator wasp *E. Lopezi* in 1984.

Response in Malawi

In 1986, with support from IFAD, Malawi launched a country-wide program to release predator wasps. By 1990, the CM population had declined significantly and a pest-predator equilibrium was established.

IITA's research and breeding programs on cassava were also taken up again by Malawi's Root and Tuber Crops Research Program, established in 1978, which focused on identification of best local varieties and distribution of clean planting material to avoid pest contamination. In the 1980s, the program released a first wave of improved local varieties, including *Gomani*, *Mbundumali*, and *Manyokola*, which were selected for early bulking properties and tolerance to mosaic virus, a disease transmitted through whiteflies and infected cuttings.[1] Concerted seed multiplication efforts saw massive cassava production throughout the country.

In response to the 1991-1992 drought, the Malawian government and NGOs launched the "Accelerated Multiplication and Distribution of Cassava and Sweet Potato Planting Materials as a Drought Recovery Measure in Malawi," which was implemented through the Southern African Root Crops Research Network IITA/SARRNET.[2] The program began multiplying cassava and sweet potato planting materials on a small-scale. It explicitly discouraged maize production in drier areas in order to provide space for these more drought-resistant crops. As a result, there was rapid cassava and sweet potato adoption.

Response in Zambia

As early as 1982, the Zambian Government reduced the policy focus on maize, listing procurement prices for sorghum, millet, and cassava. During the same period, Zambia's Root and Tuber Improvement Program (RTIP) started collection, inventory, and maintenance of local cassava varieties. In just a few years, it assembled and catalogued a collection of 500 local and 200 exotic varieties. By 1991, crop diversification away from maize became the government's official policy. The Swedish International Development Agency (SIDA) also funded cassava research, including a series of mass selection trials on 700 accessions (or plant genetic material).

The 2002 drought saw heightened farmer interest in cassava, which was bolstered by government and donors distributing in the country's southern drought-prone zones, where it became a key component of the Program Against Malnutrition's food security packs. However, the promotion of improved cassava varieties appeared constrained by the lack of resources in the following years.[3]

RESULTS[4]

Since the 1980s, diversifying from maize and promoting cassava production increased smallholder productivity, reduced hunger during lean seasons and drought years, and provided rural households with low-cost, in-kind drought insurance.

More specifically, diversification efforts have accomplished the following:

Production and Productivity

In the late 1980s, Zambian farmers rapidly reduced their maize growing area and increased the proportion of land devoted to cassava, millet, sorghum, groundnuts, and sweet potatoes. From 1990 to 2002, the area planted with cassava increased by 60 percent, from 103,159 hectares to 165,000 hectares. This figure then doubled by 2009, with a total land area of 337,536 hectares dedicated to cassava, and an estimated total number of 397,185 cassava farmers in the country.[5] In Malawi, the area dedicated to cassava production increased from 71,919 hectares in 1990 to 202,338 hectares in 2001.[6] This figure stabilized in the following years. It was estimated in 2006 that about 379,057 farmers produced cassava for commercial purposes in Malawi, on approximately 191,000 hectares.[7]

The area expansion of cassava and gradual availability of improved clones resulted in an astonishing production boost, which tripled in Zambia from 315,000 tons in 1980 to 950,000 tons in 2001. Since 2005, the country has steadily produced over 1 million tons of cassava per year. In Malawi, the production increase was massive: from 144,760 tons in 1990 to an estimated 4,813,699 tons in 2013. Most cassava growth in Zambia has been in the traditional cassava zones in the north and western parts of the country. Malawian cassava production grew rapidly in all regions during this time.

In both countries, improved cassava varieties produced more output with the same labor and land and without purchased inputs. Although cassava yields are difficult to measure because of irregular and partial year harvesting, research suggests that Malawi's average cassava yields per hectare grew from 2 tons in the 1990s (when the pests were plaguing the fields) to an average of 18 tons per hectare in 2007.[8] In Zambia, RTIP released three improved local varieties—*Bangweulu*, *Kapumba* and *Nalumino*—in 1993/94. These yielded 20 to 30 tons per hectare, compared to an average of 7 tons for traditional varieties.[9] Zambia's national average yields however reached only approximately 9 tons per hectare in 2009. Improved varieties bulk early and enable harvesting to occur six to 18 months earlier than with traditional varieties. They also provide superior resistance to major pests.

Marketing and Processing

Cassava marketing has not been equal in the two countries. In Malawi, short distances to market permit large-scale trade of fresh cassava via bicycle. High population density and increasing maize and bread prices following economic liberalization produced an urban fast-food market for prepared cassava in central Malawi. In this part of the country, cassava has sometimes been two to three times more profitable than other cash crops, including tobacco, groundnuts, and maize.

In Zambia, greater distance to markets mandates trading dried cassava chips or flour. In 2009, the government designed a $12 million worth 2010-2015 *Cassava Sector Development Strategy* with the objective to "improve linkages within the value chain and increase global production, processing and commercialization."[9]

Income

Between the early 1980s and 2002, the value of cassava crops per hectare increased from $375 to $675 in both countries, nearly doubling farmer incomes.[10] As a result, subsistence farmers growing cassava could ensure their food security with fewer resources, while farmers who marketed their crop doubled their cash returns. The production of hybrid maize did not follow the same evolution, as its value actually decreased in the same period, from $375 to $313 per hectare. The cost of inputs—seeds and fertilizer—for hybrid maize production also increased from $77 to $107, further reducing farmers' profit margins.

Meeting Small-Scale Farmer Needs

In both countries, small farms dominate cassava production. A study from 2003 showed that in Malawi, the smallest farms—under one hectare—allocate 17 percent of their cropped area to cassava, while farms in the five- to 20-hectare range allocate only three percent. In Zambia, where farms are generally larger, farmers devoted an average nine percent of cropped area to cassava.[11]

Cassava is a crop with many advantages for small farmers. It requires little labor and is very resistant to drought and water stress. It has a flexible harvesting calendar and can be kept as a security supply of food for lean periods. In Zambia, cassava is a staple food for over 30 percent of the population and, in some regions within the cassava belt, more than 80 percent of the farmer household population depends on cassava for food security, while maize and beans are cultivated as cash crops.[12] In Malawi, female-headed farm households, which are poorer on average than their male counterparts, were found to devote more land to cassava (14.4 percent of their land versus 9.7 percent for male-headed households).[13] This suggests that investment in cassava research and interventions is of particular importance to the food and financial security of female-headed households.

Sustainability

Farmers can grow cassava indefinitely, without having to depend on seed suppliers, fertilizer distributors, or rural credit programs. The crop is easily reproduced and tolerates poor soil conditions (low fertility, aluminum toxicity). Improved varieties are resistant to pests and high yielding, with no need for chemical inputs. Lastly, low-input cassava production generates none of the acidification or pesticide residue that occurs with other crops.

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Women farmers participating in variety selection.

Cassava is a crop with many advantages for small farmers. It requires little labor and is very resistant to drought and water stress.

Farmer participating in variety selection.

FOR MORE INFORMATION

www.oaklandinstitute.org
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ENDNOTES

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4 Unless otherwise indicated, agricultural statistics for this case study are from FAO stats, http://faostat.fao.org/.

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11 *Ibid.*

12 *Zambia Cassava Sector Development Strategy 2010-2015. Op. Cit.*

13 *Haggblade, S. and B. Zulu. Op. Cit.*

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Cassava in the market. © International Institute of Tropical Agriculture