

C3P

Crop Crisis Control Project

CASSAVA CUTTING MOVEMENT FROM PRIMARY TO BULKING SITES

Case Study Burundi, Remedies to Reduce Loss.

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Brief 4



Background

Over the last five years, Burundi has encountered major food security problems due to the effect of war, refugees returning home and their re-integration, and the occurrence of plant disease and climate change. More than 50% of the population lives on less than 0.25 USD per day (Institut des statistiques et des études économiques du Burundi - ISTEEBU, 2007). A number of conferences and workshops have been organized, targeting country decision makers, international organizations and NGOs, and other stakeholders working in the food security sector to address the situation. There has been unanimity that plant diseases are major contributors to food insecurity in Burundi, with cassava mosaic disease (CMD) being the single largest threat.

CMD Status in Burundi

Cassava mosaic disease was identified in 2002 in the northern provinces of Burundi and has subsequently spread to all provinces of the country. An estimated 80% of 84 000 ha of cassava under production has been impacted by the disease with production losses reaching 90% in the most severely affected provinces (FAO, 2006). Cassava is the third most important crop in Burundi – behind beans and banana – and significantly contributes to rural livelihoods as both a food and cash crop. Its importance derives from its adaptation on lands of marginal fertility and its

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low labor requirements. Cassava is a major staple food and a good source of carbohydrates when consumed as a tuber (1190 calories per kg of dry matter) and of protein when consumed as leaves (70 g per kg of leaves). Due to production losses from CMD, cassava flour was sold at a per kg cost of as much as three times what it was pre-disease in Burundi.

CMD Strategy in Burundi

The Government and its partners have taken measures to reduce the threats to food security caused by CMD through multiplication and distribution of CMD-resistant varieties and the promotion of improved management practices. The Government has aggressively pursued a plan for the multiplication of 1300 ha of CMD-resistant material for 2007 with the intention of distribution to the population starting in early November 2007.

CRS and its local implementing partners participated in this initiative through the C3P project. The C3P project operated in 8 of 16 provinces in Burundi and multiplied 150 ha of CMD-resistant planting material in six provinces (Bubanza, Kayanza, Ngozi, Kirundo, Muyinga and Karuzi). CRS also supported cassava multiplication in Gitega and Ruyigi Provinces through local implementing partners. This was financed by ECHO (European Community Humanitarian Office). Other provinces were covered by the FAO (United

Nation's Food and Agriculture Organization), and PRASAB (Projet d'appui à la sécurité alimentaire et gestion durable des terres) and multiple NGOs. ISABU (Institute of Science and Agriculture for Burundi), operated cassava multiplication sites in all provinces of Burundi.

Purpose of the Brief

Despite the measures taken in multiplication and dissemination of CMD-free cuttings, anecdotal evidence has suggested relatively high loss rates of cassava planting material. Major factors affecting loss include the time lag between the harvesting of cuttings versus the date of planting and methods of handling, bagging, and transporting cuttings.

In a coordination meeting held in February 2007, the Burundian national committee to combat CMD concluded that the average loss of cuttings from research stations to multiplication fields was about 20%. CRS's experience from one major C3P supplier during the February-March planting season in 2007 indicated that loss rates in some instances were over 50%. Given the relatively low multiplication rates and long duration of cassava—as a rule of thumb one cassava plant provides enough planting material for ten plants and a cassava plant comes to maturity after 12 months—it is extremely important to identify factors



A cassava plant at 8 weeks of growth.

that cause the loss of cassava planting material and to takes steps to reduce loss associated with it.

The purpose of the brief is to share the Burundi experience with other cassava partners and to explore some of the most important factors impacting loss— from cutting harvest to planting of fields with cuttings. Every cassava cutting that does not result in a viable plant represents the potential loss of ten plants. This brief will explore some of the principal causes behind cassava cutting loss from harvest to planting¹.

Cuttings Procurement under C3P

The cuttings used in the C3P project were provided mainly by ISABU and a small quantity from CRS's own fields. Ninety percent of the cuttings received through ISABU came from the Mparambo research center as much as 300 km away from the beneficiaries while the other 10% were brought from the Moso research center, which is less than 50 km away².

The cuttings were cut at a rate of approximately 15 000 per day, immediately packed in sacs of 1000 cuttings, and, in the ideal situation where vehicles were available, they were immediately loaded into lorries for transport.

The time lag between the initial harvesting of cuttings to the packaging and transport of them to destination sites ranged from as little as 1-2 days to as much as two weeks. This depended upon the availability of labor at the point of harvest to efficiently cut and package planting material, the availability of transport, and the capacity of partners at destination sites to receive and disseminate cuttings at field level.

The cutting process alone at the ISABU managed Mparambo site took in some cases as long as 7 days to cut cassava planting material for a single partner. The average transport time was 4 days from harvest point to partner field sites. In some cases, cuttings were planted in fields at partner sites as late as up to 7 days after reception by partners.



Ministem cassava cuttings. Due to their small size, they are prone to drying out which reduces their viability to produce a cassava plant.



Longer cassava cuttings are more voluminous than ministem cuttings. While more difficult to transport in bulk, they have a longer shelf life than ministem cuttings.

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- 1 This is based on an assumed multiplication rate of 10 to 1 where the multiplication rate can vary – depending on the cassava variety, soil, rains, and handling of cuttings.
 - 2 Mparambo and Moso are the two principal cassava cutting sites run by ISABU. The distances cited between each site and the end beneficiaries of the cuttings are estimations.

As the germination rate of cuttings begins to decline as early as 72 hours after cutting, the time lag between the harvest of a cutting and the planting of a cutting is important to track.

In addition to the time delay impact on cutting viability, packaging and transportation of cassava planting material can significantly impact germination rates. Mini stem cuttings packed tightly in closed sacs and transported in non-aerated lorries hasten cuttings to dry out more quickly and reduce their germination rates.

What's more, the bruising of cuttings due to loading, off-loading, and transport on rough roads also negatively impacts germination.

Synthesis of Cutting Losses under C3P from Selected Partners

Table 1 summarizes the loss rates of cassava planting material by CRS partners between December 2006 and February 2007. The table was developed using two sources of information, reports from partners and data from a cassava cutting template, the format of which was developed as a result of the losses witnessed by C3P in Burundi.

The data provided a starting point for the authors of this report to visit partner fields, to talk with their field technicians and to consult with staff associated with the production sites from where the cassava cuttings were sourced.



Muyinga, Burundi. CRS partner staff show losses of cassava cuttings received under the C3P project.

While the average estimated loss rates for the six partners involved are 18%, and slightly below the Government of Burundi's 20% estimate of loss rates from primary or research managed fields to multiplication sites, there is significant variance among partners.

C3P partners that received planting material from their own sources or the Moso site (CRS Kirundo and BDD Ruyigi) recorded average loss rates of 11%, or roughly ¼ of the loss rates recorded at C3P partners that received planting material from the Mparambo site (BDD Bubanza, BDD Ngozi, BDD Muyinga, Caritas Belgique) where average loss rates were 44%.

Loss rates for CRS Kirundo were significantly less than the loss rates of the partners. CRS Kirundo received the majority of its cutting from its own field and from the ISABU managed Moso site. At the Moso site, the recipients of the planting material were expected to handle their transport arrangements and provide oversight when the cuttings were being harvested.

This germination rate (see Table 1) was the average rate recorded by each partner. Partner staff indicated significant differences between partner sites due to variances between reception and plantation at partner sites and variable ecological conditions like soil quality.

The low germination rate for BDD Muyinga relative to other partners is attributable to the partner planting late in the season in comparison to the other partners. They

started their first planting in early February whereas CRS Kirundo, Caritas Belgique, BDD Bubanza, and BDD Ruyigi made their first planting in late December and BDD Ngozi in mid-January. Replanting, to make up for losses in planting material, continued for all partners from between mid-January through early March 2007.

Primary Findings

Given the Burundian Government's mandate to plant 1300 ha of CMD-resistant material during 2007, the large role played by ISABU in providing the primary material to partners, and the shortage of planting material that was witnessed during late 2006 and early 2007, the loss rates indicated per table 1 should be of considerable concern for cassava seed aid practitioners.

Loss rates were significantly lower when the recipients of material were actively engaged in both the process of cutting material and in the transport of material from origin to destination at partner managed sites and when staff were knowledgeable about cutting preparations, packaging and transport. Staffing and technical knowledge on cassava was significantly different between Mparambo and Moso, and this also accounts for the loss variance between these source sites.

Lessons Learned

1. Transportation of cuttings, when necessary, should happen in an aerated lorry and cuttings should

Table 1: Loss Rates of Cassava Planting Material by C3P Partners (Period: 12/06-2/07)

Partner	Area Planted (Ha)	Cuttings Received	Loss at Reception	Percentage Loss at Reception	Germination Rate
BDD Bubanza	30	300,000	166,000	55.3%	88
Caritas Belgique	10	100,000	43,181	43.2%	83
BDD Ngozi	10	100,000	20,500	20.5%	90
BDD Muyinga	10	100,000	34,000	34.0%	68
Subtotal 1	60	600,000	263,681	44.0%	
CRS Kirundo	48	480,000	71,000	14.8%	90
BDD Ruyigi	38	380,000	24,000	6.3%	93
Subtotal 2	86	860,000	95,000	11.0%	
TOTAL	146	1,460,000	358,681	18%	

- move in bundles and never in closed sacs. The transportation of ministemms or short cuttings should also be strongly discouraged.
2. Cuttings procurement should be planned with the presence of the beneficiary and efforts need to be made to reduce the time lag between cutting and planting. When the cutting and transportation is carried out with recipient supervision, in a timely manner, and with relatively short distances of transportation, loss rates can be very low.
 3. Cutting instruments need to be very sharp or designed to make clean clear cuts and produce no 'tearing'. Unclean cuts or tearing will bruise the cutting and reduce its viability.
 4. Quality control guidelines for cassava cuttings, storage, and transport should be incorporated in training modules at regional, national, and local levels.
 5. Cassava cuttings suppliers must be diversified. A lack of diversity among suppliers can lead to poor service



Madame Tugwezu Mwembu is a citizen of Burundi and has been seriously impacted by the effects of cassava mosaic disease. A mother of nine children, she relies heavily on her own production from agriculture to feed her family. Her three most important crops are sweet potato, cassava and arrow root.

She was a refugee for two years in neighboring Tanzania following violence after the assassination of Burundi's first democratically elected president in 1993. Like more than a million Burundians that have been refugees due to conflict over the past decade, she has returned home.

Since 2006 she has been associated with a 13-member farmer group made up of 4 men and 9 women. Her group is affiliated with Caritas Belgium, a C3P partner working in northern Burundi to promote the multiplication and dissemination of improved and disease-resistant cassava varieties for farmers. Working as a group, it is easier to source planting material and share labor. The group cultivates a common piece of land and also shares labor to help prepare, plant, and weed individual fields.

among a handful of suppliers, high prices, and very little orientation to delivering a quality product.

6. The use of cassava templates to enable for the analysis of the supply chain and for the documentation of loss needs to be expanded. Further analysis of cassava cutting loss is important to understand the relative importance of the different steps from harvest to planting.
7. Promoting transparency by sharing information can support good governance and create a more enabling environment for the end consumer to make definitive procurement decisions on cassava cuttings.
8. Training in cassava cutting, preparation, packaging and transport should be aimed at both private and public extension services.

Conclusions

Cassava planting material is generally only commercialized when there is a crisis such as the occurrence of cassava mosaic disease. This crisis leads to the need to rapidly bulk up, through multiplication, limited supplies of disease-resistant cassava planting material. The high loss rates associated with the bulking and transport of commercialized cassava planting material comes in stark contrast to the low loss rates of conventional farmer to farmer dissemination of cassava planting material. Given the low multiplication rates of cassava and the shortages in cassava mosaic resistant cassava planting material, cassava practitioners need to give much more consideration to understanding and reducing losses of cassava planting material which result from handling and transport.



Farmers preparing fields for planting. Many poor farming households lack access to land in Burundi.



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Further Reading

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Members of a farming group in Ngozi, Burundi. In the background is the cassava multiplication field they planted through the C3P project.

Acknowledgements:

We are very thankful to the CRS partners to C3P that shared their experiences with cassava cutting losses experienced during the C3P project. Their frankness and willingness to share challenges is what made this brief possible.