

ANNUAL PROJECT REPORT 2015

CASSAVA CARP
(RUFORUM Grant No. RU 2014 CARP 04)

Developing a community-based cassava seed system for increased productivity and market linkages in Uganda



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CASSAVA CARP REPORT SUMMARY

The Cassava CARP project is aimed at enhancing sustainable production, processing and marketing of cassava and cassava products among the farming communities. Specifically, the project is focusing on quality cassava planting material, appropriate agronomic practices and promotion of relevant technologies for improved performance of selected value chains. The primary entry point is to ensure access to virus-free (clean) cassava planting material of farmer preferred and elite varieties. Through existing multi-stakeholder innovation platforms, farmers and other actors are being engaged in each of the four pilot study districts, where cassava plays a vital role of food security and bio-resource. The focus districts include Kole and Apac (Northern Uganda), and Serere and Bukedea (Eastern Uganda); and some research for development activities at Makerere University Agricultural Research Institute at Kabanyolo (MUARIK, Wakiso district).

Since its inception in October 2014, the project has identified some key challenges facing cassava production, processing and marketing in the study areas. Some challenges have incited investigative research topics for students while others are key areas of incubating business ideas with university graduates. Through community knowledge workers (CKW), the project has started engaging the communities in solving their challenges while sometimes providing direct support in terms of basic materials. The project is evaluating planting material, bioethanol, high quality flour, and composite porridge flour as key products for value chains for improvement. To this effect, the project has identified and virus-cleaned at least one farmer preferred cassava variety in each community. Virus free stock materials are now assembled for farmer preferred varieties including Bao, Bukalasa (B11), and Mercury. Mother gardens have been established consisting of clean and elite varieties (NASE 03, NASE 14, NASE 19 and NAM 130) in Apac/Kole, Serere and Bukedea districts.

The project is also building human resource capacity in research (1 PhD, 3 MSc, 3 BSc) as well as supporting incubation of business ideas (3) along the cassava value chains. The project team, graduate students and business incubatees (3 BSc) work with farmers to generate and diffuse knowledge for improved management of cassava pests and diseases, and processing and marketing of cassava products. Following the project annual review meeting of December 2015, project team felt that there were many clear research intervention areas identified after the reconnaissance studies including student topics. Many expected outcomes of the project will directly impact on the rural communities especially those involved in cassava production and associated value chains.

PROJECT PARTNERS

The project is being implemented by a consortium of partners and institutions from the public and private sectors as well as farmer groups and community based organizations. Makerere University is the lead institution in partnership with the National Crops Research Institute (Namulonge), Coalition for Health, Agriculture and Income Networks in Uganda (CHAIN Uganda), The Popular Knowledge Women's Initiative (P'KWI), and Kubere Information Centre (KIC). Below is the list of key project partners:

- Dr Settumba Mukasa (PI, Plant Biotechnology/Virology), DAP, Makerere University.
- Dr. Robert Kawuki (Cassava Breeding), NaCRRRI-NARO.
- Mr. Anthony Pariyo (Cassava Seed System), NaCRRRI-NARO.
- Prof. M.M. Tenywa (Soil Scientist), DAP, Makerere University (MAK).
- Dr. H. Talwana (Entomologist), DAP, Makerere University (MAK).
- Prof. J. Mugisha (Agric. Econ.), SAS, Makerere University (MAK).
- Dr. B. Obaa (Agric. Extension), DEIS, Makerere University (MAK).
- Dr. J. Bisikwa (Agronomist), DAP, Makerere University (MAK).
- Prof. S. Kyamanywa (Business Incubation), Consortium for enhancing University Responsiveness to Agribusiness Development (CURAD).
- Dr. Apollo Kasharu (Farmer Linkages), CHAIN Uganda.
- P'KWI Farmer Group, Bukedea districts, Eastern Uganda (CKW, Mrs Norah Ebukalin).
- SSOSPA Farmer Group, Serere districts, Eastern Uganda (CKW, Mr Joseph Okalebo).
- Kubere Farmer Group, Kubere Information Centre, Apac/Kole districts, Northern Uganda (CKW, Ms Mercy L Apio).

ABOUT THE CASSAVA CARP

The Cassava CARP was initiated in October 2014 with support from RUFORUM to supported improved livelihoods in the major cassava growing districts on northern and eastern Uganda. As a community action research programme (CARP) initiative, this project is working with the rural farming communities where cassava ought to play a vital role in food and income security. The project is using a bottom-up approach in the **community action research interventions** – starting with farming communities in identification of community challenges. The project is envisaged to: i) Increase access to high yielding and disease free planting materials, ii) Build capacity for production of basic seed and provide information packages on appropriate agronomic practices for cassava production, iii) Foster interaction of various actors along the cassava value chain, and iv) Create and strengthen cassava market linkages

THE PROBLEM

Cassava is a very important staple food crop in Uganda, particularly among farmers the northern and eastern districts of the country. These areas are prone to drought and many other ravages of life. Given the robustness of the crop, it proved to be the main stay of these communities. The crop is a great resource in terms of food and income security. It is ranked as the number one most important food crop in the selected study districts. Some farmers sell the fresh tubers to nearby markets while others process the tubers into dry chips for better storage and long distance marketing. Some farmers also process the dry chips into flour for food or bioethanol production. However, in the last two decades, the crop has been devastated by virus diseases namely Cassava mosaic diseases (CMD), and Cassava brown streak disease (CBSD).

These viral diseases are systemic and therefore largely spread through planting material. CMD causes serious yield losses in susceptible varieties that are mostly landraces or old varieties. Varieties released in the last 20 years are mostly resistant to CMD, but very susceptible to CBSD. CBSD affects quality of the tubers through root necrosis and rotting making them unfit for consumption or use, it can lead to up 100% yield loss. The widespread nature of these diseases makes access to quality planting material a key challenge to cassava production by the resource poor farmers. The other contributor to low cassava productivity is the lack or use of appropriate agronomic practices.

Despite the field production constraints, sometimes production exceeds local household consumption levels in certain bumper harvests periods of the year ushering in new challenges such as wastage due to rotting of fresh tubers. This is further exacerbated by poor post-harvest handling and low prices of fresh tubers. In order to avoid post-harvest losses, farmers have been engaged in traditional processing through peeling and drying chips to make flour and other products (MAAIF, 2010). However, this is not enough and as a result calls for other interventions such as secondary processing like high quality flour, porridge composite and bioethanol production. These products are also require improved processing technologies, marketing and market linkages, and information sharing if farmers are to maximise the benefits from cassava.

THE CONCEPTUAL FRAMEWORK

The project was conceived on the premise that fostering interactions of the various actors along the cassava value chains can lead to enhanced sustainable production, utilization and marketing and thus contributing to improved livelihoods. Multi-stake holder platforms are key for such interactive linkages and testing pre-conceived research questions. The five key intervention areas are indicated in Figure 1. The first project intervention or result area has been completed during the reporting period of 2015. The project has identified and virus-cleaned at least one farmer preferred cassava variety in each community. Mother gardens have been established consisting of clean and elite varieties in Apac/Kole, Serere and Bukedea districts. Work is still on-going for the remaining four result areas (Figure 1).

The key research intervention areas and focus products and shown in Figure 2. The different nodes of the flow chart will be handled by students, scientist or research technician as described in the subsequent sections of this report.

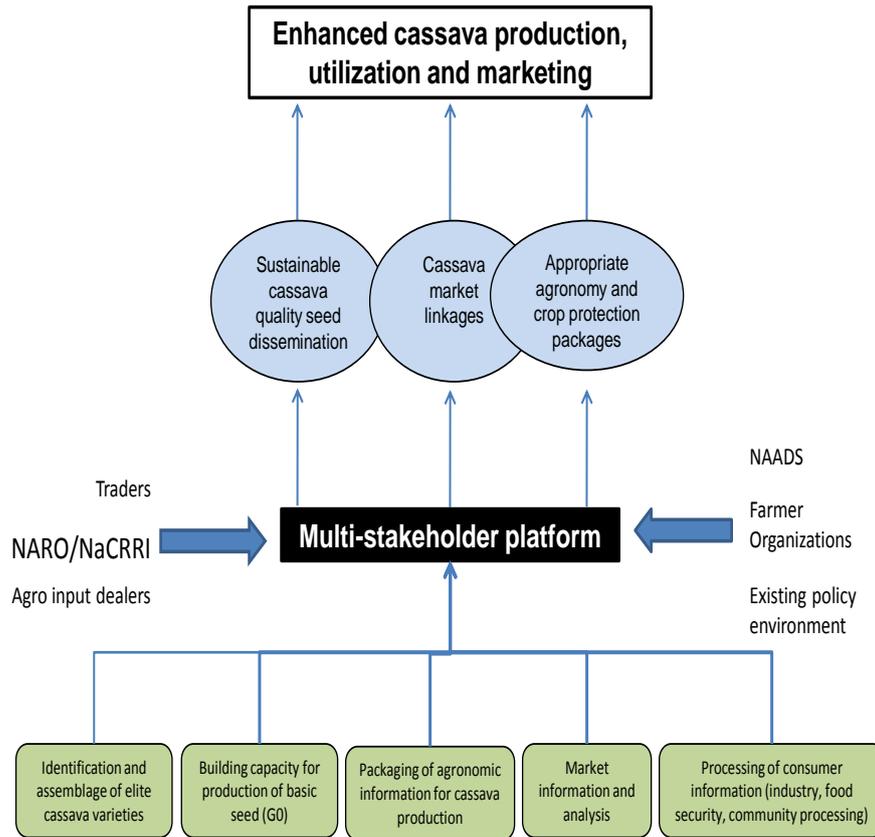


Figure 1: Conceptual framework for enhancing cassava production, utilization and market linkages through use of community based multi-stakeholder platforms in Uganda.

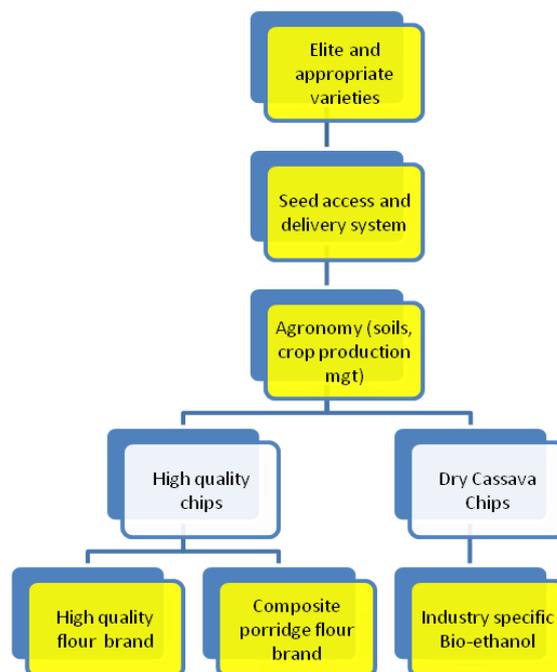


Figure 2: Cassava CARP project focus cassava products and value chains

STUDENT TRAINING

The project is contributing towards human capacity building through supporting graduate research at PhD and MSc levels. All the students are registered at Makerere University College of Agricultural and Environmental Sciences. The students (1 PhD and 2 MSc) have received the appropriate project support like tuition fees, stipends and field costs during field studies. They have defended their research proposals. The third MSc student, Mr. Moses Erongu, was recruited in October 2015. He is still developing his research proposal. Students' academic programmes, research topics and proposed supervisors are indicated in the table below. All the students have participated in the reconnaissance studies in the selected farmer communities – to enable improve the study tools and research topics.

Table 1: Cassava CARP project students' academic programmes, research topics and proposed supervisors

Student (and academic programme)	Supervisors	Topics (Community)
Ms Rebecca Mukebezi (PhD Student –ARI)	Dr Bernard Obaa Dr F. Kyazze	The role of innovation platforms in enhancing the performance of the cassava value chains in eastern and northern Uganda (Kole, Serere)
Mr. Deogracious Opolot (MSc Agric. Econ.)	Prof J. Mugisha Dr Apollo Kasharu	Economic profitability of bioethanol production enterprise among the rural based cassava farming communities in northern Uganda (Apac)
Mr Stanslus Okurut (MSc Agric. & A/Econ.)	Prof J. Mugisha Dr Apollo Kasharu	Factors affecting marketing and market access for high quality cassava flour in Eastern Uganda (Bukedea)
Mr Moses Erongu (MSc Crop Science)	Dr S. Mukasa Dr H. Talwana	Use of plant virus recovery mechanism for mass production of cassava planting material (Kabanyolo)

Students have been assigned a community for farmers (district) to which they will be tightly linked for interactions and research. However, for cross-cutting research questions, a student will be able to carry out work in any community under this project.

BUSINESS IDEA INCUBATION

Agribusiness has the potential to reduce poverty and drive economic growth in developing countries like Uganda. The agricultural sector is a major source of food supply, income and livelihood for over 60% of the rural population and is an important contributor to foreign exchange earnings. Therefore, agribusiness incubation has emerged as a critical tool that can be used to create competitive agribusinesses and to accelerate the development of the agricultural sector. Consequently, besides the graduate student topics, the project team opted to have an open window for good special project research projects that could be undertaken by undergraduate students for about 6 months. Furthermore, for good ideas that can be incubated into business plans would be supported to further create demand or market linkages for cassava farmers. Some practices, like rapid multiplication

of cassava stems (Figure 3) will be shared among the cassava producing communities in order to improve timely access to quality planting material.



Figure 3: Ratoon 1 crop during rapid multiplication of cassava for stems of elite and clean varieties. This practice will be shared among farmers in each of the four districts.

Agribusiness incubation has proven to be a very successful mechanism for launching new enterprises by creating an environment where start-ups can be nurtured and allowed to flourish. Therefore, in collaboration with the Consortium for enhancing University Responsiveness to Agribusiness Development (CURAD) at MUARIK and CHAIN number of business ideas for incubation have been identified. The BSc student topics and business ideas indentified and listed in Table 2.

Table 2: Topics identified for BSc Student topics/business incubation under the Cassava CARP Project

BSc Student/ Incubatees	Mentor(s)	Topic/Business Idea
BSc Student 1:	Prof M Tenywa Dr Fred Kabi	Defining standards for utilization of cassava in non-ruminant livestock feeds.
BSc Student 2:	Dr S. Mukasa Prof S. Kyamanywa	Effect of spacing and method of planting on stem cutting production.
BSc Student 3:	Prof M Tenywa Dr S. Mukasa	Mapping soils for best cassava production.
Incubatee 1: Dr E. Nuwamanya	Dr Robert Kawuki Dr S. Mukasa	An efficient fermentation protocol for production of bio-ethanol from various cassava varieties.
Incubatee 2: C/o Mrs Norah Ebukalin	Dr Y. Byaruhanga Dr J. Bisikwa	Branding and quality certification with Uganda National Bureau of Standards (UNBS) of a composite porridge (made from cassava, sorghum and soybean)
Incubatee 3: Chain Uganda	Dr Apollo Kasharu Mr Anthony Pariyo	High quality cassava flour business planning and effect of ratooning on quality of cassava flour (starch).

COMMUNITY ENGAGEMENTS

For each community (district), a number of engagements have been initiated (Table 2). In each district a community knowledge work (CKW) actively is driving field activities together with the respective student.

Table 2: Cassava CARP project Interventions at community level in the different districts

District (Farmer group) and CKW	Interventions at community level	
Apac (KUBERE) Ms. Mercy Apio	<ul style="list-style-type: none"> Established cassava mother garden (NASE14) Support to cassava bio-ethanol producing women groups (Cegere) 	
Kole (KUBERE) Ms. Mercy Apio	<ul style="list-style-type: none"> Established cassava mother garden (NASE14, NASE 19) Support to cassava bio-ethanol producing women groups (Kole) Market linkages for bioethanol production 	
Serere (SOSPPA) Mr. J. Okalebo	<ul style="list-style-type: none"> Established cassava mother garden (NASE14, NASE19, NAM130) Market linkages for HQCF Branding of cassava based composite porridge flour 	
Bukedea (P'KWI) Mrs N. Ebukalin	<ul style="list-style-type: none"> Established cassava mother garden (NASE3, NASE14, NASE19, NAM130) UNBS label for high quality flour 	
Wakiso (TC Laboratory) Mr C. Lugoloobi	<ul style="list-style-type: none"> Optimising tissue media for rapid multiplication Virus elimination of farmer preferred/ elite varieties 	
	<ul style="list-style-type: none"> Multiplication of G0 of elite released cassava varieties: Bao, Bukalasa, Mercury, NASE03, NASE13, NASE14, NASE19, NAM130, and TME204 	

PROJECT MANAGEMENT

Besides the individual student progress reports, a number of project level activities were undertaken during 2015. The project management activities are summarized in Table 3.

Table 3: Project management activities and accomplishments

Activity Area	What has been done (Accomplishment)
Project team meetings	<p>Held internal project meetings</p> <ul style="list-style-type: none"> • Meeting 1: Inception project meeting (Feb 2015) • Meeting 2: Meeting to select students (1 PhD and 2 MSc). • Meeting 3: Evaluation of students' study topics (April 2015) and selection of MSc Crop Science student (Oct 2015) • Meeting 4: Dec 2015 Annual review meeting at Kabanyolo
Student Progress and requirement	<p>The students developed their research proposals and presented them to the project team (April 2015). Payment of tuition fees for the PhD and MSc students Students submitted quarterly progress reports</p>
Identification of CKWs	<p>CKWs were identified for each district: Ms Mercy Apio (Apac/Kole; started activities February 2015) Mrs Norah Ebukalin (Bukedea; started activities July 2015) Mr Joseph Okalebo (Serere; started activities October 2015)</p>
Field studies	<p>Farmer group discussions were held in Apac, Kole, Bukedea and Serere districts during 2015. Developed a baseline survey tool for mapping the actors in the cassava value chain in northern and eastern Uganda. Community specific research or development needs were identified (see graduate student topics and incubation ideas)</p>
Kabanyolo studies	<p>Collected 9 farmer preferred cassava varieties and established in a screenhouse at Kabanyolo. Obtained clean planting material of three new varieties (NAM 130, NASE 14, and NASE 19) from NaCRRI for further multiplication and use in establishment of multiplication blocks in each of the communities. Started tissue culture work on farmer varieties for virus elimination studies at Makerere University Tissue Culture Lab.</p>
Equipment	<p>Received the project vehicle, double cabin (Nissan Hardbody), April 2015. Repaired an insect free screenhouse and the plant growth chamber at Kabanyolo for use in production of disease free farmer preferred cassava varieties. Initiated a procurement process for the students' laptops and LCD projector.</p>
Financial reporting	<p>Total budget (October 2014 – September 2018) for four years is US\$ 372,420. Received first disbursement of the funds (October 08, 2014) of USD 146,210 Balance as at December 31 of USD 59,829. Accountability and financial report has been prepared by the project accounts assistant, Ms Olivia Najjemba, and will be submitted separately after internal university auditing.</p>

CHALLENGES AND WAY FORWARD

Farmer/community need were slightly different from the perceived challenges prior to the onset of this project. For instance, in some cases production was not viewed as a constraint. Storage, processing and marketing of farmer produced fresh cassava and cassava products were mentioned as key community challenges. This could be due to the fact that farmers largely produced for food and they always produced more than they can consume not regarding productivity levels. However, for the cassava crop to remain competitive locally and internationally, we need to look at farmer productivity levels and the unit cost of producing a Kg of fresh or dried cassava. This must be comparable to the world figures. At this point, cassava will become an import substitute e.g. for imported cassava starch, for use in animal feeds, confectionary and the brewery industry.

It was also noted that farmers preferred their own local varieties for food. The recently released varieties are preferred for processing including bioethanol production. Therefore, to cater for both categories of fresh tuber consumption and processing, this project has put emphasis on recovering old varieties through virus cleaning and multiplication. The recovered varieties will be put back to the communities with appropriate cropping practices and information on how best to exploit their food production potential.

ACKNOWLEDGEMENT

I would like to acknowledge the project team, students and the farming communities involved in the Cassava CARP Project. Makerere University is providing the necessary administrative and infrastructure support. The flexibility and financial support of RUFORUM are greatly acknowledged. RUFORUM also enable sharing with other CARP projects in Uganda and in the Eastern Africa region for improved management.

Reported by:



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