RESEARCH PROGRAM ON Roots, Tubers and Bananas

CGIAR

Cluster annual report - 2017

CA4.2 – Raising incomes and improving the health and safety at small and medium cassava processing centers

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Photograph: Dominique Dufour

1. MAIN ACHIEVEMENTS

In **Processing** (CA4.2.1), a pilot flash dryer was constructed at CIAT. Performance tests confirmed that small-scale flash dryers can achieve high energy efficiency and low production costs for starches and flours. This makes possible cheaper cassava processing, and hence easier access to cassava value chains for small processors, leading to increased production and incomes.

In **Product quality and user preferences** (CA4.2.2, CA4.2.3), the cluster made important contributions on the retention and bioavailability of carotenoids during cassava processing (casabe, HQCF bread, agbeli, boiled cassava), and on the potential for adoption of biofortified cassava varieties, taking into account the criteria of processors and consumers for baton, fufu and agbeli. Wet processes such as steaming and boiling proved better for retention of carotenoids than dry processes such as roasting and frying. The results point to the role of water in absorbing the heat from the process, and hence protecting carotenoids from elevated temperatures and degradation.

In **Use of by-products** (CA4.2.4), IITA developed a strategy for scaling-out the High Quality Cassava Peel (HQCP) process, based on decentralized and centralized models for technology transfer to private sector partners. These models will be implemented in 2018.

In **Value chains approaches** (CA4.2.5), two case studies in Ivory Coast and Colombia on the socio-economic and environmental sustainability of cassava values chains put in evidence the key role of human resources (economic and technical skills) and of road infrastructures in the successful development of cassava processing.

MAIN ACHIEVEMENTS WITH GENDER AND YOUTH RELEVANCE

Three CA4.2 scientists participated in the GREAT course on Roots Tubers and Bananas organized by Makerere University and Cornell University (https://www.greatagriculture.org/courses/rtb-pdf) in Kampala on 12-21 September 2016 and 13-17 February 2017. As part of the training, a study on gender roles, dynamics of household decision-making, and income distribution in the cassava value chain was conducted in Benin. The results are published in the following report: Gender analysis of cassava production and processing into gari in Benin.

CIRAD and the Faculty of Agronomical Sciences (FSA, University of Abomey-Calavi) conducted a gender-disaggregated study of the criteria used by consumers to assess the quality of agbeli in Benin. Women were the main decision-makers for purchasing agbeli. Key quality criteria were richness in starch, low fiber content, and ability to yield an extensible and sticky paste after cooking.

MAIN ACHIEVEMENTS WITH CAPACITY DEVELOPMENT RELEVANCE

Capacity development activities on cassava processing were postponed to 2018 due to restrictions in bilateral funding.

At least two PhD students, and 6 MSc students were trained through CA4.2 activities, on the following topics:

1) Interactions between processing conditions of gari and final product quality (PhD project).
2) Socio-economic and technological changes in the cassava value chain in the Cauca region (Colombia) over 20 years (1995 – 2017) (PhD project).
3) High diversity of phenotypes and functional properties among cassava genotypes representative of seven agro-climatic regions in Latin America (MSc project).

4) High retention of carotenoids using the production process of casabe (a cassava-based food in the Amazon basin) with biofortified cassava clones (MSc project).
5) Assessment of energy efficiency and starch end-product quality of a pilot, small-scale flash dryer (MSc project).
6) Comparative assessment of the physico-chemical and metabolic changes during ripening of bananas and plantain varieties (MSc project).
7) Development of a laboratory protocol for the extraction and analysis of pectins from cassava roots (MSc project).
8) Analysis of the composition of wastewater from small-scale cassava starch processing factories: Load of organic matter, particle size distribution, ability to flocculate in order to concentrate organic matter (MSc project).

The year 2017 also saw the hiring under permanent contracts at CIRAD and NRI of two young researchers who were previously trained on cassava flash drying under the RTB twin post-doc program in 2014-2016.

2. MAIN GAPS AND CHALLENGES

Overall, activities were carried out according to plan, with only one deliverable cancelled and two postponed (out of 32).

Research activities (e.g. processing ability, consumer preferences, etc.) that depend on the harvest calendar of experimental cassava plantations (Cameroon, Benin, Colombia) needed careful advance planning to ensure that the research teams concerned (from IITA, CIRAD, CIAT) were available at the required times. This was achieved thanks to excellent communication and coordination between parties, and will continue in 2018.

This year was the first of RTB phase 2, and uploading the list of deliverables to MEL at the beginning of 2017 took some settling in. As a result several deliverables were not registered and were uploaded as unplanned during the reporting cycle in November-December 2017. For 2018, the planning of deliverables was smoother as the planning and reporting process is now well in place and the CA4.2 team is better used to the system.

Funding remains a concern for RTB post-harvest activities in 2017 and 2018. Efforts to increase bilateral funding are on-going.

MEASURES TAKEN AND ADJUSTMENTS PROPOSED

Please see previous section, where measures taken and adjustments proposed are described following their corresponding gap and challenge.

3. PARTNERSHIPS: ACHIEVEMENTS AND CHALLENGES

List of Key External Partnerships

FP	Stage of research*	Name of partner	Topic of partnership
4	3	NAZYA Foods Plot 23280, PHI, Lusaka, Zambia	Received training on production of High quality cassava flour (HQCF) and the company is also collecting HQCF from IITA- Cassava

		Contact person: Mrs Winnie Nachivula-Company Director	processing centre operated by the IITA-Zambia Youth Agripreneurs. The company has their products all over supermarkets in Lusaka.
4	3	National Breweries PLC Plot 6438, Mungwi Road Industrial Area, Lusaka, Zambia Contact person: Mr. Chris Nicolle-Agricultural Manager	The breweries have been using cassava chips to produce EAGLE beer consumed in Zambia and they are buying cassava chips from IITA-Cassava processing centre operated by the IITA-Zambia Youth Agripreneurs.
4	1	Faculty of Agricultural Sciences (FSA) at the University of Abomey Calavi, Cotonou (Benin) Contact person: Noel Akissoe	The FSA, in partnership with CIRAD and IITA, conducted comprehensive surveys of cassava processing and consumer preferences for two products consumed in Benin: agbelima and gari. The surveys included an assessment of gender roles and level of equality among value chain stakeholders.

* Please mark: 1 – for Discovery/Proof of concept; 2 – for Piloting; 3 – for Scaling up and scaling out.

Status of Internal (CGIAR) Collaborations among Programs and between the Program and Platforms

Exploratory talks for collaborations took place with RTB FP5, PIM and CCAFS. However no formal collaboration has been initiated yet.

Name of CRP or Platform	Brief description of collaboration (give and take among CRPs) and value added*	Relevant for RTB FPs
	Please provide a short description of main activities and results obtained	

*e.g. scientific or efficiency benefits

4. FUND RAISING

The team of cluster CA4.2 made key contributions in developing the **RTBfoods** proposal, which was accepted for funding by the Bill and Melinda Gates Foundation (BMGF). Indeed, part of the rationale for RTBfoods is based on the achievements of CA4.2 in the field of users preferences during RTB1 (2013-2016). The project started in November 2017. Budget 8.2 Mn USD over 5 years, 15 partners.

The **RTB Scaling Fund** awarded the project "Scaling the transformation of wet cassava peels into high quality animal feed ingredients" to a team including scientists from IITA, ILRI and CIAT. The project started in January 2018. Budget 400 kUSD over 2 years, 3 partners.

Irish Aid awarded the project Root and Tuber Crops for Agricultural Transformation in Malawi (RTC-Action Malawi) to a CA4.2 team led by IITA. The project started in January 2018 for one year.

GIZ awarded the project BAMASWEB to a team led by IITA on cassava processing.

Scientists of cluster CA4.2 contributed to an expertise to assess the sustainability of the cassava value chain in Ivory Coast (economic, social and environmental dimensions), funded by the **European Union** Value Chain Analysis For Development (**VCA4D**) project. The project started in March 2017 for one year. Budget 190 kUSD, 2 partners.

5. INNOVATIONS[1]

List the innovations that: 1) have been made available for use to next-users in 2017; 2) have demonstrated uptake by next users in 2017.

Title of innovation (minimum required for clarity)	Corresponding output in MEL	Phase of research *	Partners involved	Geographic scope: for innovations in phases AV* or USE* only (one country, region, multi-country, global)
Development of cassava-based products and consumer preference of the products to identify the preferred products	4819	AV (recipes of the products available for uptake)	Zambia Ministry of Agriculture	Zambia
Energy efficient small-scale flash dryer for cassava processing (starch and flours)	CA4.2.1.4 (deliverables 4815, 4816, 9767, 9333)	AV (blueprints and expertise (economic & technical) to build small-scale flash dryers are available for uptake)	Deriyuca (cassava starch processors, Colombia) Niji Lukas (equipment manufacturer, Nigeria)	Multi-country (Colombia, Nigeria, Uganda, Tanzania)

* Phases: AV - available/ready for uptake, USE - uptake by next users.

[1] Research and development innovations are new or significantly improved (adaptive) outputs - including management practices, knowledge or technologies.