WP5 Synthesis for Period 1

Activities Conducted, Key Research Findings & Perspectives

Main Author(s):

- CAREY, Ted, CIP, Ghana,
- TEEKEN, Bela, IITA, Nigeria
- MAYANJA, Sarah, CIP, Uganda
- DUFOUR, Dominique, CIRAD, France

Contributor(s):

- NGOH NEWILAH, Gérard, CARBAP, Cameroon
- MADU, Tessy, NRCRI, Nigeria
- CHIJIOKE, Ugo, NRCRI, Nigeria
- BELLO, Abolore, IITA, Nigeria

This synthesis refers to the following teams (or scientists)

	Partner Institution(s)	***Country***	***RTB crop(s) of interest for RTBfoods***	***Processed/Food Product(s) of interest for RTBfoods***	***Names of people involved in the team for this WP***
Team 1	IITA/NRCRI/CIRAD	Nigeria	Cassava and Yam	Fufu, Gari, Boiled and pounded yam	Bela Teeken, Tessy Madu, Duffour
Team 2	CIP/NARL	Uganda	Sweetpotato	Boiled/fried	Mwanga, Mayanja, Kyalo, Tinyiro
Team 3	NARL/Bioversity	Uganda	Banana	Matooke	Akankwasa/van den Berg
Team 4	CARBAP/IITA/CIRAD	Cameroon	Plantain and cassava	Plantain – boiled, fried, pounded	Noupadja (Ngoh)/Lienou, Fotso
Team 5	CNRA	Cote d'Ivoire	Cassava, plantain, sweetpotato, yam	Attieke, fried plantain, fried sweetpotato, boiled	N'Zué, Ebah , TIEMELE; TRAORE Kouakou, Dibi

Abstract

of the full document summarizing each section *(NB: This section will be copied & pasted in the Annual Report delivered to BMGF). (max 2 pages)*

Work Package 5 represents the advanced testing stage prior to release. The main objective is to develop useful protocols for effectively evaluating and getting feedback on performance of advanced clones from users (producers, processors, consumers) in order to ensure that only acceptable varieties are released and promoted by breeding and seed programs. Sequencing of activities under the RTBfoods project anticipated major efforts in other WPs in the first year of the project, as critical information was gathered on validation of product profiles, methods of engaging with processors and consumers to determine preferred attributes, understanding the basis of preferred attributes, introducing selection for these in breeding programs through the use of high throughput phenotyping methods, and ultimately molecular approaches to selection. There were, however, some opportunities to take advantage of on-going advanced testing of genotypes by research teams interested in systematically engaging with processors and consumers in addition to the usual engagement with producers through on-farm trials.

In Nigeria WP5, multidisciplinary IITA/NRCRI/CIRAD teams engaged with cassava processors, producers and consumers through mother-baby trials that were on-going under the NextGen project and provided substantial information on varietal suitability for gari and fufu, as well as insights on engaging with users. Similar work was also conducted in Nigeria on evaluation of yam genotypes under the Africa Yam project for boiling and pounding. In Uganda, on-farm trials of sweetpotato genotypes under a USAID-funded project (MENU) provided the opportunity for engagement with processors and consumers to conduct evaluations of boiled and fried sweetpotato. In Uganda, methods for engagement with users in the evaluation of bananas for matooke were also underway by the NARL/Bioversity team, but results are not yet in. Elsewhere, WP5 activities were deferred until the effective engagement with the RTBfoods WP1 team could be assured so as not to rush ahead without agreed-upon protocols. However, preparations were underway for WP5 activities on targeted crops and products in each of the remaining RTBfoods countries, including Cameroun, Benin and Cote d'Ivoire, and Uganda. In the case of banana, this was largely through idenfication and multiplication of genotypes for inclusion on WP5 trials in coming years.

Preliminary reports of the the cassava and yam assessments from Nigeria and of the sweetpotato assessment from Uganda were received and salient points of methods used are summarized here.

- The cassava trials used mother-baby trials and a multidisciplinary approach to evaluate gari-eba, and fufu at locations in 2 states in Nigeria (Osun and Imo). Between 20 and 25 genotypes were evaluated, including widely grown Nigerian varieties, experimental genotypes (some from the NextGen project) and local preferred checks. The mother trials included all genotypes in replicated 60-plant plots, which were used to gather agronomic data and provide 3 expert processors at each location with roots for processing into gari, and its cooked product, eba. In Osun state, cassava was also processed into two types of fufu. During the processing operations, detailed data on relevant processing attributes and conditions such as time of peeling, yield of gari, toasting temperature, etc, was taken by researchers, while processors were interviewed on their assessment of processing quality of each cultivar for each product. Eba quality was also evaluated by processors. Baby trials were established with 20 producers in each state and used to engage with a diversity of carefully selected users chosen to represent different social groups. A sub-set of experimental genotypes and local checks was used in smaller, replicated trials at each farm, with all experimental genotypes evaluated at an equal number of farms. Regular visits during growth and after harvest provided insights on the genotype performance by the various users. Detailed data collection protocols and forms were developed and used by the team for both the mother

and baby and processing trials, and used rating scales, ranking and detailed probing to elucidate producer and processor assessments. Preliminary report and forms are posted on the RTBfoods portal.

- Similar trials were conducted for boiled and pounded yam using expert processors at 3 locations in 2 states, Oyo and Ondo, in Nigeria. Results remain to be reported, but certainly generated a wealth of information on genotype performance and provided input to each of the WPs.
- Sweetpotato trials in Uganda expanded on standard CIP on-farm trial methods, which included community engagement under the MENU project, a project aimed at evaluating and promoting orange fleshed sweetpotato varieties in selected Districts. A set of genotypes, including local white fleshed check, were evaluated boiled or fried. Three tests [Hedonic, Just-About-Right (JAR) test and Check All That Applies (CATA) test] were used. Preliminary results indicated preferred genotypes for both boiled and fried sweetpotato. However, in some cases, sweetpotato yields were very poor, and did not permit the full range of anticipated consumer sensory assessments.

The first reporting period has been a period of intensive activity across the project, with major efforts undertaken to a greater extent in WPs other than WP5. During the initial stage of project implementation there will be a need for strong interaction of WP5 with WPs 1 and 2 for development of protocols for user assessment and provision of materials for physiochemical analysis. However, WP5's ultimate objective is to provide standard, easily implementable protocols to elicit producer, processor and consumer feedback on advanced materials prior to release. Standard methods will certainly include user of "mother trials" and collaboration with expert processors. The use of citizen science approaches including the triadic comparison of technologies (tricot) Climmob methods developed by Bioversity also appear to offer promise, and the potential to use this method to complement and amplify the results of baby trials will be systematically investigated as a WP5 method in the coming seasons.

WP5 Results-Tracker: Activities & Milestones achieved

Output 3.1.1: *Methodology for participatory assessment of VUEs acceptance developed*

Activities conducted	***Deliverables***
Participatory evaluation of new hybrids (from partner RTB breeding programs) with adapted WP1 Guidance	For Period 1, a summary of preliminary results is provided in WP5 Synthesis report for Period 1.

Output 3.1.1 Indicator	*Target / Milestone*		
	Planned for Period 1	*Achieved*	*Variance & Brief Explanation*
Nb of new hybrids from partner breeding programs assessed against users' quality preferences	10 new hybrids from partner breeding programs (Nextgen, Sasha, BBB)	*Mother-baby cassava evaluations in Nigeria : Included ~25 genotypes and 3 nextgen hybrids* *Yam evaluations in Nigeria : On-farm trials, 12 genotypes, 6 new hybrids from IITA breeding effort* *Sweetpotato evaluations in Uganda : 9 genotypes in multi-locational on-farm trials with 7 genotypes from CIP/NARO breeding program* *Several bananas in multiplication for evaluation in Cameroon and Cote d'Ivoire.* *Yam, cassava, sweetptato available in Cote d'Ivoire anticipated for trial once recommended testing methods developed*	*Ongoing project activities had genotypes, including breeding program products for evaluation in WP5 advanced trials.*

Methodology development

- *Relevance: For which reasons is a « new » methodology being developed within RTBfoods project? What for? Which Originality as compared to existing methodologies for participatory assessment of new RTB hybrids?*
  - At this initial stage, trials have been and will be done with the multiple purposes of defining user-preferred attributes, including sampling for laboratory analysis and sensory analysis, and development of efficient methods of engaging with users including processors. In the three substantive cases conducted this year : cassava and yam in Nigeria and sweetpotato in Uganda, trial methods already determined by partner projects were used : mother-baby (cassava), and standard single-rep multilocational on-farm trials (yam and sweetpotato) were used by implementing scientists and partners, with the additional facet of engagement with experienced processors and/or consumers. Lessons learned during these initial trials will help us to develop recommended practices for efficient engagement with users at the advanced trial stages.

- *Lessons Learnt from participatory assessments of new hybrids conducted by WP5 in Period 1: Which major methodological learnings from activities conducted in Period 1 by WP5 partners on the different RTB crops?*
    - Engagement with expert processors, an approach used for cassava and yam evaluation in Nigeria provided useful results from the mother-baby trials. However, the effort required was quite significant. Furthermore, the effort required to engage with all of the baby trial producers also added demands for monitoring visits. The sweetpotato trials in Uganda involved careful engagement with consumers for the assessment of boiled and fried products, and this too required a very significant effort on the part of the researchers. However analysis and reporting of these results was only preliminary, and a complete assessment cannot be made at this time.

- *How first learnings from WP5 could benefit partner breeding programs (learning dimension)?*
    - Lernings from year 1 will be discussed with partners to determine lessons learned, and develop plans for year 2 trials. What is ultimately needed, once user needs are understood, will be relatively simple protocols for engagement with users. Ideally these methods should be simple and powerful, and readily taken up and used by a range of partners. Though trials were not conducted using the Climmob method, the approach is being used by NextGen cassvava and the BBB projects, and discussions were held within the project and with external partners to seriously assess the suitablity of this approach for routine application during statge 4 (advanced) trialing.

- *Gaps/Risks identified & Next steps in methodology development: what is missing to have an exhaustive methodology shareable within the RTB breeding community & likely to attract their attention? What need to be done in the next coming years within WP5 to reduce these gaps / limit these risks?*
    - We need to consider feedback of all partners with regards to lessons learned from year 1. Trials will be continued in year 2, with possible revisions to year 1 designs in the case of cassava, yam and sweetpotato. Preliminary results for potato and banana trials will also be available for consideration. Ultimately, for each crop, we require suitable, relatively low input trials that will allow us to efficiently determine user assessments (agronomic, and quality) of varieties proposed for release in order to make informed decisions about whether to advance materials under evaluation or not.

Output 3.1.2 : Acceptability of VUEs validated by RTB users (farmers, processors, retailers and consumers)

Activities conducted	***Deliverables***
Inventory of ongoing or planned on-station or on-farm assessments of advanced selection prior to release	For Period 1, a summary of on-ongoing or planned on-station or on-farm assessments is provided in the WP5 Synthesis report.

All trial work conducted so far has been on-farm. On-station work is not anticipated. Cassava and yam work in Nigeria is planned for repeat. Sweetpotato work in Uganda will need to be repeated, while potato and possibly cassava trials in Uganda will need to be planned and discussed at the RTBfoods annual meeting. As mentioned previously, work may be planned in each country, but awaits consultation based on results of WP1 findings, and recommendations of initial WP5 trials.

Team coordination

- *Successful collaborations on some activities and/or for some food products among WP5 partners?*
  - The strong engagement of the cassava and yam teams in Uganda was not anticipated during the planning for year 1, but was most welcome, and will provide significant information for discussion when planning for the next season's trials, and for providing input to the methods of others.

- *Challenges faced in coordination of WP5 team work?*
  - WP5 was not anticipated to start strong, so challenges are not great. The great disappointment was less than optimal results from the sweetpotato trials in Uganda, based to some extent on reliance on the HarvestPlus MENU project, which experienced delayed funding in 2018, and hence delays in project implementation.

- *Strategies to be reinforced/developed by WP5 coordination team for Risk mitigation & Partner mobilization in WP5 activities? If possible, refer to the teams (Institution+Country+RTB crop or food product concerned) you would like to see more involved in WP5 activities in the future.*
  - Annual meeting for year 2 planning should allow resolution of any potential problems and adequate interaction to lead to clear plans and commitments by relevant partners.

Success Story Box *: If relevant, WP Success Stories you want to make appear in the Annual Report: Narrative on WP framework, or set of activities that illustrate well the dynamism and the innovative framework of RTBfoods research project. List the teams involved (Institution+Country+RTB crop or food product concerned), the type of Activity and the Point(s) of Interest you want to put the lights on (300 words max per Success Story).*

Nothing at this time.

- *Fill-in the table below with a brief description or bullet-point lists of interactions with other WPs (successful ones & gaps) and propositions for risk mitigation*

	Successful Interactions/ Coordination with other WPs (specific actions concerned, frequency, tool sharing)	***Gaps in Interactions/Coordination with other WPs: What is needed form other WPs ? (NR = not relevant)***	***Risk mitigation: How to Improve (specific actions to be taken, frequency, tool sharing?)***
WP1	• CIP WP5 funds were used to support WP1 training in Benin and for survey work in Uganda because WP1 funds were inadequate for required work. Furthermore, WP1 results are essential to implementation of WP5 activities.	• Continuing need for discussion and interaction	• We are making plans for this interaction, incuding with WP4 and WP2.

Conclusion on Progress & Key Achievements

- *Synthesis on what worked well in Period 1 - Successful achievements – Strengths & Complementarities of scientists involved in WP5.*
  - Interaction of gender specialist, Bela Teeken, with cassava and yam trials in Nigeria was really appreciated. Lessons learned from this work will guide further efforts in year 2.

Perspectives for Period 2:

Draft of workplan for WP5 (new *hybrids from partner breeding programs to be assessed, food products concerned, teams (& product champion(s)) to be involved, etc). .*

Lists of genotypes and workplans for period 2 will be confirmed during the review process. See below for tentative list products, partners and places to be addressed in the coming period(s).

Annexe 1: Targeted RTB crops, food products by countries within RTBfoods project.

RTB Crops	*Food/Processed Products*	*Primary countries*	*Spillover countries*	*National partners*	*International partners*	*Product Champions*
Cassava	**Boiled & Pounded cassava**	**Uganda, (Colombia)**	Benin	NaCCRI, NARL, Benin-UAC,	CIAT, CIRAD, INRA, NRI	*Robert Kawuki & Thierry tran*
	Granulated cassava: Gari, Eba, Attieke	**Nigeria**	Cameroon, Côte d'Ivoire, Benin (?)	IRAD, CNRA, UAC/FSA/NRCRI	IITA, CIRAD, NRI	*Bussie Maziya D. / Ugochukwu Ikeogu*
	Fufu	**Nigeria**	Cameroon	NRCRI, NaCRRI	IITA, CIRAD, NRI	*Ugo Chijioke / Apollin Fosto*
Cooking banana	**Boiled plantain**	**Cameroon**	Nigeria (might be done together with Fried Plantain), Côte d'Ivoire	CARBAP, CNRA	CIRAD, INRA, Bioversity, IITA	*Gérard Ngoh Newilah*
	Matoke	**Uganda**		NARL	BIOVERSITY, CIRAD, IITA	*Kephas Nowakunda*
	Fried plantain, Alloco	**Nigeria** (can be done together with boiled plantain)	Cameroon	CARBAP	IITA/CIRAD	*Josephine Agogbua / Delphine Amah*
Sweet potato	**Boiled Sweetpotato (& purée?)**	**Uganda**		NARO (NaCCRI)	CIP, JHI, North Carolina State University, NRI	*Robert Mwanga*
	Fried Sweet potato	**Nigeria**	Cote d'Ivoire, Uganda	NARO (NaCCRI), CNRA	CIP, CIRAD, NRI	*Jan Low*
Yam	**Boiled Yam**	**Benin**	Nigeria, Cote d'Ivoire	Bowen U., UAC/FSA, CNRA, NRCRI	CIRAD, IITA, INRA, NRI	*Noël Akissoé*
	Pounded Yam	**Nigeria**	Cote d'Ivoire, Benin	Bowen U., UAC/FSA, CNRA, NRCRI	CIRAD, IITA, INRA, NRI	*Jude Obidiegwe / Bolanle Otegbayo*
Potato	**Boiled potato & Potato fries (?)**	**Uganda**		Kazardi	CIP, JHI	*Thiago Mende / Elmar Shulte*