

Bioversity International Activities & Achievements in Period 3 (2020)

Kampala, Uganda, 29 January 2021

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This report has been written in the framework of RTBfoods project.

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Ethics: The activities, which led to the production of this manual, were assessed and approved by the CIRAD Ethics Committee (H2020 ethics self-assessment procedure). When relevant, samples were prepared according to good hygiene and manufacturing practices. When external participants were involved in an activity, they were priorly informed about the objective of the activity and explained that their participation was entirely voluntary, that they could stop the interview at any point and that their responses would be anonymous and securely stored by the research team for research purposes. Written consent (signature) was systematically sought from sensory panelists and from consumers participating in activities.

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ABSTRACT

This report highlights progress made by Bioversity International (now Alliance of Bioversity International and CIAT) in the implementation of the RTBFoods project during Period 3 (November 2019 – November 2020). During this period, activities focused on Work Packages 1 and 2. For WP1, the main activities included: data collection (market trader interviews in Nakaseke district), data processing, analysis and report writing for Activities 3, 4 and 5. Achievements included finalised report for Activity 3, advanced draft reports for Activities 4, 5, gender specific output and co-authorship in a paper published in the international Journal of Food Science and Technology. Under WP1, Moreen Asasira an MS student in Agricultural Economics at Makerere University, Uganda, progressed well in her thesis and has submitted the first draft for review by university supervisors. Her work focuses on urban consumer preferences. For WP2, the main work involved preliminary identification and prioritisation of the key traits for WP2 to dissect based on Activity 3 results in collaboration with the Uganda matooke team. Willy Nelson Kisenyi an MS student in Food Science at Kyambogo University, Uganda successfully defended his MS thesis titled, 'Physicochemical and sensory properties of selected local and hybrid cooking bananas (matooke) in Uganda'. His supervision was shared between Bioversity, NARL and Kyambogo University. Under WP2 work related to the ontologies, lexicon elements were extracted into a specific dictionary format in collaboration with the food scientists and an internship by Amos Asiimwe an MS student in Human Nutrition at Makerere University, Uganda. Steps were taken to get a food product ontology enabling the Breedbases to integrate the sensory traits measurements produced by trained sensory panels in WP2. Resulting validated food product property dictionaries for matooke, boiled cassava and boiled sweet potato are uploaded on the RTB platform. As part of the ontology work, Bioversity spearheaded the formation of a banana 'expert' group comprising of breeders, social scientists, gender researchers and food scientists from Bioversity, NARL and IITA to validate some of the traits and their definitions. The group will continue to interact regularly, and this platform can be used to discuss related work and future potential collaborations. Bioversity co-developed presentations that were disseminated by other RTBFoods colleagues at three workshops (RTBfoods project monthly webinars, GREAT Virtual Symposium and French Agency for Research conference). Capacity development has been an integral part of Bioversity's work and to that effect two master's students and an intern contributed to various work packages of the project.

Staff commitment, activities performed & perspectives

Deadline for Submission to PMU: **January 31, 2020**

MEL Contact Person : Eglantine Fauvelle, eglantine.fauvelle@cirad.fr, Skype ID : tartineglantine.

RTBfoods Reporting Cycle for Period 3		
Main steps in the process	Responsible	Deadline
1. All Deliverables uploaded on RTBfoods platform	All scientists	December 20, 2020
2. Reporting of Scientific Progress & Achievements <u>by WP</u>	WP Coordinators	December 20, 2020
3. Financial Reporting	Partner Focal Points & Financial Officers	January 15, 2021
4. Reporting of Activities <u>by Institute</u>	Partner Focal Points	January 31, 2021
5. Revised version of WP reporting	WP Coordinators	February 15, 2021
6. Reporting to BMGF	PMU	March 15, 2021

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Collaborator(s)

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Focal Point

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1 PRODUCT PROFILE INVOLVEMENT (BY COUNTRY)

Partner Institute	Product (Country) – Main PP in bold
Bioversity International	1-Matooke (Uganda) with NARL, IITA & NaCRRI

2 BIOVERSITY INTERNATIONAL SUMMARY NARRATIVE

Tell us the story of your Institute in Period 3 focusing on main Activities & Achievements (Dec. 2019 to Dec 2020) (1-page max). (NB: This section will be copied & pasted in the body of the RTBfoods Annual Report for Period 3).

In Period 3, Bioversity International (now Alliance of Bioversity International and CIAT) was involved in **Work Packages (WPs) 1 and 2**. This section highlights the activities and achievements of Bioversity and partners in these work packages. **All activities were jointly coordinated with the National Agricultural Research Laboratories (NARL).**

For WP1, the main activities included: **data collection** (market trader interviews in Nakaseke district), **data processing, analysis** and **report writing** for Activities 3, 4 and 5. The main achievements were a finalised report for Activity 3 and advanced draft reports for Activities 4 and 5. Bioversity co-authored a **paper published in IJFST titled ‘The East African Highland Cooking bananas ‘Matooke’ preferences of farmers and traders: Implications for variety development’**. The article was a joint output with colleagues from CIRAD, NRI and NARL. Bioversity also **contributed to the development of the gender output** which was submitted for review to PMU and will be finalised early 2021.

For WP2, the main work involved **preliminary identification and prioritisation of the main traits for WP2 to dissect based on Activity 3 results** in collaboration with the Uganda matooke team (comprising IITA, NARO and Bioversity) and work related to ontologies. Willy Nelson Kisenyi, an MS student at Kyambogo University, Uganda successfully defended his MS thesis titled, ‘*Physicochemical and sensory properties of selected local and hybrid cooking bananas (matooke) in Uganda*’. Nelson’s stipend and research costs were covered by Bioversity and his supervision was shared between Bioversity, NARL and Kyambogo University. His work involved conducting **sensory evaluations using trained panelists, physicochemical analysis of selected local and hybrid matooke cultivars** and contribution to the development of a standardised protocol for preparation of matooke in the laboratory and sensory lexicon for matooke.

Under WP2 work related to the **ontologies, lexicon elements were extracted into a specific dictionary format** in collaboration with the food scientists and an internship by Amos Asimwe an MS student in Human Nutrition at Makerere University, Uganda. Steps were taken to get a food product ontology enabling the Breedbases to integrate the sensory traits measurements produced by trained sensory panels in WP2. Resulting **validated food product property dictionaries for matooke, boiled cassava and boiled sweet potato are uploaded on the RTB platform** (<https://tinyurl.com/sensory-TD>). As part of the ontology work, Bioversity spearheaded the **formation of a banana ‘expert’ group comprising of breeders, social scientists, gender researchers and food scientists from Bioversity, NARL and IITA** to validate some of the traits and their definitions. The group is expected to work together on

RTBfoods related work and other outputs beyond the RTBfoods project which will be useful for the banana breeding program. One of these activities under CRP RTB is around development of user defined ontologies for the different user groups.

Capacity development has been an integral part of Bioversity's work and to that effect **two master's students and an intern** from local universities contributed to various work packages of the project. Bioversity co-developed presentations that were disseminated by other RTBfoods colleagues at three workshops (RTBfoods project monthly webinars, GREAT Virtual Symposium and French Agency for Research conference on Gender in Research).

Synthesis of internships and studentships

Moreen Asasira's work contributed to WP1 objectives and documented the preferences of urban consumers in Kampala. Nelson Kisenyi's work contributed to WP2 objectives. His work included conducting sensory evaluations of selected local and hybrid matooke cultivars and, characterizing the following parameters: physical characteristics; chemical properties; proximate composition; starch and its components; texture analysis and correlation analysis between sensory characteristics and physicochemical properties of the selected cooking banana cultivars. Amos Asiimwe's internship under WP2 focused on crop ontologies - lexicon elements were extracted into a specific dictionary format in collaboration with the food scientists and steps were taken to get a food product ontology enabling the Breedbases to integrate the sensory traits measurements produced by trained sensory panels in WP2.

Lessons Learnt

Bioversity closely collaborated with an interdisciplinary team from NARL and IITA who were partners in all activities. This strong partnership resulted in various joint outputs that will be useful for the banana breeding program. During the project, we also interacted with various partners, built networks, and learnt about the preferences and socioeconomic dynamics in various other RTB crop and food products.

3 BIOVERSITY INTERNATIONAL STAFF INVOLVEMENT BY WP & PRODUCT PROFILE

Should be aligned with Financial Reporting (cf Excel Spreadsheet 'PERSONNEL COSTS').

First Name NAME	Country of Residence	Permanent, Student OR Contractual	WP1	WP2	WP3	WP4	WP5	Matooke (Uganda)
Pricilla MARIMO	Uganda	Permanent	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Beatrice EKESA (co-funding)	Uganda	Permanent	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Elizabeth ARNAUD (co-funding)	France	Permanent	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Willy Nelson KISENYI	Uganda	Student	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

List of Students involved in RTBfoods activities in Period 3 (including Student exchange).

First Name NAME (+ Institute if not from Bioversity International)	Master Student or PhD or Post-Doc	Subject Title	WP	University of affiliation	Fellowship Starting Date	Fellowship Ending date	Co-funding (ex: NextGen, AfricaYam, BBB, SweetGAINS, CRP RTB)	Tutor(s) in RTBfoods project
Willy Nelson KISENYI	Masters	Physico-chemical and sensory properties of selected local and hybrid bananas in Uganda	2	Kyambogo University	Jan 2019	Nov 2020		Pricilla MARIMO Beatrice EKESA
Moreen ASASIRA	Masters	Consumer preferences for cooking banana attributes. A case for urban consumers	1	Makerere University	Nov 2018	Dec 2020		Pricilla MARIMO
Amos ASIIMWE	Intern	Provided support on ontologies related activities	2	Makerere University	Sept 2020	Dec 2020	CRP RTB	Elizabeth ARNAUD

4 BIOVERSITY INTERNATIONAL ACTIVITIES & ACHIEVEMENTS ON MATOOKE (UGANDA)

Product Champion K. NOWAKUNDA (NARL)

4.1 WP1 – Matooke (Uganda)

Bioversity International Key Contact for WP1 on Matooke in Uganda: Pricilla MARIMO

15-20 lines Narrative on Activities performed & Progress in report writing by Activity including Challenges faced & Covid-19 impact (if relevant). Please mention co-funding program(s) (if any). NB: Sub-sections below can be increased or deleted if not relevant.

Activity 3 achievements – Gendered Food Mapping/ Preference Surveys:

In period 3, the remaining activities under Activity 3 were completed. The activities included field **surveys with market traders in Nakaseke district**. The data was compiled, and a report which included data from both Mbarara and Nakaseke was produced which was submitted to the WP1 leadership for review. Surveys with market traders were conducted in March 2020 just before the COVID-19 induced lockdowns and had impacts on some of the timing for implementing some activities.

Some of the other achievements include an **IJFST journal article** from Activity 3 data and a **Gender output focusing on activity 3 results** produced and draft submitted for review to PMU.

Moreen Asasira (MS student in Agricultural Economics) has made great progress in her thesis work which is focusing on urban consumer preferences. A first draft of the thesis has been shared with the supervision team at Makerere University. The plan is to finalise the thesis in 2021. The university approved final version will be shared with PMU.

Activity 4 achievements – Processing Diagnosis:

Activities performed included **data entry, cleaning and report writing**. An advanced draft of Activity 4 will be submitted by end of January 2021 for review.

Activity 5 achievements – Consumer Testing

Activities performed included **data entry, cleaning and report writing**. An advanced draft of Activity 5 was submitted in December 2020 for review.

ALL WP1 activities: For all activities, co-funding was provided institutionally to cover staff time for Pricilla as only 4 days had been covered under the grant. We had **delays due to the Covid situation and lockdown** e.g., delays in hiring support, data entry, no access to hard copies etc. The advent of the pandemic delayed several activities particularly hiring support to help with data entry, cleaning and writing and no access to the filled questionnaires due to the lockdown. Hence, the few months towards the end of the year was marked by a lot of pressure to finish the numerous outputs.

4.2 WP2 – Matooke (Uganda)

Bioversity International Key Contact for WP2 on Matooke in Uganda: Willy Nelson Kisenyi, Elizabeth ARNAUD and Pricilla MARIMO

In period 3, WP2 activities revolved around the thesis of the MS student (Willy Nelson Kisenyi) who was jointly supervised by colleagues from Bioversity, NARL and Kyambogo University. The other

related work is crop ontologies which is described in detail in Section 5. Nelson's work included **conducting sensory evaluations of selected local and hybrid matooke cultivars and, characterizing the following parameters: physical characteristics** (finger length, finger circumference, peel thickness and pulp/peel ratio); **chemical properties** (pH, TSS, titratable acidity, color and dry matter); **proximate composition** (moisture content, crude fat, crude protein, total ash, crude fiber and total carbohydrates); **starch and its components** (amylose and amylopectin); selected essential mineral nutrients (Zn, Ca, Fe, K, Mg and Na); **texture analysis** (hardness, cohesiveness and adhesiveness) and **correlation analysis between sensory characteristics and physicochemical properties of the selected cooking banana cultivars**. He successfully defended his MS thesis at Kyambogo University, Uganda and is currently in the process of incorporating corrections. Nelson's thesis is titled, '*Physicochemical and sensory properties of selected local and hybrid cooking bananas (matooke) in Uganda*'

Institutional co-funding for Beatrice Ekesa enabled supervision for the MS student as none of her staff time was covered under the project. All the ontology development work done by Elizabeth Arnaud and Amos Asiimwe was co-financed by CRP RTB.

4.3 WP5 – Matooke (Uganda)

Bioversity International Key Contact for WP5 on Matooke in Uganda: (Pricilla MARIMO)

15-20 lines Summary Narrative on Activities performed & Progress done in On-farm Participatory Assessments of Advanced Genotypes. Please make sure to mention co-funding program(s), Methodology & Tools used, Stakeholders involved, Nb of clones assessed & Nb of environments. Refer to Covid-19 impact on the implementation of institute activities (if any).

Due to the limited budget, none had been allocated for WP5 work under RTBfoods. The advent of the COVID pandemic meant work related to **participatory varietal selection could not be conducted due to the restrictions on travel** and standard operating procedures that were put in place.

4.4 Interactions with other institutes working on Matooke

Brief Narrative on cross-institute interactions for Staff, Equipment, Protocols &/or Results share. Please mention the WP(s) in which these interactions take place. NB: Sub-sections below can be increased or deleted if not relevant.

NARL (Uganda):

Activities were coordinated jointly with NARL. All the WP1 activities – planning, review of survey tools and adaptation of tools, implementation of field surveys, data processing and writing of reports are done jointly. For WP2, the **MS student (Nelson) conducted his work in the laboratory at NARL** which involved measuring the physical properties of matooke, analysis of chemical properties such as pH, TSS, dry matter and colour, proximate composition, starch, amylose and amylopectin contents, mineral analysis, texture analysis and sensory evaluation of the selected matooke cultivars. Joint supervision of student was done with NARL colleague (Moses Matovu).

IITA (Uganda):

Interactions with Brigitte Uwimana and preliminary finalised tables from Activity 3 gendered food mapping exercise were shared and comments provided for clarification on some aspects. IITA is also part of the **banana expert group created to validate some of the traits** and their definitions.

NARL, BTI, CIRAD: Interactions were around the **crop ontology work** and detailed information is provided in the next section.

5 DATA MANAGEMENT & ONTOLOGY DEVELOPMENT AT BIOVERSITY INTERNATIONAL

Bioversity International RTBfoods Data Manager: (Elizabeth ARNAUD)

Summary brief on institute activities & level of progress in the development of ontologies for post-harvest quality traits. Make sure to list quality traits & RTB crop(s) or product(s) concerned and institute staff involved - Also mention partner collaborations/contributions within RTBfoods framework (if relevant).

The ontology development work was coordinated by Elizabeth Arnaud. Steps were taken to get a **food product ontology enabling the Breedbases to integrate the sensory traits measurements produced by trained sensory panels in WP2**. A lexicon, which is a defined list of attributes and properties developed by food scientists, is integrated into the SoPs to guide the collection of organoleptic traits measurements. The lexicon elements were extracted into a **specific dictionary format** (see Annex 1) in collaboration with the food scientists and an internship by Amos Asiimwe (MS student in Human Nutrition at Makerere University, Uganda). It will be used to better describe in Breedbases the variables of sensory data files that currently do not provide enough information for interpretation by non-expert. The validated SoPs were provided by CIRAD QualiSud team after their validation. For consistently extracting the elements composing the sensory variable, we used and **modified the Crop Ontology Trait Dictionaries Template to adapt it to food products**. Resulting **validated Food product property dictionaries for matooke, boiled cassava and boiled sweet potato are uploaded on the RTB platform** (<https://tinyurl.com/sensory-TD>). The TD for boiled yam still needs expert validation. Discussions were held with Christophe Burgaud (CIRAD), Nelly Forestier-Chiron (CIRAD), Isabelle Maraval (CIRAD), Eglantine Fauvelle (CIRAD), Marie-Angélique Laporte (Bioversity), Elizabeth Khakasa (NARL), Jolien Swanckaert (CIP), Miriam Nakitto (CIP). Amos Asiimwe visited NaCRRRI Namulonge and NARL Kawanda to gain in-depth understanding on how the SOPs were generated, explanations about the procedures for conducting trained panel sessions and to get clarification on some unclear traits and definitions. The BTI team has provided us access to a test Musabase to prospect how we can integrate the ontology elements and annotate WP2 data sets because we will have to map the food product properties as per food scientists with the breeders' way of naming similar quality traits as it differs in some cases. This will be performed early 2021. In parallel, we **developed a new format for extracting variables related to the food processing techniques** for the annotation of data collected in WP1-activity 4 in collaboration with Alexandre Bouniol, WP-co-leader, CIRAD. We started by the reports for **boiled and steamed cassava** and will continue with boiled yam.

Spearheaded by Bioversity, a **banana 'expert group' constituting breeders, social scientists, gender researchers and food scientists from Bioversity, NARL and IITA was created** to validate and curate banana specific traits that will be incorporated in the banana ontology. An inaugural meeting with the group took place in December 2020. The plan is for the group to continue meeting regularly. The work of the expert group will go **beyond the RTBfoods project** and the meetings/interactions will provide a platform to discuss and share ideas on related activities and **upcoming opportunities for collaboration**. Part of work will focus on creating user defined and inclusive ontologies based on preferences from the different value chain actors – this will be co-financed by **funds from the CG Gender Platform and CRP RTB**. The expert group is open to cater for any staff turnovers, is expected to grow with time and bring in other expertise that might be currently missing. A preliminary list of members is provided in Annex 2 (please note this is tentative and based on a list of those who were contacted in the initial request).

6 ETHICAL CLEARANCE



Describe Process implemented in Uganda for Ethical Clearance of RTBFoods Activities: Responsible Institute, Institutions contacted & Material provided (ex: Methodological Manuals), Next Steps.

Ethical approval in Uganda is given by Institutional Research and Ethics Committees (RECs), accredited by the Uganda National Council of Science and Technology (UNCST). The process includes: (1) Identification of a relevant and accredited Institutional Research and Ethics Committee (2) Preparing and submitting an application (3) Paying the fees (4) Obtaining approval. Among the accredited RECS in Uganda, the **Makerere University of Social Sciences Research and Ethics Committee was the most relevant for RTBFoods activities**. We therefore contacted the committee and obtained the requirements to obtain ethical approval. The committee requires a (1) Fully filled application form, (2) A copy of the research proposal (3) Fourteen copies of the research protocol, (4) Fourteen copies of the informed consent forms (5) Fourteen copies of the questionnaire that will be administered in the research surveys. **All these documents have been submitted to the committee.**

Summary on Main Conclusions from cross-program coordination meetings (if any). Make sure to mention Date, Duration and Participants.

RTBFoods/ABBB

Not applicable

7 BIOVERSITY INTERNATIONAL TRAVELS: PARTICIPATION IN RTBFOODS MEETINGS & INTERNATIONAL EVENTS ON RTBFOODS BUDGET

Fill-in the table below paying attention to the alignment with Financial Reporting (cf Excel Spreadsheet 'TRAVEL COSTS').

	Title /Training Objective	WP	City, Country	NAME(S) of Participants
RTBFoods Meetings	RTBFoods Annual meeting (2020)	ALL	Kampala, Uganda	Pricilla Marimo Willy Nelson Kisenyi
RTBFoods Trainings	Trainings on instrumental texture analysis and sensory evaluation using trained panelists	3	Kawanda, Uganda	Willy Nelson Kisenyi
International / Regional Conferences				
Scientist Exchanges				

8 BIOVERSITY INTERNATIONAL CAPITAL EQUIPMENT OR INVESTMENT (CO-INVESTMENT)

Synthetic list of Equipment purchased on RTBFoods Budget (ex: texturometer, RVA, pHmeter, etc.). Should be aligned with Financial Reporting (cf Excel Spreadsheet 'EQUIPMENT COSTS')

None.

9 COMPLEMENTARY SOURCES OF SUPPORT FOR RTBFOODS ACTIVITIES

Synthesis on complementarity between RTBfoods & partner programs activities in Period 3 (e.g. NextGen, AfricaYam, BBB, SweetGAINS, CRP RTB, USAID, co-funding from Institute contribution, etc.).

Please, summarize Complementarities, Activities & WP(s) concerned.

CRP RTB provided co-financing. This covered staff time for Pricilla Marimo, Beatrice Ekesa and Elizabeth Arnaud under **Work Packages 1, 2 and 5**. An intern supporting the crop ontology work (Amos Asiimwe) was also covered using co-funding.

10 BIOVERSITY INTERNATIONAL PUBLICATIONS

List of Publications (attached with a DOI) published in RTBfoods framework (e.g., Journal Articles, Conference Communications, Manuals, Leaflets, Posters, etc.)

Co-developed presentations that were disseminated by other RTB colleagues at the following 3 conferences:

- Kephass Nowakunda presented on behalf of the Uganda matooke team how we have been collectively working together and how insights from WP1 surveys are being used to identify priority characteristics for trait dissection in the lab - (presented on 22 May 2020)
- "Insights and lessons from gender-responsive RTB food product profiling studies in East and West Africa". Presented at a conference on Gender in Research hosted by the French Agency for Research (ANR) - (presented by Eglantine Fauvelle on 5 December 2020)
- "Insights and lessons from gender-responsive RTB food product profiling studies in East and West Africa". Presented at the GREAT virtual symposium (presented by Lora Forsythe on 24 November 2020)

*Focus on the Institute Contribution to the IJFST Special Issue: List of papers with staff Participation in RTBfoods IJFST Special Issue: **Consumers Have Their Say: Assessing Preferred Quality Traits of Roots, Tubers and Cooking Bananas, And Implications for Breeding.***

- Kenneth Akankwasa, Pricilla Marimo, Robooni Tumuhimbise, Moreen Asasira, Elizabeth Khakasa, Innocent Mpiriirwe, Uli Kleih, Lora Forsythe, Geneviève Fliedel, Dominique Dufour, Kephass Nowakunda. (2020). The East African highland cooking bananas 'Matooke' preferences of farmers and traders: Implications for variety development. *International Journal of Food Science and Technology*. <https://doi.org/10.1111/ijfs.14813>

Any challenges faced in the promotion of Bioversity work in RTBfoods framework through publication?

None.

11 GAPS & CHALLENGES FACED AT BIOVERSITY INTERNATIONAL

Synthesis on the Impact of Covid-19 on the implementation of RTBfoods activities in Period 3? Risks identified & coping strategy proposed in agreement with the Focal Point for RTBfoods & WP coordinators.

When the lockdown was implemented, we had just finished data collection for the market interviews in March 2020. Because of the **lockdown, we had no access to hard copies** of the filled questionnaires and hence could not do any of the initial tasks required to produce a report. Some of the activities e.g., scanning of forms require external contractors and coordination around that during lockdown was not possible. We therefore had to wait for the lockdown to be lifted to get the hard copies for data entry to begin. We also subsequently had **delays in hiring support for data entry and processing**. This resulted in a delay in the preparation of some and we could not meet the set deadlines. Information on the status was conveyed to WP leaders throughout 2020. The team could not participate in face-to-face meetings hence we had to **revert to virtual meetings however connection was not always stable**.

Other Challenges faced in the implementation of RTBfoods activities in Period 3? Causes, Risks identified & Mitigation Strategy proposed by the Focal Point for RTBfoods.

Most of the challenges were related to COVID-19 and have been highlighted above. The focal point (Pricilla) ensured that planned activities were conducted despite the challenges. Due to the limited budget, **only 4 staff days had been allocated to Pricilla; however, this was not enough** to conduct the labour and time intensive outputs that had to be produced by the end of Period 3. **Institutional co-financing was used to ensure continuity of activities.**

12 BIOVERSITY INTERNATIONAL PERSPECTIVE WORK PLAN & INTERNAL ORGANIZATION FOR PERIOD 4

Draft Roadmap with main activities planned at Institute level in Period 4.

Given the small budget allocated to Bioversity for the entire project, it was challenging to spread the amount over 5years hence the budget was only available for 3years. The **budget was therefore fully spent by the end of Period 3**. There are however a few **outputs that are still in the pipeline which will be covered by institutional or RTB co-financing**; these include Act 4 and 5 reports and respective peer reviewed publications, gender focused report & publication and part of the ontology work. For Period 4, if budget is confirmed in 2021 from RTBFoods and/or Breeding CoP, activities will include the ones listed below. Please note these activities will only be conducted if budget becomes available. At the time of submitting the report there was no confirmation yet of availability of funds.

- New Trait Dictionaries for additional foods products (WP1, WP2) not covered by Amos Asimwe's internship and processing technics will be developed and progressively uploaded in Crop ontology and Breedbase – see table below
- A new section or visualization will be created for the Food products quality traits
- A social and market segment ontology will be developed
- Further meetings with BTI will occur to make sure that the new ontologies are harmonized in the databases, the feasibility to develop a module for food products sensory data trials in Breedbase will be studied.
- We will continue engaging scientists in expert groups for cassava and yam in expert groups.

Food Products	Country	Products covered by the internship
Boiled Cassava	Uganda	Yes
Boiled Plantain	Cameroon, Nigeria	No
Boiled Potato	Uganda	No
Boiled Sweet potato	Uganda	Yes
Boiled Yam	Benin, Cote d'Ivoire, France	Yes
Fried Sweet potato	Nigeria, Ghana, Cote d'Ivoire	No
Fried Plantain	Cameroon	No

Attieke (Cassava)	Cote d'Ivoire	No
Eba	Nigeria,	Yes
Cassava Fufu	Nigeria, Cameroon	Yes
Gari	Nigeria	No
Pounded Yam	Nigeria	Yes
Matooke	Uganda	Yes

13 APPENDICES

13.1 Annex 1: Extraction of the Lexicon elements into a Food property Dictionary

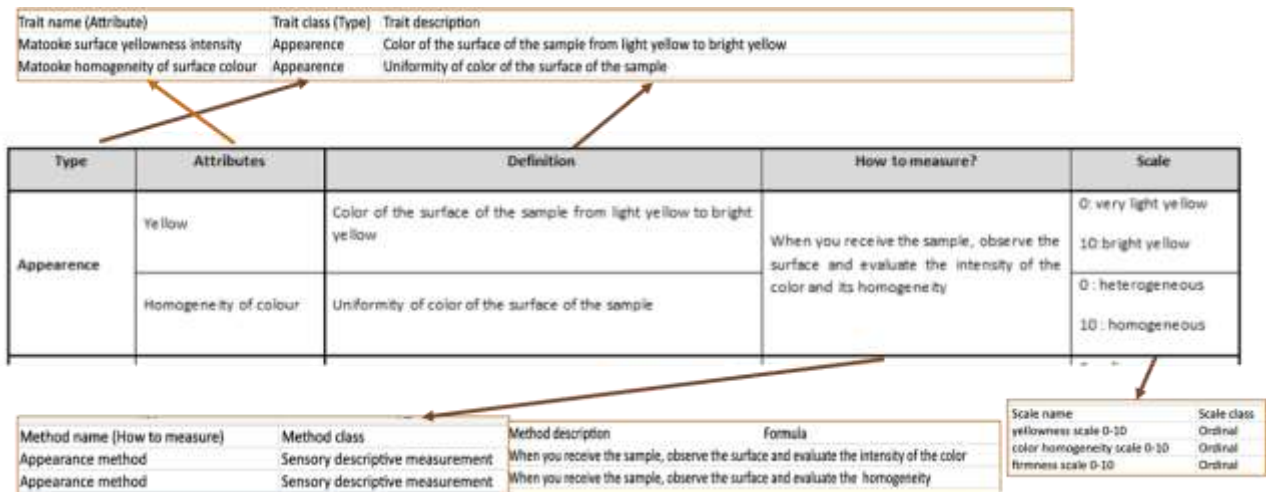


Figure 1: Extraction of the Lexicon elements into a Food property Dictionary

13.2 Annex A: Tentative list of banana 'expert' group members (Uganda)

- Pricilla Marimo (Gender, socioeconomics, Alliance Bioversity-CIAT)
- Elizabeth Arnaud (Ontologies, Alliance Bioversity-CIAT)
- Willy Nelson Kisenyi (Food scientist, Alliance Bioversity-CIAT)
- Amos Asimwe & Sylvia Khamila (Food science interns, Alliance Bioversity-CIAT)
- Priver Bwesigye (Program Leader - National Banana Research Program, NARL)
- Kephas Nowakunda (Programme Leader, Food Biosciences and Agribusiness Programme, NARL)
- Kenneth Akankwasa (Socio-economist, NARL)
- Ivan Arinaitwe (Breeder, NARL)
- Moses Matovu (Lab characterisation, NARL)
- Samuel Edgar Tinyoro (Food Scientist, NARL)
- Sarah Kisenyi (Food scientist, NARL)
- Moreen Asasira (Agricultural economics MS student, Makerere University)
- Elizabeth Khakasa (Food Scientist, NARL)
- Brigitte Uwimana (Breeder, IITA)
- Violet Akech (Breeding, IITA)



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