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**Expanding Utilization of RTB and Reducing Their Postharvest Losses**

**RTB-ENDURE**

**Monitoring and Evaluation Plan**

**(Description)**

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**1. Background**

The *‘Expanding utilization of RTB and reducing their postharvest losses’* (RTB-ENDURE) is a three year research project (2014-2016) funded by the EC/IFAD. The project’s goal is to contribute to improved food security for RTB-producing communities in East Africa, including producers and other stakeholders along the value chain. The specific objective is to improve food availability and income generation through better postharvest management and expanded use of RTB, based on: (1) postharvest and processing technologies; (2) value chain development; (3) capacity development.

The project addresses postharvest management of four different crops, namely potato, sweetpotato, banana and cassava. Since project inception in March 2014, the various CG (CIP, IITA, Bioversity and ILRI) and non-CG partners (CIRAD, NARO, Makerere University, NGOs, private sector, etc.) have established multi-agency research teams that have been engaged in conducting scoping activities and preparing the sub-projects for funding. Out of these, four sub-projects have been selected for funding (hereafter called ‘sub-project’). Following this preparatory phase, in the next two years of the project (Jan 2015-Dec 2016), the four research teams will conduct on the ground testing of innovations for improved postharvest/value chain with evidence of relevance for other countries in East Africa.

**2. The M&E Plan**

This Monitoring and Evaluation (M&E) plan covers the period 2015-2016. The objective of developing this plan is to provide a framework that will facilitate the collection of accurate, relevant and timely information to enable the project meet information needs for all stakeholders and for decision making. It will pay attention to documenting what works for replication and what does not work for corrective action. This plan articulates performance indicators designed to track results which the project proposes to deliver in order to realise the overarching goal. The M&E plan also supplements the project logframe in terms of articulating the project data collection protocols and responsibilities as well as performance measurement along the set objectives.

As earlier indicated, the project seeks to contribute to improved food and income security for RTB-producing communities in East Africa through expanding utilization of RTB and reducing their postharvest losses. To achieve this goal, the project intends to test and validate technical, commercial and institutional innovations that are expected to contribute towards the following objectives:

* Decrease RTB postharvest losses by 15% in pilot sites
* Increase shelf-life of RTB by 20% in pilot sites
* Increase processing of RTB by 10% for on-farm use (where relevant) in pilot sites
* Increase income from RTB and their products, including livestock where relevant, for rural producers in pilot sites by 10%
* Increase participation of women in higher and more profitable levels of the value chain and more equitable distribution of benefits between men and women in the community.
* Enhance the capacity of National Agriculture and Research Institutions (NARS) , development organization and private sector players to engage in a continuous collaborative innovation process to tackle different constraints in RTB value chains

The M&E Plan consists of a description of the sub-projects and how the sub-project’s specific research outcomes logically contribute to the project-wide objectives, a Performance Monitoring Matrix (PMM) and a description of reporting mechanisms. In total, the project has 7 research outcome level indicators and 12 outputs level indicators.

Four different crops, namely potato, sweetpotato, banana and cassava are the focus of postharvest research in this project:

**Banana:** The banana sub-project aims at addressing risks of high postharvest (PH) losses due to short green life of bananas and damage arising from poor postharvest handling facing banana value chain actors in Uganda. The aim of the sub-project is to: (1) Reduce post-harvest losses through promotion of varieties with intrinsic longer shelf-life and better PH handling practices; (2) Increase market benefits and transparency in unit pricing through product differentiation and piloting the weight-based pricing system; (3) Promote sucker staggering for evening-out banana production across seasons; and (4) Link the different actors along the value chain for upgrading storage, transport and marketing. Ultimately, the objective is to enable consumers to access high quality cooking banana of preferred varieties throughout the season in different quantities/forms of presentation. The sub-project outputs will be promoted through various technology uptake pathways such as extension systems, publications, print and electronic media. Through adopting market preferred varieties, postharvest reduction technologies, weight-based pricing mechanism and increased coordination along the value chain, it is expected that in the medium to long-term farmers and traders in Western and Central Uganda will benefit from increased food security and income. To deliver these results, the sub-project is making some key assumptions: that banana’s cultivar biodiversity will be retained because of cultural values while at the same time being cognizant of the fact that drought stress may hinder sucker emergency for selection beyond the traditional sucker selection period of the cropping calendar; and that the culture attached to bananas in the current way it is marketed and consumed may hinder the adoption of the proposed product differentiation and piloting of the weight-based pricing system .

**Sweetpotato:** The sub-project focuses on understanding the technical, economic and social feasibility of the utilization of sweetpotato roots and vines for making silage for pig feeding in order to create value adding opportunities and attenuate the constraint of feed shortages. Furthermore it aims at identifying the most suitable business models for silage production, marketing and utilization at various levels of the sweetpotato value chain. The business model will be designed to maximise the benefits: increased availability of affordable pig feed, increased nutritive value of SP feeds, increase income for value chain actors, reduced labour costs, gender empowerment and social inclusion, employment for the youth, women and men, increased social acceptability, improved knowledge and environmental sustainability. While anticipating to generate these benefits, the sub-project will have to contend with the fact that both sweetpotato and pigs are susceptible to diseases. The sub-project also assumes that weather will be favorable for regular supply of sweetpotato vines and roots for purposes of ensilaging, that silage making as a business will be economically viable and socially acceptable by farmers and that farmers will continue to grow sweetpotato varieties that are suitable for silage making.

**Potato:** Potato farmers in Uganda are besieged by myriad challenges especially price fluctuations and gluts during harvesting seasons, leading to postharvest losses. This situation is exacerbated by lack of appropriate storage facilities as well as the environmental conditions such as warmth and humidity which speed up the rotting process. The potato sub-project is therefore intended to test and validate storage innovations at individual farmer level (improved traditional stores) and farmer association level (ambient stores) as well as at wholesale trade level (ambient stores and, possibly, coolbot technology) to ensure safe storage of potatoes for longer periods. Furthermore, the sub-project will build capacity of various value chain actors in pre and post-harvest handling techniques (i.e., dehaulming, proper harvesting, sorting, grading, packaging and transportation) which extend shelf-life of potato in order to target different market segments. It is expected that the adoption of these innovations will enable farmers to steadily supply potatoes to the market, obtain better prices and reduce postharvest losses. While these technologies have been already adopted elsewhere in the world, the economic and social feasibility of these proposed PH technologies has not yet been evaluated locally (this focus cuts across other sub-projects as well). The sub-project is making assumptions that weather conditions will remain suitable for construction of PH stores at each level, that there will be active and collective action with mutual interest by associations and individuals in pilot sites and that the national research and development organizations will be interested in promoting and disseminating the proposed innovation, once these have been tested and validated by the project.

**Cassava:** The main objective of the cassava sub-project is to test and validate the technical, economic and social feasibility of using waxing and high-humidity storage technologies for extending the shelf life of fresh cassava roots to at least one week from the current 3 days. These technologies, in particular the waxing one, have been widely adopted in a number of countries for targeting high value markets (e.g., in Costa Rica for export to Europe) and the technical feasibility does not represent a significant risk. However, their suitability to the specific Ugandan context requires testing and validating. This sub-project is mainly based around learning and capacity development of national research and development organizations as well as private sector players potentially interested to invest in this business. In the medium to long-term it is expected that the adoption of these technologies will contribute to reduce postharvest losses and offer farmers located in remote areas the possibility to target distant, higher value markets, therefore contributing to improved income and food security for value chain actors. In doing so, the sub-project is making two key assumption, that these shelf-life extending technologies will be compatible with cultural, agricultural and marketing systems of the target group. At the same time, the sub-project assumes that sufficient quantities of cassava roots will be available for conducting the research since it has not designed an intervention for ensuring consistent supplies of raw material to test and validate the PH technology.

**3. How sub-project specific research outcomes contribute to overall project’s objectives**

RTB-ENDURE is a research project and each sub-project will produce research outcomes and outputs. Each sub-project is expected to contribute towards project-wide objectives but it is important to recognize that each sub-project is different and it cannot be expected that they will contribute towards all project objectives in the same identical way.

Figure 1 provides a graphical representation on how each sub-projects contributes toward project’s broader objectives. Details on how each sub-project’s research outcomes contribute to project’s objectives are provided in revised logframe (Appendix 1) and in the PMM.

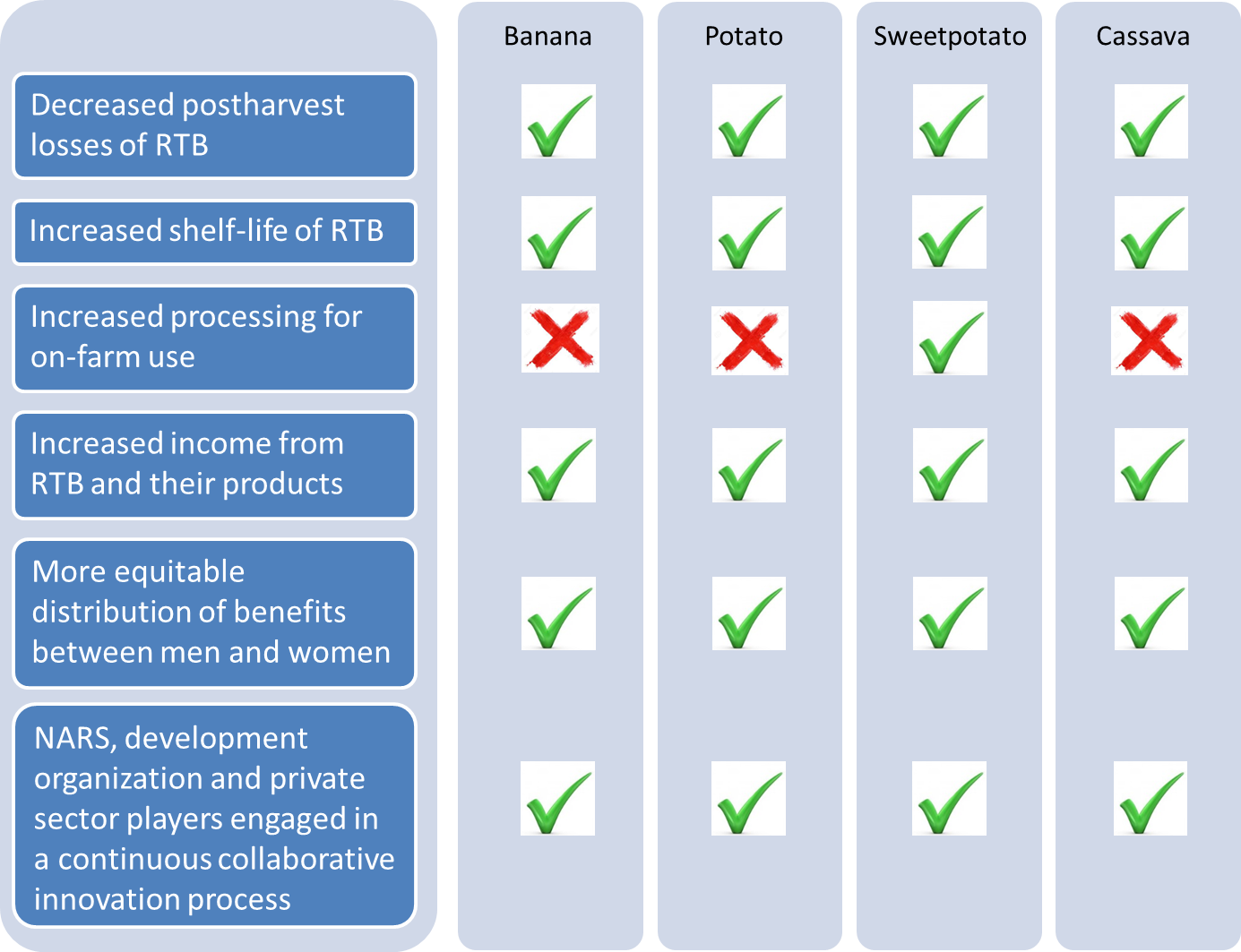


Figure 1: Contribution of each sub-project towards project’s objectives

### 4. Monitoring Mechanisms

For each sub-project, a Principal Investigator (PI) responsible for its overall implementation and a several Output Leaders have been identified. They are presented in Appendix 2.

The project monitoring will consist of 4 interrelated levels: at activity/process level, sub-project output level, overall sub-project level and overall project-wide level (see reporting and data management sections):

1. Sub-project’s day to day activity/process monitoring – This will be done to determine whether the activities as outlined in sub-projects’ - and project’s - work plans are implemented as designed (specification, quantity and quality) and in time. Activity monitoring will involve simple methods such as recording participants and observing and recording processes. Activity/process monitoring will seek to answer questions such as how many pilot farmers attended a training, how many seedlings were distributed, what level are the draft guidelines, how many technologies for each crop group were inventoried etc. It is therefore the responsibility of the implementing partner/staff to keep process data and the responsibility of the Output Leaders to verify the implementation through spot checks.
2. Sub-project’s output monitoring – Reporting on the progress at the output level will be done on a bi-annual basis to determine whether or not planned interventions and activities implemented are generating the anticipated outputs. For each output, the specified deliverables will act as the means of verification. The Output Leaders will supervise the execution of outputs to enforce and verify quality. The PIs, and less frequently the M&E Specialist and the Project Management Team, will backstop the verification efforts of the Output Leaders through spot checks.
3. Sub-project’s outcome monitoring – on some outcome indicators, periodic validations have been planned to occur at specific time along the project’s life. This will be reported 6 monthly and annually (where possible) and will provide important information as far as progress on outcomes are concerned. The methods proposed to achieve this are outlined in the PMM. The PIs will lead on outcome monitoring. The M&E Specialist and the Project Management Team, will backstop the verification efforts of the PIs through spot checks.
4. At the project-wide level, monitoring will be done to a) monitor level of achievement on project-wide outputs; b) document and consolidate the progress towards project-wide objectives; c) report on the overall project-wide progress at both output and research outcome level. The project M&E Specialist will be responsible for monitoring at this level (with support from the Project Management Team)

Based on this, the Project Management Team will discuss and share observations with partners regarding progress of implementation. The Project Management Team will discuss notable delays or difficulties with partners and will provide appropriate support or advice to institute corrective measures. These reviews will be done mostly bi-annually to reflect on the progress of implementation of the project interventions. The Project Management Team in consultation with the PIs will undertake process monitoring as needed, based on planning assumptions to verify delays in implementation. Monitoring will include both simple observation of activities and more rigorous and systematic data collection, to provide a basis for periodic assessment of the implementation plan.

## 5. Performance Monitoring Matrix

The PMM presents the overarching Monitoring and Evaluation Framework of the project. It informs the data collection timing, method and responsibility for each and every indicator. For purposes of operationalizing the PMM, the following are proposed as the main data collection mechanisms and analysis:

1. Tracking outputs of completed project activities
2. Case stories on research products
3. Periodic assessments of emerging outcomes
4. Endline survey

The data generated from these mechanisms will be used for updating the project’s data factsheet across the entire project period. Whereas, output (both sub-project’s and project’s) level tracking will be focused on quantitative data and analysis, the deliverables on the other hand will provide both quantitative and qualitative data to help demonstrate results. Small scale field surveys will be conducted to collect qualitative and quantitative information in order to address specific outcome related questions.

Click the icon below to access the project’s PMM.



## 5.1. Baseline and target values

Scoping studies have already been conducted by the implementing teams in order to develop the sub-projects and have provided crucial baseline data on some key indicators. This information has established initial conditions against which the progress of the project will be compared. However, for some indicators baseline information is missing and data collection on these will be needed. Additionally, market studies have been planned for; these will help verify some of the data generated by the scoping studies. This information will be collected between May and June 2015. The baseline results will form a basis for follow-up studies to assess project achievements. The baseline values will also inform the setting and/or refinement of performance targets. For other indicators, the baseline is zero since the activities are new.

## 5.2. Data collection methodology and dissemination mechanisms

The Project Management Team and the M&E Specialist have proposed some performance indicators after reviewing the various sub-projects. These indicators were discussed with the partners during the meeting-cum-training workshop for the launch of the research implementation phase held in Kampala on the 1st to 3rd December 2014. During this meeting, specific targets for the progress indicators together with their means of verification were preliminarily identified in consultation with the partners. In January 2015, the Project Management revised the project logframe to properly reflect the activities, outputs and research outcomes of the selected sub-projects. Following this, and upon consultation with the different PIs and lead persons in the research teams, a revised set of indicators has been identified. Finally, these new indicators – and related targets – were validated by the PI and Output Leaders of each sub-project during a purposely organized workshop on the 31st March 2015.

The project’s data collection approach for outputs and outcomes indicators will be two pronged; through project monitoring (see PMM for details on means of verification) and small scale periodic field surveys.

The figure below shows how the data emanating from the project monitoring will be collected, processed and used:



Figure 2: Data management

### 5.3. Data Quality Assessment Plan

All reported data is subject to periodic data quality assessment. The project’s M&E Specialist will ensure that the data are properly documented, managed and updated on regular basis. It is essential that any data collected and reported are of the best possible quality. In order to ensure data quality, a Data Quality Audit (DQA) may be conducted in early 2016 by an independent M&E expert to verify data submitted by all sub-projects. Each PI will be responsible for maintaining accurate and factual data for his/her sub-project. Data audit will focus on critical elements of data quality, namely: validity, reliability, timeliness, precision and integrity. Also, since the project will be implementing its project activities through partners, the project M&E specialist will ensure that the implementing partners are well briefed on data quality issues.

## 6. Project Reporting

The Project Management Team is required to report on the progress of project implementation to the donor and other stakeholders (Annual Progress Reports). Since the project is implemented in collaboration with national partners, it is imperative that a robust reporting mechanism is put in place to track progress and mitigate delays in taking corrective action as required. The PI of each sub-project is required to report to the Project Management team on bi-annual basis (Bi-annual Progress Reports). These reports are described below.

### 6.1. Bi-annual Progress Reports

PIsare required to report to the Project Management Team on progress on sub-project outputs and research outcomes for each sub-project on 6-monthly basis. In order to do that, Output Leaders will prepare and submit output reports to the relevant PI every six months (see figure 4). PIswill consolidate output reports to summarize progress of each sub-project, on 6-monthly basis. These reports will be collated and synthesised (including translating sub-project outputs into project outputs) by the M&E Specialist and will contain analysis of data on respective performance areas. These reports will also highlight any implementation challenges so that appropriate strategy can be sought with relevant key stakeholders.

The sub-project specific reporting templates can be assessed by clicking the icons below:

|  |  |
| --- | --- |
| 1. **Potato sub-project** | 1. **Sweetpotato sub-project** |
|  |  |
| 1. **Banana sub-project** | 1. **Cassava sub-project** |
|  |  |

### 6.2. Annual Progress Reports

Two annual Technical Progress Reports will be prepared for submission to the donor in February 2015 and 2016. The first report will mainly focus on the outputs of the preliminary phase leading to the preparation and selection of the sub-project for funding. The second report will comprehensively present project’s outputs and, whenever possible, emerging research outcomes during the whole implementation period, significant achievements, observations, challenges encountered and recommended strategies to address them. The reports will present an analysis of what is working well and what is not working well and attendant reasons. Specifically, the technical reports will capture lessons learned for purposes of improving action. The information generated from the technical reports will be shared with key stakeholders.

The project reporting schedule for the research implementation period (2015-2016) is shown in diagram below:



Figure 4: Project reporting schedule

### 6.3. Final Project Report

During the last two months of the project (Nov. – Dec. 2016), the Project Management Team, in collaboration with the M&E Specialist, will prepare a Final Project Report. This report will comprehensively summarize all the activities, outputs and outcomes of the project, lessons learnt, objectives met, or not met and why. The report will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and mainstream project results into relevant national research and development organizations and private sector initiatives.

### 7. Annual Project Review (APR)

The Annual Project Review (APR) meeting will be organized in late 2015 and serve as a mechanism for annual assessment of implementation progress. APR will also bring together key stakeholders to share and discuss the progress of project implementation over the year. It will serves as an essential project management tool and help highlight areas for critical reflections and for extracting lessons learned for overall improvement of project actions. The APR will inform the Annual Progress Report. The outcome of the APR will feed into the annual planning and will allow strategy realignments. Also, during this meeting, project indicators will be reviewed since the M&E system is dynamic and not static.

## 8. Dissemination of results

Information generated from the project’s monitoring and evaluation mechanisms will be disseminated within and beyond the project pilot zones through case stories and other information sharing mechanisms to be designed by the Communication Team. In addition, the project will identify, document, analyse, and share lessons learned that might be beneficial in both facilitating the wider adoption of the most promising innovations by value chain stakeholders and in the design and implementation of similar PH projects in the future. Identifying and analysing lessons learned will be an on-going process, and the need to communicate such lessons is one of the project's central goal. Partners will be encouraged to document and report lessons learned to project management so that appropriate compilation and documentation is undertaken.

**9. Project Evaluation**

This is a short duration project with only two years of intensive implementation. The M&E system is therefore ‘a big M’ and ‘a small E’. i.e. the project will give much focus on monitoring progress (monitoring outputs at sub-project and project levels) rather than evaluation. Evaluation mechanisms will be limited to small scale surveys and an endline survey mainly to assess achievements towards research outcomes.

Appendix 1 – RTB-ENDURE Logframe

|  | **Objectively Verifiable Indicators** | **Means of Verification** | **Assumptions** |
| --- | --- | --- | --- |
| ***Goal*** | | | |
| Contribute to improved food security for RTB-producing communities in Eastern and Central Africa | Long-term impacts at national and regional level:   * Increased and more stable consumption of RTB food (25% increase) * Improved diet quality among consumers (15% of consumers) * Increased crop incomes amongst RTB producers (20% increase) | * National agricultural, household, and food consumption surveys. * Ex-post assessments where possible. | * Technical feasibility of the proposed innovation * Proposed innovations economically viable and socially acceptable * Value chain actors provided with required inputs, information, technical skills and access to credit * Further donor and technical assistance likely to be needed to scale out most promising innovations * Macro-economic situation conducive to scaling out * Competitive position of RTB not undermined by subsidies to grains |
| ***Objectives*** | | | |
| To improve food availability and income generation through better postharvest management and expanded use of RTB, based on:   1. Postharvest and processing technologies 2. Value chain assessment and development 3. Capacity development | * Decreased RTB storage losses by 15% in pilot sites * 20% increased shelf-life of fresh RTB in pilot sites * 10% increased processing of RTB for on-farm use (where relevant) in pilot sites * 10% increased income from RTB and their products, including livestock where relevant, for rural producers in pilot sites * Increased participation of women in higher and more profitable levels of the value chain and more equitable distribution of benefits between men and women in the community * NARS, development organization and private sector players engaged in a continuous collaborative innovation process to tackle different constraints in RTB value chains   *Please see details about how each subproject is expected to contribute towards the project’s objectives in the Research Outcomes section below* | *Please see details in the Research Outcomes section below* | * Macro-economic situation conducive * Competitive position of RTB not undermined by subsidies to grains   *Please see additional details in the Research Outcomes section below* |
| ***Research outcomes (intended next-users are pilot farmers, traders and project partners)*** | | | |
| Decreased postharvest losses of RTB crops | **Banana:**   * 10% average reduction of on-farm physical losses (product no longer fit for human consumption or damaged to the point that it is used for other purposes other than human consumption) for male and female pilot farmers in comparison to status quo * 10% average reduction of on-farm economic losses (product sold at discounted price due to quality deterioration) for male and female pilot traders in comparison to status quo * At least 50% of male and female pilot farmers extending sucker selection period to at least 5 months   **Potato:**   * 15% reduction in the amount of potato incurring quality deterioration, and therefore market price discount, after 3 months from harvest under current on-farm storage practice as a result of improved preharvest and harvest practices.   **Sweetpotato:**   * 50% average reduction of the amount of wasted vines for pilot male and female farmers involved in on-farm trials * Utilization of at least 20% of non-marketable roots (roots of such a poor quality that cannot be sold or that, if sold, would fetch such a low price that the commercialization results unattractive) for silage making by male and female pilot farmers involved in on-farm trials   **Cassava:**   * 50% average reduction of physical losses (product no longer fit for human consumption) at the pilot packing houses (between purchase and sale of the fresh roots) in comparison to status quo * 20% average reduction of economic losses during storage (product sold at discounted price due to quality deterioration) at the pilot packing houses (between purchase and sale of the fresh roots) in comparison to status quo | * M&E * Project progress and final reports | * Technical feasibility of the proposed innovation * Farmers/traders willing to adopt recommended improved preharvest, harvest and postharvest practices * Farmers/traders willing to use sweetpotato roots for silage making |
| Increased shelf-life of RTB crops | **Banana:**   * Varieties from mother gardens with at least 20% longer shelf-life (quality characteristics retained)   **Potato:**   * 3 months average extension of the shelf-life of ware potato   **Sweetpotato:**   * Utilization of vines extended from the current 3 days (in fresh form) to at least 1.5 months (as silage) for male and female pilot farmers involved in the on-farm trials   **Cassava:**   * Quality characteristics of fresh cassava retained for at least 2 weeks (zero economic losses) | * M&E * Project progress and final reports | * Technical feasibility of the proposed innovation * Farmers/traders willing to postpone the sales of ware potato |
| Increased processing of RTB crops and their products | **Sweetpotato:**   * Male and female pilot farmers involved in on-farm trials able to feed pigs on sweetpotato silage for at least 3 months in a year | * M&E * Project progress and final reports | * Technical feasibility of the proposed innovation * Farmers willing to use silage for pig feeding |
| Increased income from sales of RTB crops and their products by adopting innovations for improved postharvest management | **Banana:**   * Male and female pilot farmers and traders selling an average of 15% of their bananas in graded form * Male and female pilot farmers and traders selling an average of 15% of their bananas with weight-based pricing mechanism * Pilot traders selling an average of 10% of their bananas in different presentation forms (e.g., clusters, peeled and unpeeled fingers)   **Potato:**   * Average 20% higher profit margin obtained by male and female pilot farmers and traders because of deferred sales of stored ware potato   **Sweetpotato:**   * 5% of male and female pilot farmers selling sweetpotato silage * At least 20% savings on purchased pig feed cost by male and female pilot farmers * 20% average increase in pigs’ weight gain for male and female pilot farmers involved in on-farm trials   **Cassava:**   * Average 10% higher income obtained by traders because of sales of treated roots (traders model) * Average 10% higher revenue obtained by farmers running the pilot packhorse because of sales of treated roots (farmers model) | * M&E * Project progress and final reports | * Technical feasibility of the proposed innovation * Farmers/traders willing to adopt recommended improved postharvest practices * Consistent market demand for banana value adding as identified during scoping activity * Farmers/traders willing to postpone the sales of ware potato * Farmers willing to use silage for pig feeding |
| Initial adoption of proposed post-harvest innovations by next-users | **Banana:**   * At least 25% of male and female pilot farmers planting varieties with intrinsic longer shelf-life from mother gardens in their own fields (excl. on farm trials) * At least 25% of male and female pilot farmers adopting sucker selection in their own fields (excl. on farm trials) * At least 10 additional farmers/traders (among those not involved in the trial and supported by the project) adopting at least one of the proposed technological and/or commercial innovations   **Potato:**   * 30% of male and female pilot farmers adopting at least one pre-storage technique in their own field (not pilot fields) * At least 10 additional farmers/traders (among those not involved in the trial and supported by the project) constructing ambient stores or paying a fee for storage services   **Sweetpotato:**   * At least 50 additional male and female farmers within a 5km radius from the demonstration centres feeding pigs with sweet potato silage * At least one farmer/entrepreneur not directly supported by the project in each location (Kamuli and Masaka) starting a silage making business   **Cassava:**   * At least one private entrepreneur or farmers/traders association with a business plan to establish a packing house and/or a packing house with a business plan to develop/expand outgrower schemes | * M&E * Project progress and final reports | * Technical feasibility of the proposed innovation * Proposed innovations economically viable and socially acceptable * Consistent market demand for banana value adding as identified during scoping activity * Demand for treated cassava roots large enough to justify investments * Access to credit |
| Increased participation of women in higher and more profitable levels of the value chain and more equitable distribution of benefits between pilot men and women | * At least 20% of women involved in the pilots are involved in more profitable nodes of the RTB chain * At least 30% of women involved in the pilots perceive greater control over RTB crop income | * M&E * Case studies * Project final report | * Local and national partners agree about project’s positive selection mechanisms for ensuring women participation in the pilots. * Local social-cultural context allowing women’s participation in higher nodes of the chain and better control over income |
| Strengthened capacity of NARS, development organization and private sector players to innovate through development of knowledge, attitude, skills and social capital | * At least 50% of NARS, development organizations and private sector players involved in the project implementation perceive that their capacities have been strengthened in each of the following areas:  1. proposed technical innovations 2. understanding and responding to market opportunities and constraints 3. establishing and/or strengthening linkages among value chain actors 4. conducting research in partnership 5. integrating gender in research activities | * Initial capacity need assessment * Final capacity need assessment * M&E * Project final report | * Stable partners committed to capacity development |
| ***Outputs*** | | | |
| 1.1 Current main RTB postharvest challenges and priorities for improvement identified with key RTB production communities (women and men) and value chain actors | * Main postharvest constraints and causes of PHL identified * Relevant PHL estimated according to specific criteria for all crops * Marketing opportunity and constraints understood | * Project inception report * Business cases for funding * M&E plan * PMCA training workshop report | * Partners willing to share their knowledge and conduct scoping activities * Respondents willing to contribute |
| 1.2 RTB technologies and their application for reducing PHL and expanding utilization prioritized and gaps for research identified | At least 2 technologies for each crop group inventoried and product development/pilot experiences reviewed, including via online sources and literature review, and gaps identified | * Business cases for funding | * Partners willing to share their knowledge, conduct scoping activities and prepare business cases for funding * Respondents willing to contribute |
| 1.3 RTB varieties with improved postharvest characteristics identified, tested, and validated with target communities (women and men) and value chain actors across a range of production, marketing and storage environments | At least 10 RTB varieties tested and validated for improved postharvest characteristics, including where relevant nutritional factors, with stakeholder platforms | * Project progress and final reports * Website | * Project partners conducting collaborative research * Target farmers, traders, processors and consumers willing to be actively involved in the research * Accessibility of the research sites |
| 1.4 RTB on-farm storage and processing systems tested and validated | At least 4 on-farm storing and processing technologies tested and validated with stakeholder platforms | * Project progress and final reports * Website | * Project partners conducting collaborative research * Target farmers, traders, processors and consumers willing to be actively involved in the research * Accessibility of the research sites |
| 1.5 Other RTB technologies to reduce PHL and expand utilization tested and validated | At least 6 other RTB technologies to reduce losses tested and validated with stakeholder platforms | * Project progress and final reports * Website | * Project partners conducting collaborative research * Target farmers, traders, processors and consumers willing to be actively involved in the research * Accessibility of the research sites |
| 2.1. Current RTB value chains analysed and priorities for improvement and enhanced gender equity identified with key chain actors/stakeholders | Priorities for improvement shared and agreed with stakeholders in 4 value chains | * Project inception report * Business cases for funding * Website | * Partners willing to share their knowledge and conduct scoping activities * Respondents willing to contribute |
| 2.2. New market opportunities to expand use of RTB assessed and prioritized with stakeholder participation | 1 new market opportunity identified per RTB crop | * Project progress and final reports * Business cases for funding | * Partners willing to share their knowledge and conduct scoping activities * Respondents willing to contribute |
| 2.3. RTB producers, traders and processors strengthened for equitable participation and innovation in value chains | At least 20 producers, traders and processors strengthened per crop | * Project inception report * PMCA training workshop report * Training events reports * Project progress and final reports | * Project partners willing to provide training * Target farmers, traders, processors willing to participate in the training * Accessibility of the research sites |
| 2.4. Sustainable multistakeholder platforms for further RTB value chain innovation created or strengthened (when already existing) with public/private sector and NGO and CBO participation | 4 platforms fully operational (one per crop) | * Project progress and final reports * Minutes of the platforms’ meetings | * Platform participants willing and able to attend the meetings * Conducive environment to hold regular meetings |
| 3.1. Project’s website containing documented methods, technologies, and knowledge products suited to target audiences (researchers, extension services, communities, NGOs, etc.) | * 1 functional project’s website * Series of project publications (e.g., scientific articles, manuals, guidelines, MSc theses, technical reports and protocols) available online | * No. of website hits * Series of project publications accessible from the website * No. of downloads of project publications | * Members of the research teams willing to produce publications * MSc students concluding their studies * Journals’ T&C not preventing on-line dissemination of published papers |
| 3.2. Capacity built in key national partners for reducing PHL and increasing use of RTB | * At least 3 training events held per RTB crop * Researchers from the National Agricultural Research Organization (NARO) involved in the design and implementation of the research for all crops * At least 5 MSc students supported and supervised | * Project inception report * PMCA training workshop report * Meeting-cum-training workshop report * Business cases for funding * Project progress and final reports * MSc theses | Stable partners committed to capacity development |
| 3.3 Outputs of research disseminated throughout agricultural knowledge and information systems | * Communications plan developed to guide project and identify target audiences, needs, and appropriate communication channels for delivery of strategic messages * At least 2 articles published and available in print and online * At least 3–5 presentations and posters given at fora and symposia * At least 5 project publications (e.g., manuals, guidelines, MSc theses, technical reports and protocols) produced and disseminated for each crop | * Project communication and visibility plan * Article’s proofs and websites of peer-reviewed journals * Programs, reports and proceedings of fora and symposia * Articles in traditional, on-line and social media * Project progress and final reports * Website | * Members of the research teams willing to publish and present the project’s results * MSc students concluding their studies |
| ***Activities*** | | | |
| **Preparatory phase (2014)** |  |  |  |
| Hold a project inception workshop to: i) analyse RTB value chains and main postharvest challenges; ii) identify priorities for improved postharvest management and enhanced gender equity with key value chain actors; and iii) establish multi-agency research teams for each RTB crop (banana, sweetpotato, cassava and Irish potato), | 1 inception workshop | * Project inception report * Project progress and final reports |  |
| Provide training and build capacity on PMCA methodology and gender mainstreaming in collaborative research design and implementation | * 2 training sessions on gender mainstreaming in the inception workshop * 1 4-day PMCA training workshop * 3 training sessions on PMCA in the meeting-cum-training workshop * 3 training sessions on gender mainstreaming in the meeting-cum-training workshop | * Project inception report * PMCA training workshop report * Meeting-cum-training workshop report * Project progress and final reports | * Project’s partners willing to attend and actively contribute |
| Conduct scoping studies to validate hypotheses and assumptions about the preliminary identified priority innovations for improved postharvest management | Scoping studies conducted for 7 research options (2 for banana, 2 for sweetpotato, 2 for cassava and 1 for Irish potato), including literature review, key informant interviews and collection of primary data | 7 draft business cases submitted for funding | * Respondents willing to contribute |
| Organize a poster session during the RTB Annual Review and Planning Meeting to present the draft business cases | * 1 poster session | * Report of the RTB Annual Review and Planning Meeting 2014 |  |
| Review (internally and externally) the submitted draft business cases and preliminary select the most promising for funding, based on agreed criteria | * Feedback from 2 external reviewers based on agreed criteria * Preliminary selection of 4 draft business cases for funding * 1 set of required amendments and recommendations for each preliminary selected draft business case | * External reviewers’ feedback * Minutes of the project’s Process Committee * Communication about required amendments and recommendations |  |
| Select best bet research options for improved postharvest management | 4 revised business cases selected for funding | * Project progress and final reports * Communication about the outcome of selection process to research teams |  |
| Establish a project’s Steering Committee | 1 project’s Steering Committee established (6 representatives of CRP-RTB and 3 representatives of national and regional agricultural R&D organizations) | * Project progress and final reports * Steering Committee membership | * Interest and availability of non-CG representatives |
| Organize an event for the official launch of the research implementation phase | 1 Meeting-cum-training workshop | * Meeting-cum-training workshop report * Meeting-cum-training workshop concept note * Project progress and final reports |  |
| Develop project’s Gender Action Plan for research implementation | 1 Gender Action Plan | * Meeting-cum-training workshop report * Project progress and final reports * Gender Action Plan | * Active participation of research teams’ members |
| Develop draft the M&E system for the research implementation phase | * 1 Draft M&E plan * 1 Performance Monitoring Matrix | * Meeting-cum-training workshop report * Project progress and final reports * Draft M&E plan * Performance Monitoring Matrix | * Active participation of research teams’ members |
| **Research implementation phase (2015-2016)** |  |  |  |
| 1. ***Crop specific activities*** |  |  |  |
| Please see Gantt charts presented in the 4 business cases for details of activities carried out by each research team | | | |
| 1. ***Overarching activities*** |  |  |  |
| Develop and implement the project M&E system | * 1 M&E plan * 1 Performance Monitoring Matrix * M&E visits | * M&E plan * Performance Monitoring Matrix * Reports of the visits of the M&E Specialist * Project progress and final reports |  |
| Develop and implement the project communication and visibility plan | * 1 Communication and visibility plan * 1 functional project’s website * Project publications (e.g., scientific articles, manuals, guidelines, MSc theses, technical reports and protocols) available online * Preparation and submissions of papers and posters for presentations in fora and symposia * Articles in traditional, on-line and social media | * Communication and visibility plan * Website * Media coverage * Project progress and final reports |  |
| Hold an annual project review meeting | 1 project review meeting | * Project progress and final reports * Report of the project review meeting |  |
| Hold regular meetings with the members of the project’s Steering Committee | Meetings with members of the Steering Committee held biannually | * Minutes of the project’s Process Committee |  |
| Organize an end-of-project workshop | 1 end-of-project workshop | * Report of the end-of-project workshop * Project final report |  |

Appendix 2 – Principal Investigators and Output Leaders of each sub-project

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| **RTB-ENDURE Sub-project** | **Leader** |
| **Banana** | **PI: Enoch Kikulwe (Bioversity)** |
| Output 1: Increased access of farmers to cooking-banana varieties with preferred quality attributes and intrinsic long shelf life traits | Kephas Nowakunda (NARO) |
| Output 2: Convenient presentation forms of cooking bananas reducing post-harvest losses and acceptable to different market | Kephas Nowakunda (NARO) |
| Output 3: Demonstrate Sucker staggering benefits | Michael Batte (IITA) |
| Output 4: Technologies, market information and regulations for increased market access and fair pricing mechanisms promoted | Enoch Kikulwe, Bioversity |
| Output 5: Improved practices, (dis)enabling environments, norms and culture to foster mutual understanding along the value chain | Susan Ajambo (Bioversity) |
| **Cassava** | **PI: Adebayo Abass (IITA)** |
| Output 1: Knowledge on market segments for fresh cassava and use of deteriorated cassava roots generated | Gloria Okello (AFRII) |
| Output 2: Recommendation on best model of marketing shelf-life extended cassava roots developed | Harriet Muyinza (NARO) |
| Output 3: Information on varietal differences in PPD and eating quality of varieties generated | Harriet Muyinza (NARO) |
| Output 4: Technologies for extending shelf-life of fresh cassava roots to increase access to fresh cassava of preferred quality traits over a long storage and marketing period evaluated | Harriet Muyinza (NARO) |
| Output 5: Two pilot packing houses established and operationalized | Harriet Muyinza (NARO) |
| Output 6: Assessment of adaptability and profitability of the technologies in Uganda conducted | Harriet Muyinza (NARO) |
| Output 7: Capacity of partners built on waxing, pruning, RH and marketing models in Colombia | Pamela Nyamutoka (IIRR) |
| Output 8: Capacity of farmers, traders , local entrepreneurs especially women built on technologies for extending shelf-life, business management | Pamela Nyamutoka (IIRR) |
| **Potato** | **PI: Monica Parker (CIP)** |
| Output 1: Current status and ware potato marketing system in Eastern Uganda mapped and gender based market constraints and opportunities identified, analyzed along the potato value chain | Sam Namanda (CIP) |
| Output 2: Testing and validation of pre-harvest and storage methods by potato variety under different ambient conditions developed taking into account technical, economic and social aspects as well as consumer acceptability | Arthur Wasukira (NARO) |
| Output 3: Capacity in ware potato pre-harvest and storage methods for producers, traders, researchers and extension agents strengthened | Arthur Wasukira (NARO) |
| Output 4: Skills in entrepreneurship, agribusiness and collective action developed for selected actors (men, women and youth) in specialized ware potato markets | Misaki Okotel (Self Help) |
| Output 5: Recommendation for extending shelf-life, increased utilization and reduction of post-harvest losses along ware potato value chain disseminated | Arthur Wasukira (NARO) |
| **Sweetpotato** | **PI: Gerald Kyalo (CIP)** |
| Output 1: Knowledge on pig feed resources (quantity, quality and seasonality) in Masaka and Kamuli districts in Uganda documented | Danilo Pezo (ILRI) |
| Output 2: At least 2 methods for SP silage preparation validated and piloted in the targeted districts | Danilo Pezo (ILRI) |
| Output 3: Dual purposes SP varieties and their cutting management identified and promoted | Gerald Kyalo (CIP) |
| Output 4(a): Capacity for uptake of silage making as a business for the youth, women and men strengthened (Kamuli) | Grace Babirye (VEDCO) |
| Output 4(b): Capacity for uptake of silage making as a business for the youth, women and men strengthened (Masaka) | Apollo Tumwijukye (CHAIN Uganda) |
| Output 5: Economic viability and social acceptability of SP pig systems validated and documented | Emily Ouma (ILRI) |
| Output 6: At least 2 dissemination models for the innovation tested and best models identified and promoted for scaling up | Gerald Kyalo (CIP) |