



Annual report 2020

NL-CGIAR Seed Systems Development

Enabling and Scaling Genetic Improvement and Propagation Materials

Please expand the 'Explanatory Notes' for further information, Fold notes before sending in your report (including appendices as merged PDF).

← Expand for General Explanatory Notes

1. General information

Project number	W.08.240.104		
Title of the project	Enabling agribusiness development for scaling quality cassava seed systems for control of major viral diseases in Rwanda and Burundi		
Project leader	Name	<i>Dr. Silver Tumwegamire</i>	
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	Phone	+250 785 060745; +256 772 911652	
Start date of the project	April 1, 2019		
End date of the project	March 31, 2022		
Project duration (years)	[up to 3 years]	Reporting year	2

1.1. Summary of the project for the public

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>> Please write your answer here:

Year 2:

The main progress for year two has been four fold, namely: a) documentation and approval of six varieties for official release in each of the two target countries; b) increased production and management of pre-basic and basic seeds in both countries; c) implementing capacitating and coaching seed business among the cases identified under different models – this has involved signing MoUs with cases under different models ; and d) documenting and sharing results of the assessment studies earlier done. In Burundi good collaboration with ONCCS has resulted into seed certification. In Rwanda, RICA is new but first engagement has been made.

Year 1:

Progress in year one was characterized by a number of assessment studies for situation understanding. Key among these were: a) DNA fingerprinting to document and map the varieties currently grown in target countries; b) Mapping and maturity profiling of CASS models as well as analysis of markets and other cassava seed value chain actors to understand the cassava seed systems; c) Institutional constraint and opportunity analysis using a Rapid Appraisal of Agricultural Innovation System; d) Farmer typology household (HH) survey was conducted in both countries using Rural HH Multi-Indicator Survey (RHoMIS) methodology to understand the heterogeneity of cassava farmers.

2. Changes to the initial proposal and in the administrative set-up of the project

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No changes have been made to the initially proposed project activities. Only limited changes have been registered in project personnel. Dr. Marc Schut who was the lead consortium member at WU has left effective 1 April 2021. He has successfully handed over his responsibilities (activity implementation and funds management) to Mr. Samuel Mugambi, a project research associate at IITA whose position is co-funded with WUR. Ms. Fleur Kilwinger remains as a project consultant officer to support Samuel on WUR component activities. At SPARK, Ms. Marthe Paauwe has left SPARK Rwanda and has been replaced by Ms. Kibe Waringa. Also, SPARK has been allowed to partially fund the position of a Finance Officer by shifting some budget from the position of Burundi Country Coordinator. This budget shift will not cause over expenditure on personnel nor in any way minimize the involvement of the Burundi Country Coordinator in the project.

3. Project overview and progress report

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3.1 Goal and objectives of the project

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The overall goal of the project is to improve food and income security of the cassava farmers and other users. The overall objective is to increase cassava productivity through development and deployment of cassava brown streak disease (CBSD) / cassava mosaic disease (CMD) resistant varieties, as well as a system that will produce high quality virus-tested seed and facilitate its dissemination to farmers. The specific objectives are: a) To diversify the availability of cassava varieties with strong resistance/tolerance to CBSD and CMD that meet farmer and commercial end-user preferences; b) To develop, test and tailor different types of CASS models (i.e. (i) government-led, (ii) private sector-led and (iii) cooperative-led) with and for different groups of farmers; and c) To understand and respond to constraints and opportunities at farmer and institutional levels for upscaling CASS models in collaboration with different cassava value chain actors.

The project supports development of sustainable clean seed production and delivery systems as a key solution to CBSD and CMD threats on cassava productivity in the two target counties of Rwanda and Burundi. The two countries represent the frontline of CBSD and efforts to control its westwards spread.

The project's envisaged impacts include food security, improved incomes and easy access to clean cassava seeds by farmers in both Rwanda and Burundi.

The project interventions are organized under three interrelated Work Packages (WP) that are expected to lead to the achievement of the three objectives. WP1 addresses objective 1 and ensures that high quality and disease resistant cassava varieties, which respond to farmer and commercial processors' needs, are tested, registered, and made available in the two countries. WP2 addresses objective 2 and ensures the development, testing and validation of complementary CASS models that will fulfil the needs and possibilities of different types of cassava farmers. WP3 addresses objective 3 and ensures identifying and responding to constraints and opportunities to create an enabling environment for scaling CASS models that have proven to be socially, environmentally and financially sustainable under WP2. The fourth WP, WPO, provides structural conditions for effective project organization, coordination, MEL and knowledge sharing.

3.2. Progress towards Output

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Looking back – What did you achieve?

Research activities:

- CBSD immune clones (6 in Burundi; 12 in Rwanda) introduced from IITA have been field evaluated for CBSD/CMD dual resistance and root yield performance (Table 1). Other ten CBSD/CMD resistant elite clones

introduced from IITA Uganda to Rwanda were established for field multiplication in preparation for multi-site testing next season. These clones are yet to be introduced into Burundi.

Table 1. Preliminary disease reaction at 9 months and root yields at Rubona station

Clones	Foliar CMD		Foliar CBSD		Root weight (kgs)	Root necrosis Inc.	Root necrosis Sev
	Inc (%)	Sev	Inc (%)	Sev			
PER 333	75	5	0	1	5	0	1
ECU 159	69	5	0	1	12	0	1
PER 431	54	5	0	1	10	0	1
COL 262	75	5	0	1	5	0	1
PER 597	65	5	0	1	7	0	1
PER 226	37	4	0	1	18	0	1
COL 2173	38	3	0	1	27	0	1
PER 221	86	3	0	1	5	0	1
PER 206	93	4	0	1	15	0	1
ECU 41	100	3	0	1	0	.	.
COL 2182	100	3	0	1	10	0	1
PER 353	0	1	0	1	0.3	0	1

- In Rwanda, participatory assessment for consumer acceptability and profiling end-use quality attributes was conducted for 8 promising cassava clones. Six (Nase14, Narocass1, Ndamirabana/7, Gahene/2, Bulk13, Bulk35, MM95/0414/1, MM96/8299) of the profiled varieties have been documented and approved for official release (Table 2).
- In Rwanda twenty four (24) on-farm trials to demonstrate yield benefits of using clean seed have been established in farmers' fields across main cassava agro-ecologies. In the trials, clean seed of two varieties NASE14 and NAROCASS1 sourced from research station at Rubona are planted along seed sourced from farmers' fields using 40 plant plots. Similar trials will be established in Burundi next season.
- In Burundi, variety profiling was done for 33 elite clones (including 16 from the core germplasm of Burundi cassava collection). Among profiled varieties, six (Mkumba, TZ130, F10-30-R2, Nase14, Kiroba, and KBH2006/026) have been documented and provisionally approved for official release (Table 2).
- SNPs analysis was conducted and data generated for samples collected during the finger printing survey reported last year. Preliminary data analysis has been conducted and manuscript drafting initiated.
- Data from a household typology survey and seed network analysis collected in year one were analysed and results used to develop a scientific paper, which is ready for submission for publication. The findings will be used to inform development of tailored business models and explore how they might work out for different types of farmers as well as to inform scaling of the tested business models.

Table 2. Root yield and CBSD/CMD resistance of six varieties for official release in Rwanda and Burundi 2021

Six varieties released in Rwanda				Six varieties approved for release in Burundi			
Varieties	Root yield t/ha	CBSD root necrosis	CMD	Varieties	Root yield t/ha	CBSD root necrosis	CMD
Nase14	28.9	2.2	1.0	Mkumba	8.9	1.8	1.0
Narocass1	36.9	1.4	1.7	TZ-130	14.3	2.0	1.4
Ndamirabana/7	33.9	1.0	1.0	F10-30-R2	11.5	2.3	1.7
Gahene/2	34.7	1.0	1.0	Nase14	15.3	2.4	1.0
Bulk13	31.7	1.0	1.0	Kiroba	8.1	1.0	3.0
Bulk35	38.6	1.0	1.0	KBH2006/026	13.5	1.3	1.6

Impact activities

- A new screen house has been installed in Burundi to increase space and capacity for pre-basic seed multiplication and management. Last year we reported installation of semi-autotrophic hydroponics (SAH) in Rwanda for the same purpose.

- Capacity needs assessments were done for the different business cases under the identified CASS models. As a result, capacity building and strengthening has been undertaken through trainings and coaching of the actors in the business cases. The focus has been on 4 business development components: i) cooperative management; ii) financial management; iii) farming as business and marketing strategies; and iv) entrepreneurship to ensure access to market and finance.
- The competitive screening and selection of youth Agri BDS incubators and a dataset of 47 selected potential applicants was finalized for Rwanda. The implementation concept was designed with detailed plan of activities for further process of business plan competition. The selected youth will be capacitated through mentorship along the incubation pathway and process. A similar process is planned for Burundi next year.
- Two webinar seminars were conducted with all consortium members to share knowledge and insights from the studies as well as discussing how those results could inform the development of business models. Additionally, consortium members could also provide feedback on the results and used methodologies to enrich the studies' results and learnings.

Insight – What did you learn?

- The twelve and six immune clones tested in Rwanda and Burundi, respectively, showed susceptibility to CMD but neither foliar nor root CBSD symptoms. The clones are unsuitable for official release to farmers but are important sources of CBSD resistance for future breeding efforts.
- The study that linked farmer typologies and their seed sourcing practices, replacement dynamics, and purchasing behaviour reveals uncertainty on whether majority of the farmers can, in the near future, switch from farm saved to certified or quality declared cassava seeds. Integrated seed system for cassava is perhaps a compromise approach to be considered along the currently promoted private sector led approach.
- We also learnt that farmer typologies information can assist in the design of integrated seed system approaches. Farmers' specific needs can easily be understood hence well targeted seed business interventions for better quality seed access.
- Targeting agro-ecologies and farmers where the impact of improved quality seed is likely to be highest can favour development of a commercialized value chain that ensures sustained access of clean seed.
- For commercial seed businesses to rely on demand for genetic quality (new varieties), varieties could strategically be developed and released.
- Information on seed degeneration and replacement recommendations as well as yield benefits from clean seed are important for the promotion of commercial seed value chains as general approach to improved access to quality seed by farmers.

Foresight – What will you do next?

- Variety evaluation is ongoing and will continue in both countries by the NARS. Special effort will be made to initiate trials with Kanju's 10 elite clones in Rwanda.
- We will continue to support the operationalization of the newly instituted cassava seed standards by engaging relevant stakeholders e.g. farmers, extension services, and inspection and certification bodies. NARS will also keep multiplying pre-basic seed and support downstream multiplication of basic and certified seed by interested entrepreneurs.
- For the on-going demo plots on yield benefits from using clean seeds in Rwanda, data will be collected according to the protocols and field days for farmers conducted to evaluate and visualize the crop's agronomic yield performance. Similar demo plots will be established and evaluated in Burundi.
- Anticipating decline in COVID-19 threat during Year 3 and it becomes safer to hold meetings and public gatherings, a number of individual and joint stakeholder engagements will be implemented to share results and elicit buy-in for scale up opportunities after project completion. Exchange visits within and between country teams to allow cross-learning.
- Capacity building trajectory enhancement of business cases under identified cassava seed business models will continue through coaching by focusing on financial management, access to finance (Saving, Payment, Borrowing, Investment) and financial linkages.
- Youth agribusiness incubations will also be initiated and supported to develop business plans that respond to opportunities within the cassava seed value chains.

- Complete and submit the developed paper to peer-reviewed journals for publication. Another paper on the 'Understanding the identity and diversity of cassava varieties currently grown by farmers in Rwanda and Burundi' will be drafted.
- Continue to provide supervisory support to the two identified MSc students and competitively select the remaining two and provide the same support to them.
- Continue to conduct knowledge sharing activities e.g. webinars, media outputs, international conferences.

3.3. Progress towards *Outcome*

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Looking back – What did you achieve?

For the ended Year 2, the project implementation continued to target three main outcomes, namely: i.e. a) farmers have increased cassava production and productivity; b) CASS models are operational leading to increased access to quality and regulated cassava seed; and c) countries' institutional and regulatory cassava SS improved. Indeed some ample progress has been made towards their achievement.

- Assessment of consumer acceptability and end-use attributes were undertaken in both countries and resulted into selecting and documenting six varieties per country for official release. The varieties are envisaged to result into increased on-farm productivity (outcome a) by the end or soon after the end of the project.
- The progress on identifying and testing business models through working with multiple business cases in both Rwanda and Burundi is associated with outcome b. In year two, cassava seed agribusiness models have been developed and enrolled for testing and the process is still ongoing. While Year two was more about coaching and capacity development of business cases, year three will be more about evaluating the performance of business models and documenting lessons learnt.
- Country focused annual project meetings were held virtually for all the stakeholders to review progress and exchange on the way forward. This was a very important activity as it allowed knowledge sharing, dialogue, and cross learning in general amongst consortium members and stakeholders. In Rwanda, the meeting was (partly) attended by the Director General of Agriculture development in MINAGRI while in Burundi, the Dutch embassy was represented.
- SPARK has adopted a cassava value chain approach for Cassava seed agribusiness development in both countries. This has allowed multi-institutional involvement in awareness, planning and access of quality seed access. Also, IITA in collaboration with NARS (RAB and ISABU) engaged with the seed quality regulators (ONCCS in Burundi and RICA in Rwanda) to implement cassava seed inspection and certification. ONCCS inspected and certified all the pre-basic and basic seeds in Burundi. RICA is a new agency since February 2020 and we held a meeting to brief them on the project's seed systems development efforts to which they responded with great interest to collaborate.

2. Insight – What did you learn?

It is early to say that much has changed in the behaviour, partnership or activities of consortium partners or stakeholders as a result of uptake of outputs from the research undertaken under the project. One reason is that research was simultaneously undertaken with other project activities and some decisions had to be made before the research outputs were available e.g. type of business models to be tested. Nevertheless, research has now provided useful insights to inform implementation of activities in the remaining period as well as during scaling of activities. Those include:

- Results from field evaluations conducted for 12 and 6 clones in Rwanda and Burundi respectively have indicated that although most of the introduced clones have significant resistance to CBSD but they are susceptible to CMD. Nonetheless, they are still very important sources of CBSD resistance for further breeding.
- Seed network analysis has revealed that adoption of improved varieties is possible in Rwanda as evidenced by wide and quick adoption of NASE14 and NAROCAS1 that were introduced from neighbouring countries during the peak of CBSD outbreak. The learning is that interventions and stakeholders need to focus more on getting new varieties available and promoting market-oriented seed entrepreneurship.
- In Burundi, the bio-physical environment has combined well with enhanced regulatory environment to deliver results quickly. The warmer weather at Moso station in Burundi favours multiplication of pre-basic seed and the project responded by installing one screen house for increased space (ISABU had one SH from CBSD Control) and not SAH as in case of Rwanda. Additionally, the project has enhanced good relationships between ISABU and ONCCS making the variety release process faster.

4. *Looking ahead – What will you do next?*

- We will continue to evaluate varieties/clones to advance quality and resistance of germplasms in breeding pipelines to release status. This includes activities leading to official release such as profiling and documenting advanced clones and filing official application for release.
- Performance of business models, currently under testing, will be evaluated and documented to form basis for scaling as well as buy-in from other stakeholders and donors.
- Results from research undertaken under the project will be packaged in sharable forms to be used as evidence for what works or doesn't and what needs to be done going forward. This includes publications.
- Organisation and capacity building of seed entrepreneurs will continue including technical support to seed production particularly to basic seed producers, quality control processes, and information sharing.

3.4. Potential for Impact

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>> *Please write your answer here:*

The project impacts are expected through improved food and income security for the cassava farmers, sustainable clean seed delivery systems, and control of CBSD/CMD in the targeted countries, as well as networked institutional systems for quality control and delivery of cassava seed. At the end of year two implementation, some ample progress towards project impact can be reported. In each of the target countries, six resistant varieties identified by farmers with good consumer and end-use attributes have been approved for official release and registration. This achievement has triggered start of mass multiplication of both pre-basic and basic clean seeds. Up to 25,960 (RW = 22,525; BU 3.435) TC derived plantlets of pre-basic seeds and up to 1,667,000 (RW = 1.2 million; BU = 467,000) cuttings of basic seed have been produced. Moreover, there is an increase in a number of potential seeds multipliers as we are working on the mind set changing of business cases. Moving into Year 3 of the project implementation comes with high possibility of improved on-farm crop productivity and viral control of CBSD and CMD pandemics. The produced seeds also represent first efforts for farmers to access clean seed from an infant formal seed systems being nurtured by CASS project among other on-going initiatives. The seed inspection and certification in Burundi represents the operationalization of seed certification and inspection which is key in sustainable seed systems.

In the two countries, seed inspections authorities have been engaged and there is potential that quality control processes will be common practices in the near future. Burundi is actually advanced at this aspect. Of course, there are still challenges to address at different levels, but there is obvious potential for impact by the end of project.

3.5. Quality of Collaboration

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Please describe how co-creation with consortium partners and/or stakeholders has been shaped and facilitated, and how various types of knowledge have proven to be complementary and contributed to progress towards output and outcomes. Include in this how you shaped and facilitated an inter- and transdisciplinary approach, and how your consortium has worked on building partnership, both within the consortium and with stakeholders. Also refer to issues of gender and social inclusion within your collaboration.

Maximum words: 500

>> *Please write your answer here:*

Collaboration between consortium partners has improved in year-2 despite the limitations to face to face meetings brought about by COVID-19. As consortium partners continued to get used to one another's working culture and approaches plus increased communication through (virtual) meetings and monthly reports, collaboration became smoother in year-two. Although face-to-face meetings were not possible throughout year two, we have used online platforms to conduct consultative and strategic meetings. The project coordination team at IITA procured a licence for zoom which allowed us to invite and host several meetings at any time. WUR used this platform to present two seminars to share insights from research on farm typologies and seed network analysis. In these meetings, all partners have had opportunity to inform others about their progress, challenges, and share insights. However, some activities

that could improve further the collaboration such as exchange visits were not possible due to already mentioned covid-19 related challenges.

Despite the limitations resulting from covid19 outbreak the project has initiated more collaborations with local partners. Examples include the seed regulation agencies, Office National pour la Certification et Contrôle de Semences (ONCCS) and Rwanda Inspectorate Competitiveness Authority (RICA) in Burundi and Rwanda, respectively. Also, the project continued to establish linkages with different business entities (individuals and cooperatives) to establish viable models for quality seed delivery (Table 3). In Rwanda, SPARK has moreover signed bilateral collaboration agreements with 4 districts of Ruhango, Muhanga, Bugesera and Gatsibo. This has strengthened the local collaboration of the project.

Table 3. Different cassava seed business cases collaborated with during year2

Country	CASS Models	Business cases
Rwanda	Cassava seeds private company led business model	INGABO Syndicate
	Cassava products processing led business model	KINAZI Cassava Plant (KCP) KIAI cooperative
	Cassava seeds entrepreneurs led business model	CDAN cooperative
Burundi	Private led Model	Richard HATUNGIMANA enterprise
		KUNDIBIKORWA Cooperative
	Cassava processor led Model	BUSERUKO RUGAJO cooperative
		KEREBUKA TURWANYINZARA cooperative

3.6. Progress towards specific indicators

← Expand for Explanatory Notes

Table I – CGIAR Common reporting Indicators		Number	Short explanation (please explain in more detail in the narrative above)
a	# of policies, legal instruments, investments and similar modified in their design or implementation informed by your research/ activities	None	No policy was targeted
b	# of people trained (highlight long-term, short-term, % women and youth)	230	230 (RW = 144; BU = 86) people trained on entrepreneurial and business skills i) cooperative management; ii) financial management; iii) farming as business and marketing strategies and iv) entrepreneurship
c	# of partnerships (highlight in what phase – research, piloting, scaling/delivery, undefined; and highlight type of partners - academic/research, private not-for-profit (NGO's e.t.c), private for profit (businesses), governmental institutions, community based organisations and farmers groups, other funders)	12	4 MoUs with business cases in RW; 4 MoUs with business cases in BU; 4 collaboration letters with government local districts in RW
d	# of innovations (distinguish: stage 1 end of research phase; stage 2 end of piloting phase; available for uptake; available for next users; distinguish type of innovation (research and communication methodologies and tools; genetic – varieties/breeds-; production systems and management practices; social science findings/evidence; related to biophysical research, e.g. decision support tools, geospatial analysis). <i>NOTE: this is indicator 4.1.1 FNS-enablers MoFA</i>	12	6 cassava improved varieties provisionally released for farmer use in both Rwanda and Burundi
e	# of peer reviewed publications (joint NL-CGIAR publications)	0	Not publication yet
Specification of research output according to NWO categories			

f	# of discussion papers; # of assessment/analysis reports/working papers; # of broader media outlets; # of contributions to congresses/CGIAR events (please specify if possible)	5	1 Assessment report for RHoMIS survey for both countries 2 Capacity Need Assessments of seed entrepreneurs produced for both country 2 concept notes for Youth Agri BDS incubation in both countries
g	# of trainings or workshops developed and held	4	4 training sessions in Rwanda and Burundi were performed on <ul style="list-style-type: none"> • Management, leadership & governance • Financial management • Farming as business & Entrepreneurship
h	# of persons trained (disaggregate by gender and target group)	230	230 (141 men & 89 women) people trained on: i) management; ii) financial management; iii) farming as business and marketing strategies, and iv) entrepreneurship

Table II - Indicators MoFA results framework (note: see annex C below for the list of potential indicators, please fill in those applicable for your SSD project, add rows if necessary)	Number	Short explanation (please explain in more detail in the narrative above)
Number of family farms indirectly/directly reached (BuZa 2.x.1; 2.x.2)	254	24 family farms have been directly reached with trials for clean seed benefits in Rwanda and 230 with capacity development as part of business model testing. More family farms will be reached in year 3 and afterwards when project efforts reach the level of certified seed because it's been at the level of EGS production in Year 1 & 2.
Number of family farms with improved access to input and/or output markets (BuZa 2.2)	-	To be reported later in relation to access to clean seed and markets for roots
Number of potential beneficiaries of new FNS-relevant research (BuZa 4.1.2)	254	24 directly reached with trials and related knowledge exchange in Rwanda and 230 with agronomy, business, entrepreneurship related trainings as part of business model testing
Number of FNS relevant knowledge institutions supported / engaged directly (BuZa 4.3.1)	6	ISABU and ONCCS in Burundi & RAB, RBC, One Acre fund (OAF) and RICA in Rwanda
Number of businesses co-investing in FNS activities (BuZa 5.3)	1	Kinazi Processing Plant (KCP) in Rwanda
Number of businesses involved in FNS activities (BuZa 5.3.1)	2	KCP
Number of women that benefitted from FNS interventions (BuZa 8.1)	89	Women trained as part of business case capacity development

Table III - Delayed Deliverables for the Review Period: please report only on delayed deliverables and your mitigation strategy here, deliverables that are on track can be updated in the IP. Please list your mitigation strategy in bullet points, a longer narrative explanation can be provided in section 3.7. In case you have an overview of deliverables and Milestones of your project in the form of a project Gantt / Pert chart, please also include as annex to this report.

Deliverable	Target month	Why delayed	Mitigation strategy
Financial management training (business record keeping, financial statements, profitability analysis, cost-benefit analysis and internal/external auditing procedures)	Q2 Year 2	Covid19 related restrictions	Postponed to Q1 year 3

Capacity building, market facilitation and business linkages through business proximity coaching (and by organizing Matchmaking events (with business to business, market players, financial institutions, public institutions, service providers, buyers, input suppliers:	Q3 year 2	Covid19 related restrictions	Postponed to Q2 Year 3.
Training on access to market through marketing strategies establishment (sourcing and supplying strategies)	Q2 Year 2	Covid19 related restrictions	Postponed to Q1 Year 3.
Introduction and testing of CBSD/CMD elite clones (Kanju's clones)	Years 1 and 2	Slow virus cleaning process at KEPHIS Slow micro-propagation at RAB	To be initiated in year 3 and continued by RAB and ISABU
Screen house installation in Burundi	Year 1	Procurement bureaucracy Covid19 restrictions	Only waited when restrictions were relaxed

3.7. Risks & Mitigation

← Expand for Explanatory Notes

Please report on what setbacks (e.g. Covid19) or unforeseen circumstances you encountered and how this was or will be solved?
What problems and risks do you foresee for the future and which strategies will you apply in order to prepare for and lessen the effects of the risks.
Maximum words: 300

>> Please write your answer here:

The main risk was Covid19 outbreak that directly threatened different aspects of project life as shown below.

Covid19 related risks	Mitigation
Project staff health	<ul style="list-style-type: none"> Encouraged the project staff to comply with government orders of working from home and following SOPs of wearing face masks and hand hygiene Respecting guidelines but still meet people in smaller groups and virtually where possible
Poor intra-consortium engagement	<ul style="list-style-type: none"> Subscribed to online meeting platforms such as Zoom and MS teams so that project partners could continue to meet as needed
Poor inter consortium engagement	<ul style="list-style-type: none"> Invited and conducted virtual meetings with new partners Visit individual partner organisation and groups
Activity implementation	<ul style="list-style-type: none"> For the activities such as growing plants in the tissue culture laboratory and screen house, that needed continued monitoring e.g. RAB and ISABU asked on person to visit the plants regularly.

3.8. Feedback to NWO-WOTRO and/or partner-organisations in the NL-CGIAR research programme

← Expand for Explanatory Notes

>> Please write your answer here:

Year two working environment has been unusual due to covid-19 outbreak. The year started when most countries globally had locked all entry points, banned all public gatherings, and ordered stay home for all residents. This was more so in Rwanda than in Burundi. As such, covid19 disruptions to project implementation are more severe in Rwanda than in Burundi. As stated in Table II a number of activities have been postponed to year three. At the heart of this project is the testing of the business models to identify those most suitable for the different cassava farming situations (farm typologies). However, sub-activities that included serialized training modules (financial management, financial


education, market facilitation and business linkages, and marketing strategies) were not conducted due to restrictions to physical meetings and movements between districts were not possible for many spells between Mach 2020 and March 2021. These activities have indeed been postponed to year 3 but with a clear understanding that the full output will not be accomplished by end of March 2022.

4. Statements by the applicant

By submitting this report I declare on behalf of the consortium that:

- I have completed this form and the required appendices truthfully and all consortium partners are aware of their content.
- I satisfy the nationally and internationally accepted standards for scientific conduct as stated in the Netherlands Code of Conduct for Research Integrity 2018.
- I agree with the code on Openness in Animal Testing and comply with the Nagoya Protocol and requirements for Research with Human Subjects (METC clearance) – *if applicable*.
- I have submitted all output through ISAAC (including non-academic output)

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Name Project leader:	Dr Silver Tumwegamire
Place:	IITA Kigali, RWANDA
Date:	May 1, 2021
Signature:	



Annex A. Updated Theory of Change and Impact Pathway

Updated Theory of Change

The project works along three-related work packages to increase the access to and use of high quality cassava seeds in Rwanda and Burundi. The Theory of Change is built along (1) Inputs and Resources, that are needed to facilitate a (2) Chain of Events that take place under a set of (3) Assumed Conditions.

1. Inputs and Resources: that are required to increase the access to and use of high quality cassava seeds are (i) More cassava varieties that are resistant to CBSD/CMD and meet end-user preferences, (ii) complementary business models that deliver quality cassava seed to different types of farmers, (iii) an enabling institutional and policy framework for delivery and quality assurance of cassava seed in Rwanda and Burundi.

2. Chain of events:

- i. If more resistant cassava varieties exist, and if these match end-users' preferences, then the demand for such varieties increases →→
- ii. If the demand increases and is formalized, then profitable cassava seed agribusinesses and access to finance can emerge →→
- iii. If agribusinesses emerge, then farmers have better access to quality cassava seed →→
- iv. If farmers plant more quality cassava seed, then quality and quantity of cassava production increases →→
- v. If quality and quantity of cassava production increase, then farmers become more food secure and earn more income by selling surplus, and private processors have better access to raw material →→
- vi. If processors have better access to quality and quantity cassava roots, then % effective use of the factory production capacity increases, which lowers the overall production costs and makes them more profitable →→
- vii. If processors become more cost-effective, they can sell products at a lower price, which increases their market share and increase demand for cassava roots →→
- viii. If demand of cassava roots increases, then prices for cassava roots increase →→
- ix. If farmers earn more from cassava, then they are likely to invest in quality cassava seed →→
- x. If farmers invest more in quality cassava seed, then agribusinesses in the seed value chain grow and become more competitive →→
- xi. If agribusinesses in the seed value chain grow and become more competitive, then the seed system becomes more sustainable →→
- xii. If more farmers invest in buying and growing high quality cassava seed in a sustainable seed system, then the spread of the viral diseases will reduce

3. Assumed conditions: For the chain of events to take place different types of public and private partners need to work together under the project. To be able to have impact at scale, barriers at farmer and institutional levels within both formal and informal seed systems need to be identified and addressed. For the project to be successful, adaptive capacity and flexibility based on continuous monitoring and evaluation is essential.



Update Impact Pathway diagram with reporting of the progress on the indicators (max. 1 page)

Research outputs	Indicators including progress made thus far
Elite clones of cassava tested for CBSD/CMD resistance & end-user preferences	# of elite cassava clones tested (8 clones in Rwanda and 16 clones in Burundi) # of clones from CBSD Project profiled and documented for homologation (33 clones profiles and 6 documented in BU; 8 clones profiled in RW and 6 documented in RW)
On-farm clean seed demo trials established	# of demos established (24 demos in RW; TBD in year 3 for Burundi) # of farmers aware of benefits of growing certified cassava seeds (TBD Year 3)
Efficient and profitable basic & certified seed multiplication	# basic & certified seed multipliers supported (4 basic seed centers in Burundi; 7 basic seed centers in Rwanda) # of high quality cassava cuttings produced (1,200,000 cuttings of basic seed in Rwanda and 467,000 cuttings of basic seed in Burundi) # of SH units established (SAH installed in RW; SH installed in BU)
Existing and potential cassava seed enterprises and their market dynamics identified & understood	# assessment reports done (Two reports (1 per country) are available) # of selected business cases (3 models for Rwanda and 2 for Burundi selected and related cases) # of collaboration agreements signed (4 MoUs with business cases in Rwanda; 4 MoUs with business cases in Burundi; 4 collaboration letters with government local districts in Rwanda.)
Business models developed and tested for profitability and sustainable delivery of cassava quality seeds	# of individual capacity needs assessment reports and capacity development plans (4 in Rwanda & 6 in Burundi) # of Agribusiness Training Modules (4 modules on Management, leadership & governance and Farming as business & Entrepreneurship in both countries) # of contracts signed between CASS business cases & other VCA (5 in Rwanda) # of CASS actors provided with credit or other financial products (planned in Year3)
Farm typologies in quality seed uptake analysed and understood	# of RHoMIS cassava farmer typology surveys conducted (One survey conducted for both countries) # of Scientific article published (TBD Year 3)
Cassava SS networks analysed and published	# of seed system network analysis reports (1 Report done for both countries) # articles published on constraints & opportunities in cassava SS (TBD Year 3)
Capacity development of NARS and youth agribusiness incubation to respond to institutional constraints and opportunities	# of staff of seed certification authorities trained in SS quality assurance checks (28 national seed inspectors (RW 12; BU 16) trained – done in year 1) # of people engaged in seed multiplication trained on entrepreneurial and business skills (77 people in Rwanda and 94 people in burundi trained) # of youth incubated in developing cassava SS delivery businesses (TBD year 3) # of MSc students trained (1 in Year 2 and 3 planned in Year3)
Institutional constraints and opportunities identified	# of workshop report of RAAIS conducted in Burundi and Rwanda (1 report available combining both countries)

Research outcomes	Indicators including progress made thus far	Impact
Improved cassava varieties officially registered per country	# improved varieties registered (12 varieties, 6 in RW & 6 in BU) # elite clones selected for future registration (8 in RW; TBD Year 3 for BU)	1. Increased food security and incomes for value chain actors
Farmers have increased access to clean and high quality cassava seed	# farmers using clean and quality seeds (TBD Year 3) New area (Ha) planted with clean seed (TBD Year 3)	2. Sustainable cassava seed systems in Rwanda and Burundi
CASS models are used by seed enterprises	# of partners made aware of the CASS models outcomes (TBD Year 3)	
More partnerships are engaged to invest & scale up tested CASS models	# of institutions engaged to solve institutional constraints in cassava SS (TBD Year 3)	
Quality assurance procedures by national seed certification authorities implemented	# of cassava seed fields inspected & certified (TBD Year 3)	



Evidence and synthesis of key project learning available to support scaling of CASS models	# of overview reports on CASS business models (TBD Year 3)	Collaboration between stakeholders in cassava SS strengthened and improved	# of stakeholder platforms supported to enhance collaboration (TBD Year 3)	
Public and private institutions and development partners strategically engaged in upscaling CASS models	# of public and private institutions and development partners strategically engaged in upscaling CASS models (TBD Year 3) # stakeholder collaborative or engagement meetings (TBD in Year 3)			

Time



Annex B Definitions

NWO Knowledge Utilisation

NWO Vision on knowledge utilisation: Together with researchers and other stakeholders, NWO is committed to ensuring that knowledge utilisation contributes to social impact by putting it on the agenda, being inspiring and facilitating, in ways that proportionally match all types of research

NWO Definition knowledge utilisation: The utilisation of knowledge through productive interactions with targeted stakeholders to create social - including economic – value

Knowledge Sharing and Research Uptake

- **Theory of Change:** A Theory of Change articulates the **assumptions** about the process through which change will occur, and specifies the ways in which all of the required **(intermediate) outcomes** related to achieving a desired **long-term change (= Impact)** will be brought about and documented as they occur
- **Impact Pathway:** the Impact Pathway is an integral element of the Theory of Change, in which the route from outputs via outcomes to impact is specified:
 - **Output** relates to the direct and immediate insights obtained by a research project or programme.
 - **Intermediate outcome** relates to positive steps towards outcomes.
 - **Outcome** relates to the changes in behaviour, relationships and activities of stakeholders in the business and policy environment, resulting from exchange of knowledge and the uptake of research output.
 - **Societal impact** Cultural, economic, industrial, ecological or social changes that are entirely or in part the consequence of knowledge and expertise generated by research
- **Indicators: SMART**
 - **Specific:** accurately related to the defined output or outcome as well as clearly and unambiguously formulated
 - **Measurable:** the unit of measurement is defined (qualitatively or quantitatively)
 - **Achievable:** the change anticipated should be achievable by the project (what is the baseline for the indicator?)
 - **Realistic:** the set target values for the indicators should be ambitious yet realistic
 - **Time-bound:** the time for achieving the indicator is defined



Annex C List of potential additional indicators (question 3.6)

FNS framework indicators MoFA:

- Number of family farms indirectly/directly reached (BuZa 2.x.1; 2.x.2)
- Number of family farms with increased productivity and/or income (BuZa 2.1)
- Number of family farms with improved access to input and/or output markets (BuZa 2.2)
- Number of family farms whose farming enterprise became more resilient to shocks (BuZa 2.3)
- Number of farmers that adopted research results / knowledge / new technologies (BuZa 4.1)
- Number of potential beneficiaries of new FNS-relevant research (BuZa 4.1.2)
- Number of FNS relevant knowledge institutions supported / engaged directly (BuZa 4.3.1)
- Number of value chains and/or sectors performing better (BuZa 5.2)
- Number of businesses co-investing in FNS activities (BuZa 5.3)
- Number of businesses involved in FNS activities (BuZa 5.3.1)
- Number of women that benefitted from FNS interventions (BuZa 8.1)