Federal Ministry
for Economic Cooperation
and Development

Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH

Progress Report	**BMZ Project Funding**
Including sections for the *Phase 2* project pipeline	

General Information

Implementing Organisation and Contracting Partner	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH Friedrich-Ebert-Allee 36 + 40 53113 Bonn Tel. +49-(0) 228-44600 Internet: www.giz.de
Contact for project reports	Advisory Service on Agricultural Research for Development (BEAF) Tel. +49-(0) 228-4460-3471
Closing date	**January 15, 2020**
Reporting period	2019
Submit by e-mail to	beaf@giz.de

Notes on completing the entry form:

Projects are kindly requested to fill out the additional sections in blue to support the assessment process for Phase 2 projects (see appendix to this template for more information). Please note, that information provided in this report shall be reflected later on in the Phase 2 project proposal if the Center is invited to submit one.

When completing the template, please follow the guide questions in italics, which can be overwritten. Characters should be font size 11 in Arial. Please do not change the format nor submit a pdf. Progress report should not exceed 12 pages. Detailed research reports or graphics should be added in the form of annexes.

1. Basic data

The IARC applicant	*IITA*
Project title	*Citizen Science and ICT for advancing the prevention and control of Banana Xanthomonas Wilt (BXW) in East and Central Africa – ICT4BXW*
Funding type, GIZ Project Number and Contract Number	Project Funding, Bilateral, Project Number:17.7860.4-001.00; Contract Number: 81219434
Reporting Period	*2019*
Project Coordinator	*Marc Schut; m.schut@cgiar.org.*
Project Partners	• *Rwanda Agricultural and Animal Resources Board (RAB)* • *Bioversity International (now Called "The Alliance")* • *Leibniz Institute of Agricultural Development in Transition Economies (IAMO)*
Research for Development (R4D) Continuum Phase as per proposal	***Current phase 1**: Proof of Concept ==> Pilot phase* ***Aspired Phase 2**: Pilot phase ==> Scaling phase*

2. Progress Report

State of Project Implementation	*max. 4.000*

"C" denotes Completed & "IP" denotes In Progress

1.1 (C). Baseline survey of 698 banana farming households across eight districts in Rwanda was conducted in July 2018. Access report **here**. Report for rapid appraisal **here**.
1.2 (**C**) Project newsletter 1 was developed to inform project partners, stakeholders, next-users, scaling partners, and broader scientific and development audience about project progress. Access **here**.
1.3 (**C**) The first prototype of the ICT-tool for the control and prevention of BXW was developed. Access the draft **wireframes** and **mock-up** version of the tool.
1.4 (**C**) Advanced prototype of the ICT-tool for the control and prevention of BXW developed. Access iteration process **here.**
1.5 (**C**) Newsletter 2 published - **here**.
2.1. (**C**) We developed the capacity of next- and end-users to improve the competence and confidence of the users with smartphone and the BXW-App. Access **PITDII Report.**
2.2. (**C**) Advanced prototype for BXW control and prevention (version 1.1.) was updated based on feedback from next- and end-users in the 3rd quarter of 2019. Click **here**
2.3 (C) IAMO led the writing and sharing of newsletter 3 to inform project partners, stakeholders, next-users, scaling partners, and broader scientific and development audience about project progress. Access **here.**
2.4 & 2.5 (**90% IP**) The update of the advanced prototype (versions 1.2. & 1.3) was implemented based on feedback from next- and end-users between months 12- 24, with ~2,500 farmers reached. Semi-formal report is available **here****
2.6 (80% IP) Newsletter no. 4 is scheduled for month 30.
3.1 & 3.2 (C) Theoretical model of the early warning system for mapping and preventing BXW spread in Rwanda was developed and reviewed for embedding in the BXW app.

3.3 (C) First operational model of an early warning system was developed and embedded in the dashboard of the BXW surveillance system.
3.4 (75% IP) Since data is currently being generated through the co-validation, the system is not considered to be fully tested yet. Schema shown **here**.
4.1 (C) SNA completed by IAMO. Submitted report can be accessed **here**.
4.2 (C) Partner planning of work and budget (POWB) meeting for the year 2018 organized. Report **here**.
4.3 (C): POWB meeting for the year 2019 organized. Report **here**.
4.4 (C) The inventory of changing collaboration and knowledge networks developed. Report **here**.
4.5 (50% IP) Upcoming.
4.6 (C) In-depth data collection and social network analysis (SNA) was completed for BXW control and BXW prevention (Village level baseline). Report **here**.
4.7 (75% IP) In-depth SNA was conducted by IAMO. Report **here**.
4.8 (50% IP) Plans ongoing to organize and mobilize policy makers in Rwanda in 2020 for joint action of BXW prevention and control.
5.1 (60% IP) A research paper in draft mode for BXW-related knowledge needs (content) and communication preferences (medium) of various banana system actors.
5.2 (60% IP) Draft paper is underway on the prerequisites for extension providers and smallholder farmers to translate newly acquired knowledge into actionable, impactful, and scalable BXW control.
5.3 (70% IP) **delayed due to need for data from the co-validation phase**
5.4 (40% IP) Paper is underway to link citizen science, GIS, and BXW Control.
5.5 (C) Paper published & can be accessed **here**.
5.6 (C) Developed and publish target paper Access **here**.
6.1 (C) An operational management system and MEL plan for project implementation and delivery was developed on the CGIAR MEL system
6.2 (C) Held the 1st Project progress meeting In Oct 2018, with key science and implementation partners in Leuven, Belgium. Report **here**.
6.3 (C) Held 2nd Project progress meeting in Kigali. Report **here**.
6.4 (C) Internal financial and technical audit was completed from Oct 15 -19, 2019.
6.5 (10% IP) Upcoming.
6.6 (C) Website (based on storymap) was created for the project – www.ict4bxw.com.
6.7 (5% IP) Upcoming.
***6.8* (5% IP)** Upcoming.

General Achievements and Problems encountered	*max. 3.000*

We advanced innovative control of BXW disease, through partnership, tool development, and data analytics (Fig 1). Our achievements are -

i. ***User-centered participatory BXW Tool Design:*** Our digital innovation for BXW surveillance and control has been user-centered and user-driven. We implemented a stepwise participatory and inclusive technology design (PITD) of the BXW surveillance tool and co-developed a fully functioning tool that is built on users-contextual realities and reflects user preferences. The tool is now available on Google PlayStore (named "BXW App"), and undergoing field co-validation across 67 villages, beyond defined targets in the proposal.

Fig 1*: The ICT4BXW Process*

ii. ***Unraveling readiness-to-scale (data-driven):*** Based on the successful robust survey of ~700 banana farming households during year 1, we assessed tool user-readiness through a multi-criteria quantitative analysis. By including

variables related to ICT penetration and preferences, we defined and identified major factors that may determine farmers' behavioral change in relation to the adoption digital innovation for control of BXW. This information became pivotal for the tool co-development and co-validation, and informed our ad-hoc decision to embed a smartphone training curriculum that will enhance the confidence and competence of the engaged next-users of the digital tool.

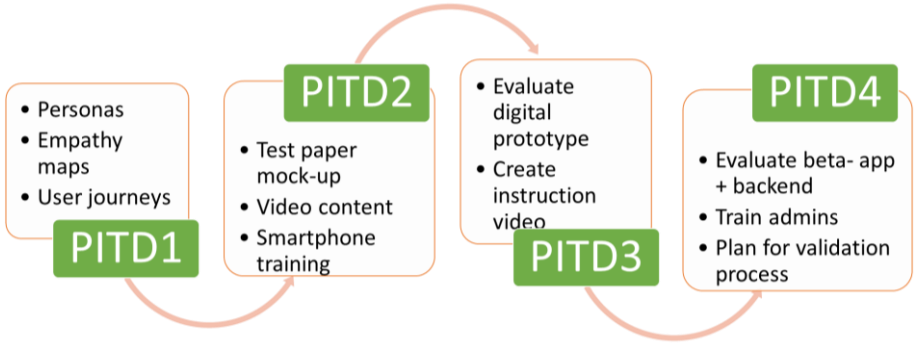


Fig 2: *The BXW Tool Co-Development Process*

iii. ***Engaging with scaling partner(s) for wider reach:*** Based on shared vision for digital innovations in the agricultural sector, we successfully established a non-transactional partnership with Viamo (www.viamo.io), a digital service provider, in Rwanda. Viamo was interested in wider dissemination of the rich banana agronomic information which we sourced from our collaborators and embedded in the BXW-App. This information was deployed on Viamo's proprietary "845" USSD service platform and within 2-3 months, the information was accessed by ~11,000 unique visitors in Rwanda.

iv. ***Strategic Communication:*** We published two newsletters, blogposts, GCIAR RTB Report, and a journal article. GIZ featured ICT4BXW project during the International Green Week in Berlin where the project leader presented the vision of digital disease surveillance in Africa, vis-à-vis deliverables of ICT4BXW Project. In addition to the initial video inputs that were collated for GIZ, we have undertaken an additional initiative to generate high-quality communication content (pictures and video clips) to showcase the BXW problem and the solutions that we are developing. These videos and manuals include "Why it's important to control BXW", "How to use the app for diagnosis", and troubleshooting - all in English and local language.

Major Limitations: The major limitations encountered are related to the readiness of the [next-]users to access and use the ICT-based surveillance and control tool, however, this was addressed by translating contents into local language, incorporating audio and visual contents/guidance, and providing training to the target users.

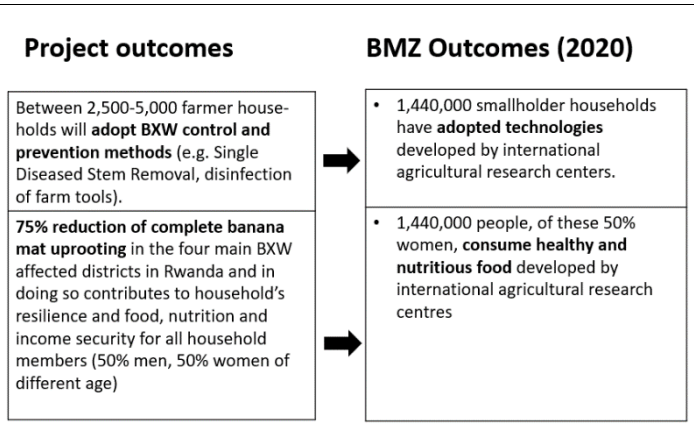
Progress towards Outcomes (and Goal)	*max. 3.000*

There were 5 main tangible outputs that serve as benchmarks for project progress and they all translate into the project level outcomes. The table below shows the outputs and means of verification

Proposed: *Between 2,500-5,000 farmer households will* ***adopt BXW control and prevention methods*** *(e.g. Single Diseased Stem Removal, disinfection of farm tools).* ***Achieved:*** *~2,200 Farmers have accessed information on BXW prevention methods (and fully or partially adopted recommendations) through engagement with farmer promoters (as next users of the tool)*
Proposed so far: *Between 2,500-5,000 farmer households with* ***enhanced resilience, food and income security*** *for all household members (50% men, 50% women of different age)* ***Achieved so far:*** *~2,200 farming households empowered to attain enhanced resilience, food, and income security. Male: female ratio was 60:40 during the baseline intervention survey*
Proposed: *Between 2,500-5,000 farmer house-holds have benefitted directly for the reduction of BXW incidence, severity and spread that will* ***enhance the nutrition security*** *for all household members (50% men, 50% women of different age).* ***Achieved so far:*** *~2,200 farming households are considered to have directly befitted from the intervention and resultant reduction of BXW incidence. Male: female ratio was 60:40 during the baseline intervention survey*

Additional achievement: Viamo was interested in wider dissemination of the rich banana agronomic information which we sourced from our collaborators and embedded in the BXW-App. This information was deployed on Viamo's proprietary "845" USSD service platform and within 2-3 months, the information was accessed by **~11,000 unique visitors in Rwanda**.

Core outputs (tangible)	***Progress***	***Verification Means***
Output 1: *An inventory of knowledge needs and communication preferences of extension providers and farmers of different socio-economic status, gender and age, and an analysis of the networks through which they access knowledge and service*	*100%*	- *Robust dataset on baseline survey of 700 banana farmers* - *Social Network Analysis (SNA) report identifying social & communication structure*
Output 2: *Functional mobile phone-based ICT applications that are used by extension providers and farmers for targeted and cost-effective BXW control*	*87.5%*	- *Fully developed BXW App tool deployed as an Android application for public access on Google playstore*
Output 3*: An early warning system that supports governments in making investment decisions in preventing BXW spread*	*75%*	- *Fully developed surveillance system for early warning available on Cloud-based server with full Admin under RAB*
Output 4*: Strengthened partner collaboration and knowledge exchange networks for BXW control and prevention*	*70%*	- *RAB + Farmer promoters+ Sector Agronomist are now coordinating on surveillance;* - *Viamo+RAB+Bioversity providing agronomic information to farmers through USSD,* - *WUR+IAMO+UR+IITA+Bioversity collaborating on ICT BXW research*
Output 5: *Publications providing compelling scientific evidence of the return on investment, impact and scalability of the project approach and tools developed*	*30%*	- *Draft journal articles which cover various dimensions of the project is underway; 1 paper published*
BMZ Outcome Target and IDO Contribution		*max. 3.000*



Beneficiaries have been reached through various activities that have been implemented under the project, including
Baseline survey: ~700 banana farmers; 138 farmer promoters
PITD Workshop + Training: 30 sector agronomists + farmer promoters
Focused Group Discussion: 10 key officials in RAB
Viamo Collaboration: ~11,000 farmers

The proposed contribution of the project level outcome to BMZ outcome is shown below. It should be noted that these outcomes are expected to be directly derived after the completion of the project. The proposed **direct** contribution during the project was 400 farming households. Currently, the project has exceeded this target, going into the 3rd year of implementation.

Review of Impact Pathway	*max. 3.000*

The overall project impact pathway and theory of change towards impact have not changed significantly from the original proposal. However, additional activities have been integrated into the work packages II and III of the impact pathway such as inclusion of ICT training sessions in the Activity 2.1 and additional iterations with next-users (Farmers promoters and government officials) in the process of developing the BXW control and prevention tool (Activity 3.3.). Also, the major necessary change in the pathway is the sequence for testing the impact of the early warning system. The test the impact of the early warning system, robust georeferenced data of incidence (from extensive surveillance) is required, however, current data from pilot locations is insufficient to meet this need. The data needs to be acquired over large number of users from various locations, across the country and over time (i.e. spatio-temporally rich). In essence, full vetting of the system is contingent on the co-validation and scaling of the tool which are both envisioned to provide the required volume of data for full testing and monitoring the functioning and impact of the early warning system.

Conclusions for the following Reporting Period	*max. 3.000*

The implementation of the ICT4BXW project is advancing according to plans and we remain very confident that all proposed deliverables will be achieved within specified timelines. A recent internal audit process indicates that ICT4BXW has achieved ~70% completion within 58% of the project timeframe. Our understanding of the contextual reality about the need to strengthen the capacity of next-users for tool usage has led to adaptation of content with increased emphasis on training. Our attempt to facilitate peer-to-peer knowledge transfer model suggests that such exchange of skills among the village-level actors (Farmer Promoters) may not deliver on the anticipated diffusion of skills/innovation. Rather, the extension delivery system (led by RAB) will continue to play a pivotal role in developing competencies for sustainable adoption. Therefore, our project continues to concentrate in developing capacity of RAB (as the tool host) to build on current advances (and knowledge) and position the team to lead tool dissemination, adoption, and sustainability, beyond the current life-span of the project (scaling phase). For instance, RAB is currently leading the field co-validation of BXW App. The rich communication materials developed under the project have proven useful for effective communication to policy makers and stakeholders either to promote BXW tool adoption or to foster policy shift regarding effective BXW control practices such as the "Single Diseased Stem Removal (SDSR) procedure" which we are still demonstrating through field trials.

In addition, demonstrated interests from scaling partners (Viamo, Arifu and One Acre Fund) have prompted important discussions on which elements of the project should be advanced for scaling. For instance, by accessing and disseminating our banana agronomic information and reaching over ~11,000 farmers through a universally accessible mobile phone platform (USSD), Viamo has shown that high-demand exists for this knowledge product. New interests are now emerging from OneAcre Fund in Rwanda (www.oneacrefund.org) and Arifu in Kenya (www.arifu.com). Similarly, in recognition of the importance of the project's mobile-based digital innovation, ICT4BXW was featured (on invitation) during the Ag. Innovation segment of the 2019 global GSMA conference in Kigali. This early scaling partner engagement and interest sets the scene for working towards a scaling phase of the project. We anticipate that One Acre Fund can also deploy the smartphone-based BXW app within their network of 900 Farmer Promoters in Rwanda for BXW surveillance and control, if the access to hardware and training is provided to facilitate adoption.

Publications, Papers and Reports	*max. 3.000*

1. **CGIAR RTB Report:** ICT4BXW 2019. Citizen science and an app for managing banana Xanthomonas wilt. *In* CGIAR RTB 2018 Annual Report, Cali. Columbia. **link**
2. **Technical Report:** ICT4BXW, 2019. Development of an ICT tool and platform for BXW disease control in Rwanda by using a PITD approach **link**
3. **Technical Report:** Participatory and Inclusive Technology Design II (PITDII) - Pre-test of the Mock-up of the BXW app **link**
4. **Technical Report:** Participatory and Inclusive Technology Design III (PITDIII) – Adaptation of prototype and Field pre-testing of BXW surveillance and control tool **link**
5. **Technical Report:** Inventory of existing collaboration and knowledge networks for BXW control and prevention in four villages in Rwanda **link**
6. **Workshop Report:** Report on Participatory Inclusive Technology Design II (PITDII) Workshop, 6-7 February 2019 **link**
7. **Workshop Report:** Report on Participatory Inclusive Technology Design III (PITDIII) Workshop, 6-7 February 2019. **link**
8. **Workshop Report:** Participatory Inclusive Technology Design IV (PITDIV) Workshop. 18th - 19th July 2019 **link**
9. **Newsletter:** Social Networks Analysis for ICT-based control of BXW in Rwanda. **link**
10. **Blogpost:** IITA-Rwanda releases a digital application in the fight against bacterial wilt disease in bananas **link**

Summary	*max. 5.000*

ICT4BXW project is uniquely set-up to advance digital disease surveillance in the context of smallholder banana production systems where BXW is threatening livelihoods and food security. Within the past 2 years, the project has been strategically implemented to deliver ICT-based tool for BXW surveillance and control with strong aspirations about the potential for scaling, while exploring/testing hypothesis in relation to contextual realities with focus on generating data-driven evidence for adoption and scaling, beyond the current phase of the project.

In the first year, we successfully initiated project activities in four provinces, eight districts, 16 sectors, and 138 villages in Rwanda. The results from the baseline survey analyses suggest that there is a significant opportunity to democratize information access to banana farmers while strengthening existing extension delivery outfit. For instance, 75% of surveyed farming households possess a cellphone (3% smartphone, 72% basic phone), while four out of five farmers indicated that "awareness" or "knowhow" is the major barrier to their use of ICT-based tools to access agricultural service. As an indicator of potential for business-driven sustainability of our evolving BXW surveillance tool, two out of three farmers indicated willingness to pay for services offered through ICT platforms. A similar trend in phone

ownership was observed among farmer promoters. In agreement with our hypothesis, results also show gender-based disparity in the number of farmers, with only one out of five being female. However, we do not see disparity in their knowledge/expertise relative to banana production and BXW management. For instance, 50% of the female and male farmer promoters indicated that they have good level of knowledge about banana. A similar observation was noted in the use of ICT devices (mainly radio and basic phones) by the farmer promoters. The rich insights generated from the baseline survey informed our strategic approach for subsequent tool development, capacity development, and co-validation in year 2.

In the second year, the project was mainly focused on the tool development, engagement of next-users, capacity development, and initial data analytics. The stepwise PITD process was eye-opening and valuable for the iterative co-development a viable tool that captures the preferences and perspectives of the target [next-/end-] users. By first mapping the various personas of potential tools and defining the respective user-journeys, critical nuances of the farmers' realities were identified and considered in the initial process of creating mock-ups and prototypes. As detailed in the final tool development report (attached), the progression from mock-up version to fully- developed tool which was released on Google playstore involved in-depth assessment and full flexibility/openness to pivot on new ideas/demands from the users. For instance, the tool was originally not envisioned to be developed in the local language, however, it became clear that the Farmer promoters mostly speak Kinyarwanda. Similarly, the idea of expecting the users to read instructions became unrealistic, so the contents (including diagnosis) were intentionally designed with graphics, videos, and audio files which were not in consideration prior to the start of the project. Finally, contrary to our initial assumptions, smartphone ownership is very low among the target users, and virtually all the sample farmers promoters who enlisted participate in the PITD had no prior experience with interacting with smartphones or apps. This points to a huge challenge that can either be faced by being aspirational or contextual. This extant reality offered an opportunity to deploy ah-hoc intervention and measure progress of the sample cohorts towards smartphone and app use competency – empowering them with necessary skills to adopt digital surveillance tool.

Finally, through our partnerships, the project has grained significant traction and attention in Rwanda (the core focal Country). Our recent annual planning meeting and interaction with GIZ representative was eye-opening as we assess potential and pathway for scaling. There was a broad consensus to focus on scaling in Rwanda, building up from our proposed direct impact on 400 farming households (within-project period) to reaching >20,000 banana farming households, with focus on facilitating, training, and empowering them to combat BXW, improve their productivity though healthier bananas, and secure their source of livelihood.

3. Outlook on Phase 2

Interest in a Phase 2 project	
☒ Yes ☐ No thanks	
General Justification	*max. 3.000*

The ICT4BXW project has successfully progressed along the RD4 continuum from the *proof of concept* to the *piloting stage*, with compelling evidence of viability for scaling through a Phase 2 implementation timeframe. In Phase 1 (ongoing), the project has gained significant traction and generated outputs by adopting human-centered design approach/principles and citizen science to co-develop a fully functioning digital surveillance system (tool + early warning platform) that can aid cost-effective monitoring and control of BXW disease. This co-

development process was intentionally focused on understanding and addressing contextual realities while incorporating critical inputs from various target [next- and end-] users. The proof of concept and ongoing pilot activities/deliverables have been limited to selected focal geographies within Rwanda, and based on several interactions with target users who are systematically selected to represent different geographies, gender, education, income, banana production system, and agro-ecologies. The underlying assumption is that the diverse cohorts of engaged users and stakeholders (5 RAB officials/ 8 Sector agronomists/ 16 farmer promoters/ 698 banana farmers) across 138 Villages, from 28 Sectors, within 8 districts are representative of the larger population across Rwanda (> 4 million banana farmers). This creates the basis for the effective scaling of the innovations designed, tested and validated during Phase 1.

The data evidence from baseline survey and several interactions with the users suggest that the adoption of the tool at scale can be enhanced by addressing the bottlenecks related to physical access to smartphones and the capability to use them effectively. Also, the digital innovation that has been developed though this project provides the gateway for other innovative opportunities to engage citizens with digital tool for control of BXW and nurturing of healthy banana production systems, including our mutually beneficial collaboration with a new partner (Viamo) who demonstrate the incredible opportunity to scale ICT4BXW by reaching & empowering >11,000 farmers within 2-3 months of disseminating banana agronomic information through the mobile-based USSD platform which is universally accessible across phone types. Similarly, ICT4BXW is linked to other initiatives such as RTB Scaling Fund and CIALCA which porvides leverage for co-investment in scaling.

As tangible evidence of scaling partner and beneficiary demand for a Phase 2 project extending beyond and building up on the current project period, during the recent annual planning meeting, collaborators and interested partners co-defined visions for the project and banana production systems in Rwanda, beyond the current Phase 1. These demand from scaling partners were documented and can be accessed below:

- RAB - **Here;** Viamo-**Here;** One Acre Fund-**Here**; Arifu-**Here;** MangoTree-**Here;** Notes from 2019 annual meeting-**Here**

Outline	*max. 3.000*

Phase 2 is envisioned to involve 3 major Work Packages (WP) -

WP1 - Dissemination of surveillance tool for adoption at scale: This will be implemented across Rwanda under the leadership of RAB and IITA. The target is to increase the number of village-level next-users (farmer promoters) of the tool for diagnosing, reporting, and controlling BXW diseases. Considering that there are 15,000 farmer promoters in Rwanda who support farmers in their respective villages, we anticipate that RAB will actively facilitate the process of increasing the number of active next-users from 68 (within intervention villages) to at least 5% (n=750) of the total pool of farmer promoters. Each farmer promoter serves ~150 farmers within their respective villages, and with proper coordination, at least 50% of farmers can be effectively reached, with periodic tracking of impact. This is expected to translate into a direct reach of 56,250 farmers to improved their resilience and livelihoods. Indirect reach of impact is expected to quadruple the direct reach, to attain >250,000 banana farming households in Rwanda, over a period of 3 years.

***WP2* - Capacity building for sustained adoption across a broad range of users**: Based on the identified bottlenecks associated with behavioral change for adoption and capacity to operate digital tools (a necessity for scaling), we consider that strategic capacity building is a necessity in Phase 2. This capacity building will be implemented at 3 levels: (i) RAB entities as manager/custodians of the surveillance systems; (ii) sector and district agronomists as enablers for the next-users; and (iii) Farmer promoters as next-users who provide direct

support to farmers. This work package can be sub-led by Mangotree, a partner organization who specializes in delivery of educational, training, and innovation curriculum for social change in East- and Central Africa region. Alternative models of curriculum delivery will be tested and this will be focused on next-users (~5-10% of the farmer promoters in Rwanda) with a direct reach of 750-1,500 farmers and indirect reach of 6,000 farmers with the improved capacity.

***WP3* - Scaling of the content/knowledge products:** During Phase 1 of the project, rich contents have been developed and incorporated into the ICT4BXW tool. Not all farmers or farmer promoters can access this, especially if they are limited by access to smartphones or signal connectivity. Yet, these contents are compatible with other scaling outlets, including basic phones (USSD and IVR), guidance manual, periodic text alerts, mass media communication, etc. operated by organisations that already operate at scale in Rwanda. Depending on the specific needs, the content for scaling can include agronomic information, control measures for BXW, and periodic alerts for BXW thresholds/threat level. This work package should be led by scaling partners such as Viamo and Arifu. We anticipate a reach of 300,000 farmers with delivered content within 3 years.

Research for Development Continuum Criteria	
Beneficiaries	*max. 2.000*

BMZ outcome targets	**The project's contribution**
1. By 2020, 1,440,000 smallholder households have adopted technologies developed by international agricultural research centres	This project advances the adoption of BXW control technologies (mainly the validated Single Disease Stem Removal practices) by 28,000 – 50,000 farming households.
2. By 2020, 1,440,000 people, of these 50% women, consume healthy and nutritious food developed by international agricultural research centres	This project contributes to a >45% mitigation of banana losses to BXW at national scale with measured impact on household's resilience and food, nutrition and income security for all household members (50% men, 50% women of different age).
SRF targets (2022)	The project's contribution
100 million more farm households have adopted improved varieties, breeds or trees and/or improved management practices	Between 200,000 – 300,000 farmers have accessed and adopted recommendations for banana agronomic best practices, BXW control and prevention methods, and communication on latest disease threats.
30 million people, of which 50% are women, assisted to exit poverty	- Between 200,000 -300,000 farming households adopt BXW control and prevention methods that enhance households' resilience, and food and income security for all household members (50% men, 50% women of different age). - Between 28,000 – 56,000 farmers acquire capacity to engage (receive information and use digital resources) in the surveillance and hands-on control of BXW while accessing ancillary information about other crops or interests that are valuable to their well-being.
30 million more people, of which 50% are women, meeting minimum dietary energy requirements	Between 200,000 - 300,000 farmers will benefit directly from actionable information provided for improved banana productivity, reduction of BXW incidence, and connection with extension system to enhance nutrition security for all household members (50% men, 50% women of different age).

Research to Product / Services	*max. 2.000*

The core innovations that will be scaled are:

1. **Validated BXW Surveillance and Control App:** The fully functioning app has graduated from the *proof-of-concept* through field-tested with 16 Farmer Promoters, to the *pilot* stage where it is undergoing co-validation with 68 Farmer promoters in 68 intervention villages (there are 68 control villages as well). In the *scaling* phase, the app will be actively disseminated under RAB's facilitation to broader network of Farmer Promoters to achieve and monitor impact at broader spatial and time-scale.
2. **Curriculum for capacity building for ICT-based extension delivery and access:** Through the implementation of Phase 1, we have developed clear and illustrated training curriculum/ templates in local language to fast-track ICT-use (mainly smartphone and apps), capacity and competence of selected cohort of 16 farmer promoters who were enlisted in the tool development process. This will complementary to the plans of Rwanda government to equip all 15,000 farmer promoters in the Country with smartphone, alignment with the 2020 National strategy and vision for digital agriculture.
3. **Content and decision support tools for improved banana production:** The contents and tools that were co-generated with partners under Phase 1 are innovative resources for local decision-support when delivered through suitable platforms that are operated by prospective scaling partners in Rwanda who are focusing on service provision to farmers. This includes the best agronomic practices for healthy banana production, ready-to-share infographics, manuals, and videos which can all be delivered at scale through appropriate print/ media outlets to actively/ passively empower citizens/ farmers with viable and most up-to-date information on BXW disease, the threat level/trajectory, and appropriate control.

If granted a Phase 2, more detailed scaling strategy development with core partners will be done using the Scaling Readiness approach (www.scalingreadiness.org).

Partnerships	*max. 2.000*

- **Rwanda Agricultural and Animal Resources Development Board (RAB)** – To lead overall scaling of the BXW-App through extension delivery networks in Rwanda (WP1), including Farmer Promoters, Sector Agronomist, District Agronomist, and RAB employees [100% in Year 1; 100% in Year 2; 100% in Year 3]
- **MangoTree** (*New) – To co-lead with RAB on the capacity building work (WP2) through deployment and refinement of ICT-use curriculum, facilitation of training sessions, and coordination of scaling co-generated contents in print form (e.g. infographics, manuals, etc) [50% in Year 1; 50% in Year 2; 50% in Year 3]
- **One Acre Fund** (*New): To support RAB and Viamo on the capacity development and BXW App dissemination (WP 1) through facilitation of engagement with nationwide network of farmer promoters who are incentivized to work with farmers [20% in Year 1; 20% in Year 2; 20% in Year 3]
- **Viamo** (*New): To lead the scaling of co-generated decision support content and early warning (WP3) through USSD, IVR, pushed text alerts, etc for access by basic phone users. [50% in Year 1; 50% in Year 2; 50% in Year 3]
- **Arifu** (*New): To support the scaling of co-generated decision support content and early warning (WP3) through USSD, IVR, pushed text alerts etc for access by basic phone users. [20% in Year 1; 20% in Year 2; 20% in Year 3]
- **IAMO**: To support the overall scaling through assess of least cost pathways to reach and scale within various social networks to which banana farmers are connected (WP1). [20% in Year 1; 10% in Year 2; 10% in Year 3].
- **Bioversity International** (Now called "The Alliance"): To provide scientific expertise for citizen science and behavioral change analytics for sustainable adoption of the innovations that are being scaled (WP 1). [20% in Year 1; 10% in Year 2; 10% in Year 3]

- **IITA:** Responsible for geospatial analytics, data management, coordination and overall back-stopping for delivery on project goals (WP1, 2 and 3). [80% in Year 1; 80% in Year 2; 80% in Year 3]

Communication of Research Results	*max. 1.000*

In this scaling phase, our main communication plan will include

- **Research publication(s)**: Scientific paper on the realities and complexities of [BXW] disease control in Rwanda, with lessons shared to guide future initiatives.
- **Outcome stories**: Attributing impacts to the outcomes of the project using methods of causal process tracing and M&E.
- **Newsletters and social media:** Partner-led quarterly newsletters, and improved visibility online through social media and website.
- **Strategic engagements with policy makers and scaling partners**
- **Technical briefs:** RAB-authored bi-annual briefs on stake of BXW in the Country with annotations of observed changes and implications for coordinated government action & local support
- **Workshops and seminars:** Focused on engaging policy-makers and presenting progress on nationwide surveillance of BXW through citizen-driven participation
- **Rwanda and German media:** delivering direct messaging to prompt farmers' access to digital contents on BXW and banana.

Funding	*max. 1.000*

We expect in-kind contributions from scaling partners such as Arifu (who runs a social enterprise), Viamo, and One Acre Fund

- RAB: 35% - To facilitate ~1,500 farmer promoters, training, and implementing M & E on the surveillance system;
- MangoTree: 8% allocation to cover staff costs, develop training materials, logistics, etc.;
- Viamo: 7% to cover cost of dissemination platform solutions (including staff costs);
- Arifu: 5% allocation to cover broader dissemination of decision-support contents (staff costs, travels, and meetings);
- IAMO: 5% allocation to cover PhD completion of RAB staff, travels, & staff time for lean SNA analytics to support development of scaling strategy;
- Bioversity: 10% allocation to cover staff time for strategic implementation of citizen science, and scenario assessment for scaling pathways;
- IITA: 35% allocation for staff time, operational costs, coordination (including meetings), travels, and geospatial analytics for BXW incidence modeling with RAB, etc.