

Progress Report

BMZ Project Funding

General Information

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Closing date	End of February per year
Reporting period	The previous calendar year
Submit by e-mail to	beaf@giz.de

Notes on completing the entry form:

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 reports should not exceed 6 pages. Detailed research reports should be added in the form of annexes.

General direction:

If the period between the last progress report and the final report would be less than 3 months, the last progress report can be omitted.

1. Basic data

The IARC applicant	IITA
Project title	<i>Citizen Science and ICT for advancing the prevention and control of Banana Xanthomonas Wilt (BXW) in East and Central Africa</i>
Funding type, GIZ Project Number and Contract Number	Project Funding, GIZ Project Number: 17.7860.4-001.00 Contract Number: 81219434
Reporting Period	2018
Project Coordinator and Project Scientists	Project Coordinator: Marc Schut, m.schut@cgiar.org , c/o IITA Head Office, Oyo Road PMB 5320 Ibadan, Nigeria; +23408034035282 Staff Member: Julius B. Adewopo, Geospatial Data Scientist, j.adewopo@cgiar.org
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2. Progress Report

<p>State of Project Implementation</p> <p>The ICT4BXW project was officially launched in January 2018, with funding from the German development cooperation (BMZ). The goal of this project is to use citizen science and ICT to develop (cost)-effective and scalable tools for advancing the prevention and control of Banana Xanthomonas Wilt (BXW) in East and Central Africa, with initial focus on Rwanda. The project is centered on two major objectives — (1) to provide up-to-date knowledge on BXW diseases to extension service providers and a decision-support tool to identify labor- and cost-effective BXW control methods and (2) to provide real-time data on BXW spread that supports governments in targeting their BXW prevention efforts in a more cost-effective way. In 2018, project activities were implemented in accordance with the proposed objectively verifiable indicators and sources or means of verification in the Logical Framework Matrix.</p>

1.1 (Status: Completed) We conducted baseline surveys of 698 banana farming households across eight banana-producing districts in Rwanda in July 2018. The sampled farmers represent different socioeconomic, gender, and age groups in the main BXW affected areas of Rwanda. The survey questionnaire was codeveloped, with contributions from project partners and thematic collaborators. The finalized questionnaire was formatted for deployment on mobile-based Open Data Kit (ODK) software through its ODK-Collect application. The ODK is an open-source software for collecting, managing, and using data. The software was deployed on tablet mini-computers and this offered flexibility of collecting data with or without active internet or phone connection. The data is subsequently uploaded into cloud-based server, when internet connection exists. The seamless collection, upload, and access of data was beneficial for rapid checking of data quality and subsequent analyses. The draft report on the baseline survey, which provides initial insights, in relation to gender dynamics, can be accessed [here](#).

Similarly, key informant interviews and an Ultra Rapid Appraisal of Innovation Systems (uRAAIS) workshop were conducted to garner and analyze BXW-related knowledge needs (content) and communication preferences (medium) of extension providers and smallholder farmers of different socioeconomic status, gender, and age groups. The outcomes provided an evidence-based entry point for the participatory technology co-development with the next-users of BXW ICT tool. The detailed report can be accessed [here](#).

1.2 (Status: Ongoing) Project newsletter no. 1 was prepared by IITA, with contribution from partners, to inform project partners, stakeholders, next-users, scaling partners, and broader scientific and development audience about project progress. The newsletter provided insights regarding the broader basis and objectives of the project, with introduction of the project-level staff and their roles. The electronic version which has been shared through various communication platforms can be accessed by following this [link](#).

1.3 (Status: Completed) The first prototype of the ICT-tool for the control and prevention of BXW was developed based on knowledge needs and communication preferences of next- and end-users by following User-Centered Design and participatory development approach. Initially, we conducted a competitive call to engage an ICT Consultant for ICT-tool development. This resulted in the emergence of MangoTree Inc. (an Uganda-based Technology Design Company) as the most qualified and contracted candidate. In collaboration with MangoTree, the first participatory and inclusive technology design (PITD) workshop was planned and organized in Nov. 2018 to map banana farmer typologies and define user-journey for the envisioned BXW surveillance and control tool. During the PITD workshop, farmer promoters (FP) were engaged as “next-users” and “end-user” of the BXW tool. Based on the understanding outcomes of the first PITD, the initial mock-up/prototype of the tool was developed for further testing/evaluation by the next-users. Click to access the draft [wireframes](#) and [mock-up](#) version of the tool.

1.4 (Status: Ongoing) We are proceeding with the development of an advanced prototype of the ICT-tool for the control and prevention of BXW based on knowledge needs and communication preferences of next- and end-users using User Centered Design and participatory development approach. The second PITD workshop was recently concluded and feedback will be consolidated for the development of the advanced prototype of the BXW tool.

1.5 (Completed) Under the leadership of Bioversity International, newsletter no. 2 was prepared and shared to inform project partners, stakeholders, next-users, scaling partners, and the broader scientific and development audience about project progress. The newsletter was shared across various communication platforms and can be accessed [here](#).

2.1. (Ongoing) We initiated the process of building the capacity of next- and end-users (farmer promoters and sector agronomists) on (a) using the ICT-tool and (b) controlling and

preventing BXW. This was done during the second PITD workshop which involve their initial interaction with the mock-up version of the BXW tool and a follow-on training of farmer promoters on the use of smartphones (a critical need identified through baseline survey data analyses). Further capacity building will be scheduled for the 2nd/3rd quarter of 2019. Report of PITD2 can be accessed [here](#).

2.2. (Ongoing) Advanced prototype for BXW control and prevention (version 1.1.) will be updated based on feedback from next- and end-users in the 3rd quarter of 2019.

2.3 (Ongoing) Based on plan of work, IAMO will lead the writing and sharing of project newsletter no. 3 to inform project partners, stakeholders, next-users, scaling partners, and broader scientific and development audience about project progress. This is planned for 2nd-3rd quarter of 2019.

2.4 & 2.5 (Ongoing) The update of the advanced prototype for BXW control and prevention (versions 1.2. & 1.3) based on feedback from next- and end-users is scheduled for months 24 & 30.

2.6 (Ongoing) The writing and sharing of project of newsletter no. 4 is scheduled for month 30. This will be the final newsletter to inform project partners, stakeholders, next-users, scaling partners and broader scientific and development audience about project progress.

3.1 (Ongoing) Plans are underway to develop a theoretical model of the early warning system for mapping and preventing BXW spread in Rwanda. This will be embedded in the BXW app.

3.2 (Ongoing) Plans are underway to develop the first prototype model of an early warning system for mapping and preventing BXW spread. This will be embedded in BXW app.

3.3 (Status: Ongoing) Plans are underway to develop the first operational model of an early warning system for mapping and preventing BXW spread. This will be embedded in BXW app.

3.4 (Ongoing) We have made progress towards developing and testing an early warning system operated in the local context by next- and end users (government officials).

4.1 (Completed) Initial work was completed by IAMO to establish an inventory of existing collaboration and knowledge networks for BXW control and BXW prevention (baseline) based on SNA. Submitted report can be accessed [here](#).

4.2 (Completed) We organized a partner planning of work and budget (POWB) meeting for the year 2018 (in conjunction with the annual project meeting) to clarify expectations and address challenges. The detailed report can be accessed [here](#).

4.3 (Completed): A partner planning of work and budget (POWB) meeting for the year 2019 was organized to identify the next steps in project implementation and align priorities. Report can be accessed [here](#).

4.4 (Ongoing) The inventory of changing collaboration and knowledge networks for BXW control and BXW prevention will be conducted later in 2019 (midline 1).

4.5 (Ongoing) Plans are underway to organize a partner planning of work and budget (POWB) meeting for the year 2020.

4.6 (Ongoing) Plans are underway to determine and assess changing collaboration and knowledge networks for BXW control and BXW prevention (baseline) based on SNA.

4.7 (Ongoing) Plans are underway to determine and assess changing collaboration and knowledge networks for BXW control and BXW prevention (baseline) based on SNA.

4.8 (Ongoing) Plans are underway to organize a high-level policy engagement meeting to mobilize governments of neighboring countries for joint action of BXW prevention and control.

5.1 (Ongoing) A research paper is being developed for publishing on BXW-related knowledge needs (content) and communication preferences (medium) of various banana system actors.

- 5.2 (Ongoing)** Plans are underway to develop and publish a research paper on the prerequisites for extension providers and smallholder farmers to translate newly acquired knowledge into actionable, impactful, and scalable BXW control.
- 5.3 (Ongoing)** Plans are underway to develop and publish a research paper on the theoretical model for early warning of BXW in Rwanda.
- 5.4 (Ongoing)** Plans underway to develop and publish a research paper on the potential of citizen science and GIS in contributing to early warning systems to prevent the spread and impact of BXW.
- 5.5 (Completed)** A research paper was developed and published on the impact of ICT-tools on collaboration and knowledge exchange networks for pest and disease management. Paper can be accessed [here](#).
- 5.6 (Completed)** Develop and publish a paper addressing the question about how citizen science and ICT provided an evidence-base for effective and scalable BXW control and prevention in East and Central Africa.
- 6.1 (Completed)** An operational management system and MEL plan for project implementation and delivery was developed on the CGIAR MEL system and activities are currently being reported through the system.
- 6.2 (Completed)** In Oct 2018, we organized and held the 1st Project progress meeting with key science and implementation partners in Leuven, Belgium to review and update the project's impact pathway. The detailed report can be accessed [here](#)
- 6.3 (Ongoing)** Plans are underway to organize the 2nd Project progress meeting with key science and implementation partners to review and update the project's impact pathway.
- 6.4 (Ongoing)** Plans are underway within IITA financial directorate to conduct internal financial and technical audit, when due, for the project.
- 6.5 (Ongoing)** Plans are underway to organize the 3rd Project progress meeting with key science and implementation partners to review and update the project's impact pathway.
- 6.6 (Completed)** In lieu of the proposed project website, we created a dedicated platform on Research Gate to provide access to all project information, blogpost and the project progress (<https://tinyurl.com/y8xchxsa>). Also, we disseminated the project information through CIALCA webpage which was set-up to provide a broader platform for regional initiatives in East & Central Africa (www.cialca.org).
- 6.7 (Ongoing)** Plans are underway to write and share project newsletter no. 5 to inform project partners, stakeholders, next-users, scaling partners and broader scientific and development audience about project progress.
- 6.8 (Ongoing)** At the due time (month 33), we will produce and share end-of-project report for BMZ on project achievement and recommendations.

General Achievements and Problems encountered

Achievements: During the first year of our project implementation, we learned about needs, gaps, and opportunities for innovation among Rwanda banana farmers through shared experiences with our partners and insights from our rich dataset(s). Our major achievements can be summarized in four categories:

- i. **Implementation of two-tiered robust baseline survey:** Considering the knowledge deficit about BXW in Rwanda, we successfully implemented a robust survey of ~700 banana farming households. The survey encompassed various aspects of banana production system, ICT penetration and preferences, and socioeconomic characteristics of each household (~600 variables in total; see dataset [here](#)). Beyond the initially proposed plan, we deployed another baseline survey to assess the status and competencies of 138 farmer promoters who support farmers at the village level within our focal districts (see

dataset here). These datasets proved to be very valuable for identifying potential opportunities and extant challenges for our tool development plan.

- ii. **Implementing activities with data-driven insights:** Using insights from initial analyses of our rich baseline datasets, we have successfully aligned our activities with the contextual realities within Rwanda’s banana production system. For instance, by analyzing the add-on baseline survey data on farmer promoters, we discovered that two out of five farmer promoters have poor or no expertise on BXW, so this guided us in prioritizing visual-based diagnostic guide as a major element of the envisioned BXW App. Similarly, data show that only two out of 100 farmer promoters have smartphones, so we conducted ad-hoc training on basic smartphone use skills for a selection of farmer promoters who will be conducting the initial field validation of the BXW tool. Generally, the insights from our data are also very useful to support the work of collaborators/stakeholders in the private and public sectors, such as Viamo, which used our data on phone usage (male vs female) to guide their strategic planning of a new project (focused on priority crops in Rwanda).
- iii. **User-centered participatory BXW Tool Design:** Our innovation for BXW surveillance and control has been user-centered and user-driven. Within the first year, we successfully implemented a rapid appraisal of agricultural innovation systems with major stakeholders connected to the banana value chain in Rwanda, and engaged the next-users of our tool in two sequentially organized workshops for participatory and inclusive design (PITD) of the BXW surveillance tool. These major activities have moved us closer to the co-development of a fully functioning tool that builds on users-contextual realities and reflects user preferences.
- iv. **Targeted Communication:** Within the first year, we published two newsletters and a peer-reviewed article. Further, on demand from 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. This will aid in effective communication to policy makers and stakeholders either to promote BXW tool adoption or to foster policy shift regarding control methods of BXW such as the “Single Diseased Stem Removal (SDSR)” which we are currently piloting in Rwanda through field demonstration trials, led by Bioversity.

Major Limitations: The major limitations encountered are related to the initial delay in recruiting staff for key positions. Also, the non-alignment of RAB’s annual budgeting cycle with the onset of the project resulted in delayed access of funds by RAB collaborators to implement field work. We created adaptive solutions to ensure that these challenges do not impede timely delivery of goals.

IDO Contribution

Survey: ~700 banana farmers; 138 farmer promoters
Workshop: 30 sector agronomists + farmer promoters
Focused Group Discussion: 10 key officials in RAB

Conclusions for the following Reporting Period

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. Also, we are keen to innovate as we progress and we increasingly see needs to strengthen capacity of next-users for tool usage and support RAB (as the tool host) for tool adoption and sustainability, beyond the project lifespan. In addition, considering our need to validate

tool usage with a wider number of next-users/end-users, we have initiated discussion with One Acre Fund in Rwanda for testing of the BXW tool through their network of ~300,000 farmers/900 farmer promoters. Based on ongoing discussion, future needs may include the add-on of functionality or creating alternative modules on our tool for other crops/diseases.

Publications, Papers and Reports

1. **Paper:** Xanthomonas Wilt of Banana (BXW) in Central Africa: Opportunities, challenges, and pathways for citizen science and ICT-based control and prevention strategies.
2. **Report:** Report on Rapid Appraisal of Agricultural Innovation Systems (RAAIS) workshop.
3. **Report:** Report on the baseline survey of banana farmers and farmer promoters in Rwanda.
4. **Report:** Report on the first Participatory and Inclusive Technology Design I (PITD-I).
5. **Report:** Report on the second Participatory and Inclusive Technology Design II (PITD-II).
6. **Minute:** Annual project partners meeting and planning of work and budget.
7. **Newsletter:** First Project Newsletter.
8. **Newsletter:** Second Project Newsletter.
9. **Brief:** BXW management in Rwanda: the case for demonstration sites for single diseased stem removal (SDSR).
10. **Report:** Annual Partner Technical Report from RAB.
11. **Report:** Annual Partner Technical Report from IAMO.
12. **Report:** Annual Partner Technical Report from Bioversity.

Most of these have been embedded throughout the document

Summary

The main results within the past year are briefly explained in the achievements section and in the reports that we have prepared for baseline survey (see link/attachment). So far, we have 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 has informed our strategic approach for tool development and ongoing plans for validation and scaling with partners.

Also, we are linking with regional initiatives, such as the CIALCA project, to leverage on cross-project learning and collaborative opportunities for tool development, advocacy, and implementation for field-related activities. Based on mutual interests in understanding and advancing opportunities for impact among farmers in the region, we expect further expansion of such cross-learning experience in the second year of the project.

